DUNDEE TEXTILE INDUSTRY

1790–1885

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The Dundee Textile Industry

PETER CARMICHAEL OF ARTHURSTONE

1809–1891

The Dundee Textile Industry 1790–1885

FROM THE PAPERS OF PETER CARMICHAEL OF ARTHURSTONE

edited by Enid Gauldie B.PHIL.

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PREFACE

It was at the suggestion of Mr David Walker that I first visited Arthurstone in the hope that letters or drawings of Peter Carmichael might have been preserved there. I am grateful to the present owner of Arthurstone, Major Peter Carmichael, for allowing me to read and select for publication the papers left by his great-great-uncle, and for his patience, kindness and helpfulness to me during my work. I must also acknowledge the help I have received from the firm of Baxter Brothers and Company and from the staffs of Dundee University Library and Dundee Public Libraries. The discovery of the manuscript and the editorial work upon it have arisen from the activities of the regional research group working within the department of modern History of the university of Dundee.

E. G.

Dundee
February, 1969

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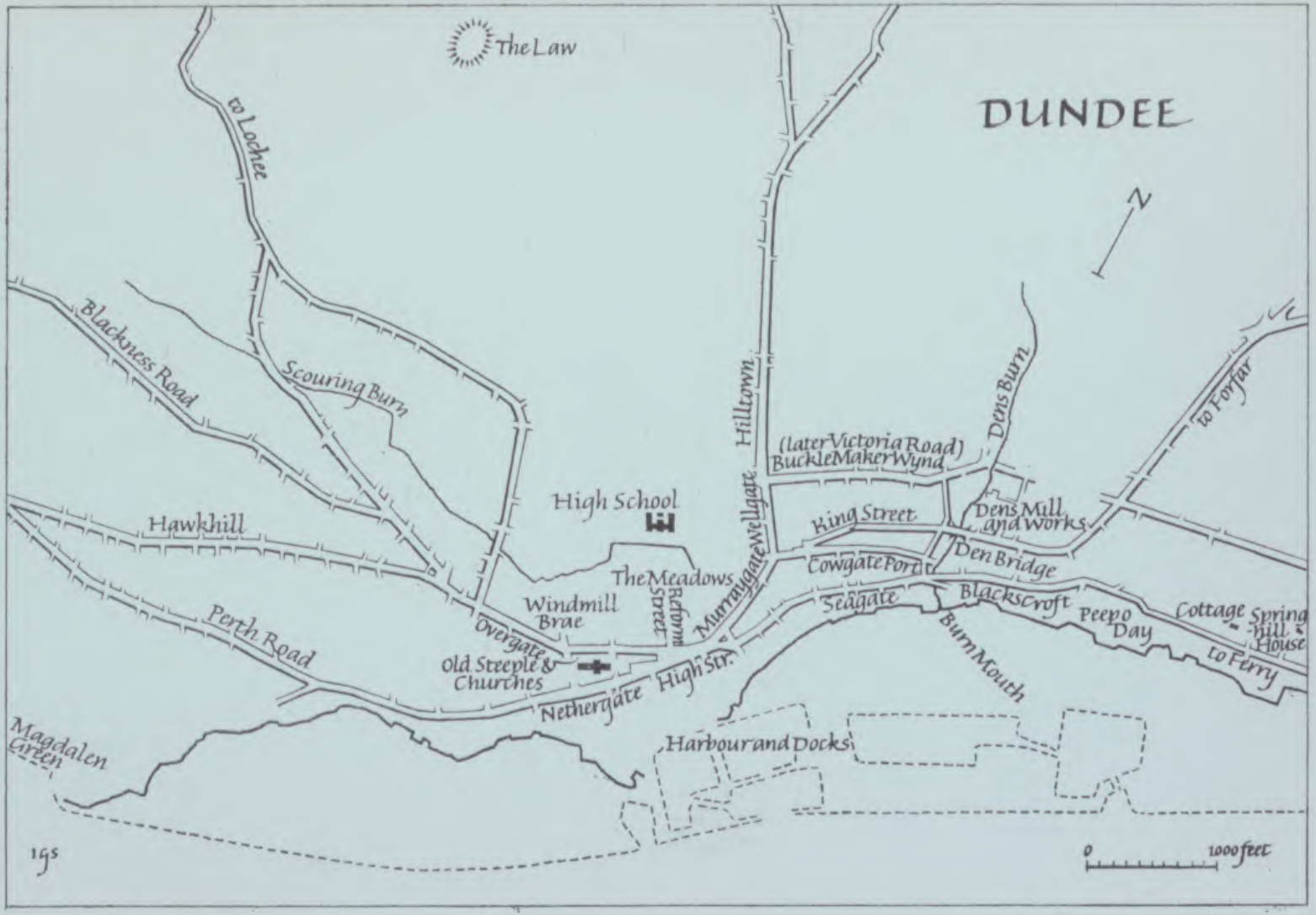
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The Meadows
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to Forfar
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Introduction

THE PAPERS presented in this volume reveal the life of a Victorian textile engineer and the history of the firm which he came to lead. Peter Carmichael was born in 1809, the son of James Carmichael, then manager of a flax mill at Kirkland in Fife. The family had been originally small farmers in Speyside, driven away from the land and into industry by dearth. After his father had settled in Dundee as tenant of a small flax mill in Lower Dens, Peter was educated at Dundee Grammar School and on leaving school served an apprenticeship at the nearby Monifieth Foundry, learning there the making of textile machinery. He worked as an engineer in London and Leeds, but in 1833 returned to Dundee, where he was soon offered the post of mill manager for the firm of Baxters, with whom he remained for the rest of his life. The Baxter family had had interests in flax since the early eighteenth century, but by 1833 had established their business as mill-spinners, merchants and manufacturers as one of the foremost in the trade. Carmichael applied to the business his considerable abilities as a manager of men and an inventor of machines. Baxters soon recognised his worth to them, making him manager over all the mills shortly after his first appointment, and a partner in 1852. The firm prospered increasingly and by the 1880s had become the largest flax firm in the world. From 1872 Carmichael was its senior partner. In 1869 he followed the example of other prosperous businessmen, the success of whose activities had diminished the amenity of their home towns, by purchasing a country estate: the lands of Arthurstone, near Meigle, in Perthshire. In his later years he spent more and more time in the country but continued to take an active interest in Baxter Brothers until his death in 1891. His remarkable advance up the social scale had been matched by his increasing wealth, and he left at his death a fortune of £516,000.[1]

[1] *Calendar of Confirmations and Inventories . . . Scotland, 1891* (Edinburgh, 1892), p. 135.

The first part of these papers is a series of autobiographical reminiscences written by Peter Carmichael himself in his old age. In these he relates his own story against the background of the linen industry, particularly as it affected his family and himself in Dundee. This autobiography, written in a simple and effective style, unfortunately breaks off in 1842.

The character of Peter Carmichael, as revealed through his own writing and particularly in his letters, contrasts pleasantly with the traditionally accepted picture of the ruthless, hypocritical Victorian textile man. He was a warm and affectionate man, although always reserved with those not close to him. He was saved from pompousness or intolerance by a cast of mind which found humour in most situations. His wide reading gave him a pleasant literary style. He was a devotedly religious man, both in his observance of Christian duties and in his private thoughts, but his family life was not conducted with Calvinistic severity. The reminiscent delight with which he recounts in an early chapter a dance in the kitchen at his home, and the hilarity which met the fiddlers' fall into the box-bed,[1] shows a man who never despised entertainment and fun even when his own days were rigorously bound by the needs of his work. This narrative betrays clearly the increasing perplexity with which Victorians of conscience and humanity faced a world in which their business interests seemed to conflict more and more uncomfortably with the needs of the people employed by them.

After 1842 the papers continue in the form of a biography with letters, gathered together by Alexander Monfries, tutor to Carmichael's children. Because the narrative linking Carmichael's letters after 1842 was written by this tutor, socially and financially dependent upon him, its tone is of uncritical adulation, untempered by the kind of humour which Carmichael himself would have shown or by disinterested appreciation of his importance. This makes it all the more necessary to place the subject of this memoir in his context and to consider the effect he had upon the firm of which he became head, the position of that firm in the town of Dundee and the place of the town in the linen trade of Britain.

The period which Carmichael served in Dundee saw a complete change not only in the importance of the flax industry but also in

[1] See below, p. 83.

the extent of the influence which could be exerted by any individual upon that industry. After the mid-nineteenth century there can have been few spheres of life in which ability counted for less than in jute and flax. In the 1850s and 1860s profits bore hardly any relation to ability or efficiency. At the height of the boom any man who could buy or rent a tumbledown mill could make a fortune. After the boom, shrinking markets and wildly fluctuating costs produced a situation in which entrepreneurial skills could have little effect on the downward trend of the industry. It was, therefore, of importance that Peter Carmichael's return to Dundee in 1833, after his training and experience in London and Leeds, coincided with what may have been the only occasion during the nineteenth century when his kind of ability could have made a lasting impression on the industry. This was the period before flax processes had been successfully mechanised. Dundee had still to reckon with Aberdeen as a serious competitor in the linen trade and had not yet caught up with Leeds. Yet by 1870 Dundee was the most important producer of coarse linens in Britain.

Various factors had influenced that change of situation. One of these was the establishment by Baxters, under Carmichael's direction, of the first successful power-weaving factory. But, while this innovation was undoubtedly of importance in speeding production and regulating quality, it was not the only influence on development. The importance of mechanisation must be considered alongside the impact which the trade felt from the establishment of the railway system around Dundee and the consequent expansion of markets. A Mexican tariff reduction in 1842 created openings for coarse linens at a time when the capturing of the government contract for duck canvas by Richards and Company of Aberdeen might have left Baxters without an outlet for their increased production. Two great wars brought orders for exactly the kind of product Baxters was geared to produce: tents for the armies in the Crimea, sails for the supply ships, gun-covers and biscuit bagging for the forces of the North in the American Civil War. Carmichael's careful control of cost and quality and his streamlining of production processes helped Baxters to take advantage of this kind of opportunity; but they could not create it. Similarly during the 1870s, when the world recession in trade set in, the greater efficiency of Baxters helped the firm to

escape the worst of its effects, and the credit for that greater efficiency was Carmichael's; but no amount of skill or foreknowledge could prevent the drastic falling away of demand. Carmichael's inventive talent and managerial ability, and to some extent his uncompromising character, did influence the trade during the years of greatest increase and may have helped to mitigate the less desirable effects of so rapid a development.

Contemporaries were in no doubt at all about the contribution made by Carmichael to textile engineering. He was described in 1891 as '*the* great motive power in the development of textile manufacturing in Dundee'.[1]

The inventions themselves are described in some detail in the text. That they were of real importance can be judged by these facts: they remained in use throughout the nineteenth century, their usefulness was recognised outside Dundee sufficiently to bring in a most comfortable income from patent rights, and, most telling of all, the family firm of Baxters found it worthwhile to secure the services and loyalty of their inventor by offering him, first, management of all their mills at the age of twenty-four, and then partnership, hitherto open only to the family.

When Peter Carmichael joined the firm in 1833 the brothers in charge were William, John and David. The firm of William Baxter and Son had been changed to Baxter Brothers and Company in 1831 to admit John and William after their elder brother Edward left to start his own export business. David joined them shortly afterwards on the failure of the Sugarhouse of which he was manager. Their father, William Baxter of Ellengowan and Balgavies, then semi-retired, was known as the founder of the firm, but in fact the Baxter linen business had originated much earlier.

The John Baxter who first came to Dundee about 1725 was a handloom weaver from the nearby village of Tealing. He left home as a follower of John Glas, a minister of the Church of Scotland who had been expelled by the General Assembly for heresy and who became the founder of a strong and popular religious sect later known as the Glassites. Glas moved first to Perth and later to Dundee, where the pleasant octagonal building still known as the Glassite Kirk, but now occupied as a furniture warehouse, was built in 1777.

[1] *Jute and Flax Machinery Advertiser*, 1891.

This religious connection proved to be a useful business connection for the Baxters in their early days, for among Glassites in Dundee were Alexander Morison of Douglasfield, one of the biggest bleachers and spinners of the late eighteenth century, Hector Turnbull, a grandson of the preacher, who founded the important bleaching firm of Turnbull and Company at Claverhouse, near Dundee, and William Sandeman, whose father was William Sandeman of Luncarty, founder of the biggest of all bleaching and linen-dealing firms in Scotland in the eighteenth century.[1]

The second John Baxter was born in 1700. His son, another John, born about 1740, brought the family a little higher up the social scale. He was admitted a burgess of Dundee in 1777. This admission dates with some nicety the beginning of the Baxter family's climb towards rank. When the first Dundee Banking Company was founded in 1763 by George Dempster and a group of Dundee merchants, John Baxter was not one of them, nor does his name appear as a client of the bank until 1787, when John Baxter and Son, manufacturers, opened an account for £500. William Baxter obtained a cash account for £300 in the same year. When the next Dundee banking venture, the Dundee Commercial Bank, began in 1792, John Baxter was one of the original partners. He was also a partner in its successor, the Dundee New Bank, founded in 1802.[2] He was by then in need of banking facilities to cover his growing business in linen dealing and manufacturing.

Between 1763 and 1792, the dates of these two banks, the chances of making a fortune in east central Scotland had improved. Although cotton displaced linen in the west it made no inroads into the markets filled by coarse linens. Sandeman's 'scale and directions for soldiers' sarking' (coarse linen shirts for the army) was followed with great success throughout Fife, Forfarshire and Perthshire,[3] and loosely-woven linen clothing for the negroes in the American plantations was another fast-selling product. In Dundee and Arbroath sail-canvas weaving became important and profitable. Linen production in Scotland rose from £835,081 in value in 1784-5 to £1,047,598

[1] John Glas Sandeman, *The Sandeman Genealogy* (revised edn., Edinburgh, 1950), pp. 100-3.

[2] Charles W. Boase, *A century of banking in Dundee* (Edinburgh, 1867), pp. 173, 225.

[3] Scottish Record Office, Edinburgh [hereafter SRO], Minutes of Board of Trustees for Manufactures (NG 1/1), vol. 17, p. 165 (22 Jan. 1762).

in 1799–1800, as the Board of Trustees for the Improvement of Manufactures reported. The increase was 'all upon the coarse', and the coarse linen manufacture was centred on Dundee as the most convenient commercial centre.[1] The name of Baxter appears with increasing regularity in the records of the Trustees between 1770 and 1820, almost always the cause of some displeasure. That in itself is a measure of increasing stature. The Trustees were apt at this period to distrust the most rapidly rising linen dealers, especially when at the beginning of the nineteenth century those dealers turned to mill spinning.

This change in activities is explained by the greater profits available in mill spinning than in dealing in manufactured goods. Prices advanced more rapidly between raw flax and spun yarn and with a smaller outlay than at any other stage of the linen manufacture. It was possible, then, in the fairly short spell between the upsurge in demand for linens from about 1760 until the establishment of machine flax spinning as a successful enterprise about 1824, for men like the Baxters to accumulate a large sum of money without a large original outlay. The flax could be bought on credit and farmed out over a large area to cottage spinners whose payment made only small inroads on the profit gained from the sale of spun yarns. Where the yarns were used by weavers in Baxters' employ, it was even more beneficial to limit the cost. The increase in the value of Dundee's production and, more vitally, in the relative importance of Dundee's place in the linen trade, gave those manufacturers and dealers concerned with the trade a greater confidence in dealing with authority. It was as leaders of a rebellious group of linen men determined to shake off the limiting parental care of the Board of Trustees that the Baxter family first emerged as a powerful influence in Dundee.

The supply of sail-cloth to the Navy during the Napoleonic wars gave Baxters their first real lift into prosperity. They were at that time employers of domestic handloom weavers with an office but without a mill or manufactory in the town. In their successful attempt to capture government orders by low-cost tendering for contracts, Baxters had used unconventional materials not consistent with

[1] SRO, Report of Board of Trustees for Manufactures (NG 1/7), vol. 8 (25 Dec. 1784–16 July 1801).

the Trustees' idea of quality. David Blair, stampmaster and inspector of yarns in Dundee, insisted that sail-canvas should be subject to the same regulations and control of quality as other linens, using the very reasonable argument that men's lives depended on the strength of sail.[1] Baxters had emerged from the infant stage where they needed the guidance of the Trustees' officials and could now afford to resent the stampmaster's fees and to thwart his interference. They treated with arrogance attempts to restrict their actions and still succeeded in maintaining their government contracts. Ships carrying Baxters' sail-canvas were in Nelson's line of battle at Trafalgar. The canvas was supplied by Baxters to a famous firm of sailmakers, Haywards of Crewkerne, who made it up into sail for the Navy.

Progress produced a new mill and a new outlet for the firm's products. In 1806 Baxters built a water-powered spinning mill at Glamis, which was one of the earliest in the district and certainly the longest lived of the early mills. Those begun before the turn of the century had not been successful.[2] An even more important step was taken in 1813 when John Baxter the third, known as John Baxter of Idvies, established an export business complementary to the family's manufacturing business. The Scottish linen industry had traditionally carried a heavy burden of middlemen. Baxters had great success because they eliminated all middlemen, so that the profits taken at each step could be theirs. The first step in the process of elimination was the founding of this exporting firm with its own agents in New York. Edward Baxter, John of Idvies' nephew, left the family firm in 1830 to concentrate entirely on this side of the business, and became American Consul in Dundee. This direct dealing not only prevented a large share of the profit going to factors in Liverpool and London but also speeded deliveries and sales and gave a greater measure of control to the manufacturer.

In 1814 a movement was begun to acquire for the merchants of Dundee the dignity and protection of a Chamber of Commerce. However, 'no set of men in the world look after their private interests with more anxiety and perseverance than the Merchants of Dundee, but few have ever shown so little concern in promoting the

[1] SRO, Minutes of Board of Trustees for Manufactures (NG 1/1), vol. 28, p. 118 (6 June 1792), vol. 34, p. 111 (15 June 1819).
[2] Glamis Mill was sold by Baxters in 1854.

general interest'; and it was not until 1819 that the first Forfarshire Chamber of Commerce was formed, thirty-six years after that of Glasgow.[1] The spur towards its formation came from the common wish of the Dundee linen men to have their cake and eat it, to be rid of the system of stamping, inspection and controls but to maintain the bounties on coarse linens exported and the duties on foreign linens imported. The first chairman was John Baxter of Idvies, and his appointment was a measure of the respect in which he was now held in the town by virtue of the family's wealth and position.

Dundee's importance as the centre of the commercial and business life of east central Scotland was now unchallenged. While in many ways still a country town, a series of mill villages clinging to three meagre water-courses, the town provided a convenient port, and the skill of its entrepreneurs made it the obvious focus for industrial activity in spite of a poor water supply. This defect made the town a less suitable site for the establishment of industries based on water-power than, for instance, Blairgowrie, Perth or Brechin. The Baxters were not alone in siting their first spinning mill at some distance from the town. James Ivory, the Dundee mathematician, in partnership with William Douglas of Brigton, had begun the very first powered flax mill for coarse yarns in Scotland at Kinnettles, near Forfar, although that meant heavy expenses for carriage of the products to Dundee harbour. James Brown of Cononsyth had operated mills at Trottick, Friockheim and Arrat before building West Ward Mill in 1806. Archibald Neilson, a Dundee merchant, had chosen Kirkland in Fife as the site of his large spinning mill begun in 1790. In every case the need for water-power had driven firms whose business activities were centred on Dundee to look outside the town for sites for their production departments.

As the possibilities of steam-power for flax began to be appreciated and the engineering industry of the town developed, so the need to be in touch with market and shipping interests and to be within reach of incoming cargoes of flax made it essential, even for those firms successfully based outside the city, to establish mills within it. Because the Baxters' first fortune was made by their commercial activities and because the profits from the mill at Glamis were an un-

[1] *Dundee, Perth and Cupar Advertiser* [hereafter *Advertiser*], 14 Jan. 1814, 26 Mar., 2 and 9 Apr. 1819.

important part of their income, they were able to delay building of a mill in Dundee until the teething troubles of flax spinning by power were almost over. By that time their own funds were sufficient to allow them to establish a well-planned and well-stocked concern.

Any earlier venture in mill-building in Dundee would have gained them little. It had not been possible in the early unmechanised days of the industry to vary production costs to any great extent. The first prerequisite of profit-making was the ability to judge raw flax. Speculation in raw materials affected profits much more than the cost of any intermediate process. It was therefore unwise to invest too early in the mechanisation of industrial processes.

The Baxters' fortune was based in the first place on commercial ability. Profits made by them in flax were invested not only in buildings and machinery for the development of the business but also in shipping, railways and other subsidiary industries. An interesting example of this is William Baxter's investment in 1838 of £2,000 in the bleaching firm of Turnbull and Company, later Boase and Company, at Claverhouse, near Dundee. Hector Turnbull, his son John, and Henry Samuel Boase, MD, manager and chemist, had salaries of £100 each yearly plus 5 per cent of the gross profits. William Baxter drew no salary but six-twentieths of the net profits. Hector Turnbull and Boase had six-twentieths of the net profits and John Turnbull two-twentieths. Baxter's original £2,000 earned interest at 5 per cent, which he left in the firm with most of his share of the profits. In 1854, when his private account with the firm was closed and his share transferred to David Baxter, his son, the balance in the account was just over £10,000. His son, later Sir David, drew interest on this sum and a proportion of the profits from the firm each year, the interest being just over £500 and his share of the profits rising from £795 in 1861 to £2,231 in 1871. By 1890 Baxters thus held, to the chagrin of Henry Boase's descendants, a controlling interest in this bleaching firm.[1]

Baxters made money from a number of different enterprises, and various properties of possible future value were bought to the firm's profit. The early retirement of William Drummond, a friend of Peter Carmichael's father, was made possible by the sale of his mill

[1] Records of Claverhouse Bleachfield (*penes* Enid Gauldie), Ledger A.

at Balgonie, Fife, to the firm of Baxter and Stewart. The heavy yarns from this mill at Balgonie were used in the canvas weaving department at Dundee and the fine yarns exported to France. When new French duties in the 1840s cut imports of British yarns, Baxters made arrangements to go into production in France itself, at Ailly-sur-Somme, in Picardy. James Carmichael, Peter's father, was eased out of the Lower Dens to make way for Baxter's expansion. Shipping interests not only lowered Baxters' own transport costs but also brought in a steady income. Baxters were shareholders in the Dundee, Perth and London Shipping Company from 1826. Shares in the Dundee and Arbroath Railway brought John, William and David £348 each yearly.[1]

The Baxters were, then, already men of considerable wealth before they became owners of industrial property on anything but a very small scale. Peter Carmichael cannot be said to have created the success of the Baxter family for them. When he came to work for them in 1833 he came as an inferior, without money of his own, knowledge of the commercial world or social standing to recommend him. But the very abilities which had given the Baxters good fortune until the 1830s enabled them to see that the linen trade now faced a new situation, which could not be met with the old commercial skills, and which needed a new kind of brain and a new kind of training. William Baxter's sons could not respond to the challenge. Edward now had his own business, David's experience had been in sugar refining, William and John had only recently joined the business in 1825, and neither was of robust health. Edward was the only one of the brothers to have children. His son, William Edward, was not born until 1825 and spent his life not in business but in politics: he was MP for Montrose burghs from 1855 to 1880. The new need for an engineer could not be filled from within the family.

The new textile machinery, all of it still in the experimental stage, needed constant adaptation and endless, painstaking repairs if it were to produce yarn of quality consistent enough to satisfy customers used to hand-spun flax. It is necessary to emphasise that the successful mechanisation of flax-spinning took place almost four decades after cotton-spinning by power had become established. Although mills

[1] Baxter Brothers Records, Ledger P2.

had been built and operated before the end of the eighteenth century they had had only doubtful success. William Brown, of East Mill, Dundee, gave a clear description of the deficiencies a decade later in his *Reminiscences of flax-spinning* (Dundee, 1862). Hand-spinners of flax had been accustomed to moisten their flax as they worked, to keep it flexible. One minister worried about the effect on their health: 'The waste of saliva in wetting the thread must deprive the stomach of a substance essential to its operations, whence all the fatal consequences of crudities and indigestion may be expected'.[1] Without this moistening the brittle flax fibres were subject to frequent snapping, with a consequent breakdown of machinery. It was not until the 1820s that James Kay's introduction of the process of wet spinning eliminated this difficulty and made possible the efficient mill-spinning of flax. Even then the machinery was far from perfect.

Millwrights used to working with wooden water-wheels and wooden going parts had to be turned into mechanics able to use metal parts and machinery subjected to the greater strain of steam power. To achieve this change they needed the training of a skilled engineer. The operatives on the mill floor, most of them unused to regular hours and disciplined work, and all of them ignorant of the needs of machines, had to be taught to nurse their spinning frames under the supervision of someone who understood their problems and knew how to get the most out of them. Above all, the unsophisticated design of early textile machinery left room for constant inventiveness and constant creative changes. The most productive mill, turning out the greatest quantity of well-spun yarn, was likely to be the one employing an engineer with the ability to improve the machinery a little ahead of competitors.

In running a power-weaving factory Carmichael could draw even less upon the experience of others. The first firm in Britain to succeed in weaving linen by power, in 1813, was Charles Turner and Company, the Limehouse firm at which Carmichael's father worked between 1812 and 1816; but its power looms were given up in 1833. William Baxter had attempted power-loom weaving in Dundee in 1828, but with such lack of success that he abandoned the attempt. The machinery was so far from perfect that it was impossible to

[1] *Old Statistical Account of Scotland* (1791–9), ii, 283 (Kirkintilloch); see also xvi, 96 (Forgan).

make a profit. William Maberley, when giving evidence to the House of Commons in 1825 on the future of machinery in the linen trade, was asked 'What was the object of your experiments?', and answered 'Profit, of course!'[1] But he was out of business a few years later, and his Aberdeen weavers were seeking work in Dundee.

Power-loom weaving of linen could only be made profitable at that period by the consistently applied ingenuity of someone like Peter Carmichael. His first and perhaps most important contribution was the successful setting in motion of mill and factory, so that the factory was operating from 1836, some years ahead even of Marshalls of Leeds. In choosing him to fill their need for an engineer-manager, the Baxters ensured fortunes for themselves and their heirs. It is true that in the period before they benefited from his help they had operated with some success. But they had not been alone. A number of other firms took advantage of the huge demand for linens in the first quarter of the century, and more than thirty mills were started in Dundee in the period 1811-35. But only one other firm which was successful in this period survived as an important business in the second half of the century. This was A. and E. Edwards, and it failed in 1872. With Peter Carmichael in charge, Baxters almost alone continued to grow in strength throughout the nineteenth century. The big names of the first half-century in Dundee – Brown, Sandeman, Boyack – had faded before 1850. The big names of the second half – Cox, Gilroy, Grimond, Scott – were small fry in the first. But Baxters' share of the market grew consistently.

It is difficult to assess how the credit for the success of the firm should be divided between Sir David Baxter, William Ogilvy Dalgleish, the other partner, and Peter Carmichael. David Baxter, 'chief of the merchant princes of Dundee',[2] seems to have been honoured in his town during his lifetime more for his great wealth than for his ability. His knighthood was awarded on the occasion of his donating a large sum of money towards the opening of Baxter Park.[3] It is certain that a great deal of his time was spent outside Dundee and that much of his time at home was spent in public

[1] *Advertiser*, 29 Sept. 1825, Report of proceedings in House of Commons. Maberley was Postmaster General and the son of John Maberley, linen manufacturer in Aberdeen.
[2] A. J. Warden, *Linen Trade, ancient and modern* (London, 1867), p. 622.
[3] See illustration below, p. 96.

affairs. He was, for instance, active in the Anti-Corn Law League and he was president of the Dundee Chamber of Commerce from 1846 to 1847 and again from 1855 to 1856. His chief value may have been as a figurehead, representing the firm and the trade on public occasions, at county dinners, political meetings, and on the Gas, Water and Harbour Boards.[1] Probably the most important contribution made by David Baxter to his family firm was his suggestion that Peter Carmichael, hitherto mill-manager, should be made a partner. Carmichael's appointment allowed the firm of Baxters to avoid the consequences of the diversion of their family interests into public affairs. Baxters were by mid-century without the inspired leadership which had brought them so far.

William Ogilvy Dalgleish (1832–1913), the other partner, married the daughter of Eliza Baxter and Francis Molison.[2] The partners of the next generation were similarly either descendants of or related by marriage to the Baxter family. Thus Carmichael was alone in being privileged to join the partnership without a family connection. Like Sir David, William Dalgleish became a public figure in the town, and a large part of his time latterly was spent outside it. In 1892 he stood as Conservative candidate for Dundee.[3] He gave generously of his time and money to charity. While he undoubtedly had a certain financial skill, his influence on the firm was less important than Carmichael's.

The exact proportion of the weight of business borne by the working partners is nowhere detailed, but there is a clear account of Carmichael's duties when manager. In 1821 William Baxter, dissatisfied with the conduct and progress of his works, asked advice of William Brown, then the wisest and most experienced of Dundee spinners. He got this answer:

> It is evident that much mischief has arisen from errors fallen into in the erection of this work owing to the employment of unskilful persons in the making, ordering and spacing of machinery. Of about a dozen spinning frames already in your mill there are no

[1] His speeches were not always impressive; see *Advertiser*, 9 Jan. 1857: 'Three Baxters spouted trite observations totally out of place and many of them in bad taste.'

[2] Francis Molison, 1793–1877, began business in Dundee early in the century as an export merchant.

[3] Obituary of Sir William Ogilvy Dalgleish (*Dundee Year Book*, 1913).

less than four different kinds, procured from as many different machine makers, all requiring different methods of treatment in carrying them on, and different sorts of tools to set and repair them with; whereas there should not have been above two kinds at the most in the mill to make the work at all manageable. . . . The evils arising from the deficiency of water and the consequent mistiming of the hands have also no doubt tended considerably to render imperfect the operations of preparing and spinning; but these will likely soon be removed by the completion of the new pond when I would expect some improvement in the making of the yarns *even under the present manager*,[1] as his time will then be less divided and his attention less distracted with vexatious stoppages. . . . The first and most necessary step to be taken at present is to procure a competent head manager for the work. If this were accomplished it would itself be a remedy for most evils. The present manager, however anxious and willing to do well, is obviously unfit; he neither understands the machinery nor can he keep authority up among the hands; he is not personally a mechanic nor can he make calculations on the operations and machinery; both of which are indispensable in the managing of a mill. Any person you may employ as a manager should be a regularly bred mechanic, experienced for several years in the management of some known mill in the neighbourhood, and willing to undertake the following duties as his daily business: (1) To provide, engage, and manage all hands for the work. (2) To take charge of all the machinery, to see that the old is kept in a proper state of repair; he is also to take charge of new machinery to be made at the work and to instruct what is to be ordered from machine makers. (3) To take charge of all operations . . . from receiving drest flax into the mill to delivering same in yarns of various sizes from the mill to the warehouses. (4) To provide or buy in all materials required, viz, green oil, whale oil, tallow, hemp, leather, roller cloth, wood for bobbins, rollers and shafts, brushes, baskets, card-covers, wrights' tools, ironmongery, blacksmith and tinsmith articles, cast iron, brass and other foundry. (5) To superintend and direct the wages clerk, personally arranging pay lists, and to deal with complaints. (6) To keep the keys. He should reside at

[1] My italics.

> or near the premises. He is not to be charged with the management of the hecklers, the providing of coals, the making of insurances, weighing of flax or keeping of warehouses.[1]

The letters now printed show that all these remained Carmichael's duties when he was a partner. Dalgleish's concern was with the commercial side of the business, but Carmichael was also involved to some extent in the buying of raw flax and the maintenance of contracts, and he insisted on being given a clear picture of the administration of the whole works on which he could found policy decisions.

The first of these decisions was to maintain and extend the mechanics' shop, although the tendency for engineering to move away from the east of Scotland had by then become well established.[2] This extension could not possibly have been carried out without a skilled and inventive engineer in the firm. As Dundee's main product, coarse textiles, diverged further and further in character from the products of other textile towns, so the difficulty of adapting standard machinery to the use of very cheap coarse raw material made the purchase of machinery more costly and its manufacture within the works more worthwhile. It was Baxters' boast that everything used in the works was made in the works. The extreme example of this was the importing from America of cargoes of raw buffalo hides which were then treated and cut into strips for use as *pickers* on looms. The main purpose of this self-sufficiency was to lower costs. It had one other important effect: it provided steady employment for a large number of male workers, a fact of immeasurably great social importance in a town which, as the century progressed, became more and more a woman's town. In the town as a whole that situation produced poor living conditions, high infant mortality and ineffective trade union organisation. Within Baxters, it was vertical integration, permitting every process to which flax was subjected to be carried on by that one firm, which made possible its great success and its escape from the worst rigours of the recession after 1872. And that stability made possible regularity of employment, wages which

[1] William Brown, 'Essays in flax-spinning and remarks on the management of East Mill, Dundee', pp. 139–40 (Dundee University Library MS.).

[2] The big foundry built by Baxters in 1864 is now Eagle Mill.

were steady if never high, and the reputation that Baxters' workers had for 'respectability'.

The second decision, to remain wholly a flax-producing firm, when everyone else in the town had turned at least part of his production to jute, may have been dictated in part by the natural conservatism of Carmichael, who thought it unwise to hope for too much from the new fabric; but it was certainly influenced also by the need to keep government contracts for canvas. Although some of the goods supplied by Baxters – horse blankets and biscuit bagging, for instance – could reasonably have been made from jute at a lower price, the Admiralty was not renowned for its willingness to accept substitutes. Any slight divergence from exact specifications was severely criticised on receipt at the dockyards, and in some cases the goods were returned.[1] Carmichael concentrated his attention on keeping that very important contract and invented testing devices so that he could guarantee the strength of canvas he supplied. A small amount of jute was used after 1867, because the long peace after the Crimean War and the government's neglect of the Navy within that period, allied to the obviously approaching replacement of sail by steam, brought a severe decline in demand for Navy canvas. Baxters were then forced to try other materials and other markets. The Franco-Prussian War of 1870, which caused the British government to consider the need for rearmament, brought a rise in demand, and there was another peak in canvas production in 1882; but these peaks were temporary. In May 1861 the highest peak was reached: 16,570 yards in that month. The monthly production of canvas for the Royal Navy reached 11,184 yards in April 1882, but never again touched 10,000 yards until 1916. Similarly, United Kingdom exports of sails and sail canvas fell fairly steadily after 1866.[2] Statistics of imports of flax at Dundee show that the period of growth in the industry was a short one. From 21,976 tons in 1848, imports grew to 39,378 tons in 1870 and fell thereafter.[3]

Firms like Baxters accepted the use of some jute partly because the

[1] Six volumes of Baxters' contract books are extant for the period 1898–1916 and show the tenders made to the Admiralty and the comments of inspectors at Royal Victoria Yard on the quality of the goods supplied.

[2] Records of Baxter Brothers, monthly statements of orders on books, 1861–1924.

[3] Statistics in *Dundee Year Books*, 'Reports of local trade', and Dundee Trade Report Association's *Statistics of the linen trade* (Dundee, 1855).

quality of their raw flax supplies deteriorated. In Russia, after the emancipation of the serfs, state intervention in the rural economy of the flax-growing areas had a disastrous effect upon the harvesting, preparation for market and dispatch of their product. For Dundee spinners the gap in quality between Russian flax and Indian jute narrowed when the flax reached them ill-grown and carelessly prepared. The price gap remained wide. They were prepared to pay higher prices for flax, a high quality raw material which they could make into a final product with a higher selling price. When the raw flax deteriorated, the price their product could fetch in the markets was lowered, and they were forced to consider the use of jute, a cheaper, lower quality material. Bad flax meant that machinery had to be constantly adapted to accept brittle, short-fibred, woody material without constant breakdown. Once those adaptations had been made the switch to jute was uncomplicated.

In these circumstances it was a natural step to introduce some of the cheaper material in an effort to lower costs and perhaps to capture new markets; but jute never became important to Baxters. The outstanding success of the years up to 1870 gave them an almost unassailable position from which to face the depression years. Although orders declined after 1870 there was always enough work to avoid the stoppage of machinery, the closing of mill gates, and the wholesale sacking of workers to which so many Dundee employers were forced during the 1870s. Because so many different departments existed within one firm, it was possible to spread the loss, and shut-down was never necessary, although the firm's books show losses in 1870, 1879 and 1886.[1] Smaller firms could not withstand the almost complete lack of world demand for their products in the last decades of the century. On several occasions Coxs and Baxters were the only firms in the district to remain in full operation. James Cox wrote in 1885: 'Most of the firms are arranging to go on four days a

[1] The loss in 1879 was the only large one in Carmichael's lifetime, and it was compensated for by a very large profit in 1880. After Carmichael's death losses were much more frequent, occurring in 1895, 1902, 1903, 1904 and 1905, and the profits were drastically reduced, except in 1900–1, until 1913. In 1913, in a proposal to capitalise part of the reserves, the firm wrote: 'The capital reserves accumulated out of past profits have so far enabled them to maintain full output' (Draft minutes of directors' meetings). See P. L. Payne, 'The emergence of the large-scale company in Great Britain, 1870–1914', *Economic History Review*, second series, xx (1967), 526.

week and to reduce wages. We are busy and intend moving on as long as we can. Uncle Peter is the same. They have gotten all the Government war orders for cloth.'[1]

The steady extension of the firm involved Carmichael in the planning and design of a large number of buildings, some of which have considerable architectural merit. He was in part responsible for the layout and design of Cox's vast Camperdown works, begun in 1849. For Baxters' Upper Dens Mill, erected in 1850–1, he had the assistance of Randolph Elliott, a Glasgow engineer. Earlier fireproof mills had been built in Scotland: for instance, Houldsworths' of Glasgow in 1802 and, in Dundee, the Bell Mill (1806), the 'Coffin' Mill (1828) and Wallace Craigie (1832). But Upper Dens and Alexanders' of Glasgow were the first effectively fireproof, large-scale mills, and both had some pretensions to elegant design.[2] The wider spans between the columns allowed better spacing of machinery. The Lower Dens mill, built in 1866 to Carmichael's design, is a pleasant example of Victorian mill architecture. Details of its twin-campanile gable are said to have been adapted from the work of Baldassore Longhena, a seventeenth-century Italian architect.[3] The cast-iron work in both mills shows Carmichael's sensitive feeling for the possibilities of the material. His own letter of 1875, in which he wrote 'I have always been rather stingy in buildings',[4] is hardly borne out by the appearance of those buildings for which he was responsible.[5]

The same understanding of workers' problems which had helped him to reconcile Baxters' employees to machine-weaving in the early period helped him to avoid the worst bitterness of the labour disputes which began in Dundee with the agitation for the nine hours' movement from 1871. In the 1830s, when he was himself a paid employee, it was his ability to keep the machines going and the patience with which he explained how to avoid breakdowns which

[1] MS. Letter-book of James Cox, 19 Feb. 1885, in the possession of Miss Margot Cox, Seaton House, Nairn, who kindly allowed me access to James Cox's records. There is a photostat copy of this MS. in Dundee University Library.

[2] Alexanders' Mill (now the Great Eastern Hotel, Duke Street) was built in 1848 by Charles Wilson, who was also the architect for mansion houses built in Dundee for the Baxter family. I am indebted to Mr David Walker for this information.

[3] Private information from Baxter Brothers.

[4] See below, p. 221.

[5] For a view of the Dens Works, see illustration below, p. 2.

made the enforcement of machine work possible. There was certainly considerable opposition within the town to the introduction of power-looms for canvas. But workers on piecework rates, who were not paid for the loss of time during breakdowns, were naturally interested in keeping the machines running. By avoiding loss of wages on account of broken machinery it was possible to gain the co-operation of the workers. By the 1870s Carmichael's own position had become very different. The Baxters were dead, and he was the acknowledged leader of the firm. His style of living, speech and dress proclaimed him to be the employer, distant in needs and understanding from the men who worked for him. Although he never fell into the Victorian habit of calling workers 'hands', he was no longer one of them, and his letters at this time do not show the understanding of social problems revealed in his earlier writing. His paternal government of the firm made it almost impossible for the union organisers to make inroads into Baxters. Requests for the management to meet union delegations were almost always met with a refusal to treat with any but Baxters' own employees.[1] This was of course far from exceptional in the industry. As wages at Baxter Brothers were probably a little higher and certainly steadier than in most other firms it was difficult for union action to be made effective.

Although Carmichael had little sympathy for the workers' wish to improve their condition, he did have real understanding of the everyday problems of their work. Part of the general industrial unrest was a protest by the calenderers in 1872 against their long hours. This gained no jot of concession from him; but he solved it, not, as most employers would have tried to do, from his office, but by 'spending many dinner hours at the lappers' table'.[2] Similarly, on another occasion he met a demand for higher wages by using a mechanical handling device to enable him to dispense with the services of protesters.[3] His own mechanical ability and inventive turn of mind led him to place his hopes for better working conditions in the improvement of machines. For him scientific advance could bring about not only smoother industrial relations but also a better society. It was a point of view hardly acceptable to Victorian textile

[1] *Advertiser*, 17 May 1872, and passim.
[2] See below, p. 211.
[3] See below, p. 185.

workers in the depressed conditions of the 1870s and 1880s. Although his personal, practical approach and his own presence on the shop floor brought a solution to each individual dispute as it arose, these methods made no attempt to solve the overall, longer-term dispute between management and labour.

Carmichael was important to Baxters because, first, he efficiently established the new spinning mill and weaving factory, so far ahead of other firms that Baxters were able to cream the market of important orders before others could effectively rival them. Secondly, his inventions of textile machine improvements brought to himself and his firm not only a steady income but also recognition and respect throughout the linen-producing areas of the world. Through these inventions the firm was able to keep and satisfy by the quality of their products the markets originally captured. Lastly, his grasp of the working of the whole enormous fabric, his very modern approach to costing, his unquestioned honesty in a town and trade where character seldom remained unquestioned, and his benign paternalism, meant that his scientific ability could be usefully deployed for the benefit of his firm.

The place of Baxters as leader of the flax trade in the town was equally important. The firm's very size and fame reflected on the city and helped to build a self-respect, which distance from the capital city and dealing in the coarsest and cheapest of fabrics always endangered. Dependence on low wage, low profit jute was a destroyer of public morale. Baxters' survival and eminence as a flax firm was important simply because it saved the city from total dependence on jute. As in all textile cities, unemployment was a desperate problem in the last quarter of the century. It would have been more serious without Baxters, who even at the worst always avoided dismissing the essential nucleus of their working population, some of whose families worked for the firm for generations. The existence of this body of steadily employed families meant that the buying power of the town did not fall as far as it might have done, small shopkeepers could remain in existence and owners of house property could continue to draw their rents. To this extent Baxter Brothers may have been of more importance to Dundee during the depression years than in the boom; but the firm also had another importance.

The effect of the spending of Baxter legacies within the town was very marked. In 1863 Sir David gave the land and funds for the opening of Baxter Park. Although his legacy of £10,000 to found a college of technical education was so inadequate for its purpose that the foundation had to be postponed until 1887 when funds had accumulated, it at least set on foot a campaign for higher educational facilities in the town. His sister Mary Anne, the last surviving member of the family, who died in 1894, founded University College, Dundee, from a part of the proceeds of her large estate. The ancient university of St Andrews, which lay across the River Tay, unbridged until 1879, had little to offer a fast-growing industrial town in need of technical and scientific education. That need might have been filled by other fortunes, but in fact it was the vast accumulation of profits and investment from Baxter Brothers which did enable education at university level to begin in Dundee. When Sir David died in 1872 he left £1,250,000. His sister left £283,000 and gave away more than twice as much during her lifetime.[1] Fortunes like these imprint themselves upon a town in innumerable ways, some of them visible in stone and lime, some of them immeasurable. Baxters employed at the height of its success 2,000 more people than the next biggest giant in the city, Coxs, which itself employed more than 3,000. In 1871 one-tenth of all those employed in jute, flax and linen in Scotland were employed by Baxters. To the Victorians, creating employment, 'giving work to thousands', was the ultimate good. Nowadays we may feel, as Peter Carmichael did, that more of the wealth should have found its way to those thousands of employees; but that feeling does not alter the impact made upon the development of a city hitherto poor by the growth within it of so enormous a concern.

The year 1815 is the first for which statistics of flax imports into Dundee exist. In this year, which was before Baxters had built their mills and factories in Dundee, the amount of flax imported into Dundee was only 1,221 tons, the United Kingdom figure being 16,294 tons. The late 1820s were disastrous trading years for the whole country, but Dundee recovered from that depression more quickly than other flax towns. By 1834 it had drawn level with Leeds. By 1836, after the establishment of the Dens Works, Dun-

[1] Dundee Public Library, Lamb Collection, 0215 (35), 279 (15), 377 (3, 4), 398.

dee's flax imports had increased to 30,653 tons, that is by almost thirty times, whereas the United Kingdom figure had increased only as far as 76,456 tons, that is by something more than four times. Dundee's share of the total flax importation for the kingdom had increased from about a fourteenth to a little less than half. The year 1836, however, although convenient in showing the effect of Baxters' new factory, is a bad year for comparison, because Dundee's over-production in that year caused over-stocking of American markets and a dangerous withdrawal of demand in subsequent years. But 1845 is a useful year for comparison between Dundee and United Kingdom flax import figures, because it was the year in which jute weaving by power was tentatively begun and jute production could not yet compete with flax. In 1845 Dundee still used more than a third of all the flax imported into the United Kingdom and its own imports had risen twenty times, while the United Kingdom imports had risen only four times.[1]

It is clear, then, that Dundee's share of the flax market grew very quickly in the first half of the nineteenth century. At whose expense was the increase made? Complete lists of flax imports for Aberdeen, Leeds and Belfast do not exist, but it is certain that Aberdeen's share declined. Flax imports there rose between 1834 and 1838 by less than a thousand tons, that is by less than a third.[2] In the same period Dundee's rose by nearly 100,000 tons or one hundred per cent. Dundee's population did not overtake that of Aberdeen, the bigger city throughout the first half of the century, until 1851, but Dundee's flax and linen production grew very much faster. Distance from markets was a major factor in Aberdeen's failure to compete, but at the beginning of the nineteenth century Aberdeen had had certain advantages singularly lacking in Dundee. The university interested itself in the town's industry. Distance from the Baltic supply ports was not greater, natural water supply was better and the hinterland was richer. Nevertheless, Dundee succeeded in leaving Aberdeen far behind as a textile city.

[1] Flax figures are collected from Warden, *Linen Trade*, from 'Reports of local trade' in *Dundee Year Books*, and from Dundee Trade Report Association's *Statistics of the linen trade* (Dundee, 1855).

[2] The figures were, for 1834: 2,679 tons; 1835: 3,451; 1836: 3,350; 1837: 4,014; 1838: 3,460 (*New Statistical Account of Scotland*, 1845, xii, 68). See also in general Victoria Clark, *The port of Aberdeen* (Aberdeen, 1921).

In Leeds, as in Dundee, flax production climbed very rapidly in the first half of the century, the rise being most rapid between 1820 and 1830 and between 1840 and 1850. The peak of production in Leeds was reached just after the middle of the century, much earlier than in Dundee.[1] The Crimean War caused a sharp demand for Dundee's coarse fabrics, but did not stimulate demand for the finer linens of Leeds. In the 1820s William Brown, the Dundee entrepreneur and flax spinner, estimated that Dundee's output was about one-third that of Leeds, although the amount of machinery and the number of people employed in Leeds was very much less. Leeds' 'slow driving and hard twisting', with engines turning more slowly but twisting the thread more tightly, produced nineteen spyndles a day per one horse power, where Dundee produced twenty-five spyndles a day.[2] In both cities the linen trade came to be dominated by one huge firm. By the 1870s Baxters of Dundee produced a greater volume of linen than Marshalls of Leeds. The Scots firm was therefore the largest flax firm in the world, although Marshalls' output was the greater in terms of value. The principal difference between Leeds and Dundee lay not between Marshalls and Baxters but in the other industries of the two towns.

In Leeds flax-spinning declined in importance as textile machine-making became more and more important. In Dundee, whose engineering industry showed signs of growing for the first thirty years of the century, independent foundries, although still of some significance, declined in relative importance throughout the century. This was partly because heavy engineering, such as locomotive building, of which Dundee firms did have a small share in the 1830s, inevitably became centred on the iron- and coal-producing areas in the west. It must also have been partly due to the policy of firms like Coxs and Baxters of maintaining their own large foundries and engineering shops, thus narrowing the scope for outside suppliers.

The largest part of the working population of Dundee was employed in jute: an industry not complementary to flax, as in Leeds, but in direct competition with it. Jute imports at Dundee grew from

[1] W. G. Rimmer, *Marshalls of Leeds, 1788–1886* (Cambridge, 1960), p. 211.
[2] William Brown MS., pp. 114–18.

16,928 tons in 1851 to 369,958 tons in 1891.[1] Jute replaced flax for many traditional uses, particularly, and almost to its complete exclusion, as a material for bagging and sacking. It must here be emphasised, however, that some of the uses to which jute was put were new uses, as for instance the holding of concrete for breakwaters, and were not encroachments on flax. Flax did develop some new outlets in sales of linen hosepipes increasingly required by the flat-dwellers in the high-density urban developments in America. But while jute imports at Dundee, with some severe fluctuations, continued to grow until 1895, flax imports reached their peak in 1870. Although jute had been introduced to the town in the 1820s and spun with uncertain success from about 1832, power-weaving of jute was not attempted on any scale until the middle of the century. Hand-woven jute competed with power-loom linen until the establishment of Coxs' factory in 1849 and Gilroy's in 1851. The new fabric did not endanger the position of flax until power-looms had been successfully adapted to jute, and until the Crimean War had created a strong demand for coarse sackings and had blockaded Russian flax ports. Because of the many uses to which their products were put by the armed forces, the jute and coarse linen trades experienced their best years during wars or periods of threatened war. The tendency to take advantage of seasons of quick, easy profit-making for the over-extension of the industry while demand lasted brought very severe recessions in periods between wars. Jute manufacturers recognised to some extent the need to build up peace-time markets, but they did not act upon it. The suspicion caused by the bitterly competitive rivalry of a trade in which one fifty-sixth of a penny on the selling price could lose an order made almost impossible the kind of co-operation which might have produced solutions for some of jute's problems.

In Ireland the flax industry, at first very widely dispersed, tended throughout the century to become concentrated in Belfast. By 1862, 33,525 people were employed in flax factories and mills in Ireland, where Mulhollands of Belfast rivalled but did not surpass Marshalls and Baxters. Almost the same number of people were employed in

[1] Jute statistics have been taken from *Dundee Year Books* and from yearly trade reports in the *Advertiser*.

Scotland in the same period, some 33,600, of whom about 5,000 were at Baxters. In England 20,305 people were employed in flax, 9,458 of these in various works in Leeds.[1]

For the period covered by A. J. Warden in his *Linen Trade, ancient and modern*, of 1864, still the most complete description of the industry in Scotland, Carmichael's papers provide an interesting sidelight and fill in both technical details and the social background which the scope of Warden's work and the nature of his interest prevented his describing. For the period after Warden, that is from the American Civil War of 1861-4 until Carmichael's death in 1891, this is the only full account so far published. It is useful in showing the dispiriting effect of working to no profit, which is echoed in the letters of his brother-in-law, James Cox: 'Everything appears the same – ships, land, everything is made without profit and no one is making a living.'[2] During this period Dundee built up and improved contacts with Europe. Through the efforts of the Chamber of Commerce, of the recently established and very talented German community and of individuals like Carmichael writing to friends in Russia, in Germany and in France, every possibility of keeping markets open was explored. Yet country after country raised tariffs against linen and jute goods, protecting their own infant manufacturing industries, often established with Dundee machinery and Dundee skills. The efficiency of Dundee's industry was incomparably greater than that of Indian mills and factories and continued to improve. Yet Indian production increased from 28,247 tons in 1850–1 to 413,664 in 1886,[3] not yet crushing Dundee out of important markets but threatening to do so. In twentieth century Dundee criticism has often been aimed at the men who made their wealth out of Dundee textiles because they chose to invest the profits of their mills and factories in American land rather than in projects of benefit to their own city.[4] In fact there was little enough need for more money to be spent on buildings and the machinery contained in them. There is considerable evidence in companies' own records

[1] *British manufacturing industries*, ed. G. Phillips Bevan: *Flax and linen*, by W. T. Charley (London, 1877), p. 77.
[2] Letter-book of James Cox, 19 Feb. 1885.
[3] T. Woodhouse and P. Kilgour, *The Jute Industry* (London, 1921), p. 22.
[4] For details see W. Turrentine Jackson, *The Enterprising Scot* (Edinburgh, 1968), pp. 21–35, 59–72.

that over-spending, not parsimony, was at the root of the textile industry's problem. The enormous structures built from war profits had to be kept in production even when the market for their products had disappeared. There was a tendency when profits fell to increase the volume of production by installing more frames and looms, so that tiny profits could be multiplied into respectable overall returns. During the worst periods of recession, the building of mills, factories and warehouses continued in the city. If the enormous sums put by Dundonians into investment trusts had been spent instead on further expansion of the home industry, this could only have increased the size of the problem. The possibility of introducing new industry to the town could not be expected to appeal to Victorian employers, whose sincere belief it was that their trade was kept alive only by the low wages which were possible in the absence of alternative employment. It is perhaps surprising that so many mills were kept going when profits were almost non-existent over long periods, the partners living on their overseas investments and sometimes lending from their private accounts large amounts to their firms to keep the machines turning and the men in work. For Carmichael the need to keep his works ticking over efficiently was of great importance, although he was by then an old man who might have chosen to escape to his country seat and turn his back on the problems of the city.

He had already shunned every aspect of town life except its industry. Politics, whether of church, local authority or parliament, had never attracted him. The inept parliamentary career of William Edward Baxter, the Liberal politician with whom he was most nearly associated, was not one to arouse either admiration or enthusiasm.[1] Political arguments in Dundee were conducted with acrimony enough to alienate anyone sensitive to the town's reputation outside its own boundaries. ' What the disagreeable man is to society, Dundee was to other towns. Our evil reputation even spread to parliament itself and we were lately informed by a member of the Upper House that so notorious there was our reputation for squabbling that there was the greatest difficulty in getting a Committee of Peers together to consider any matter which related to

[1] See British Museum, Department of Manuscripts, Catalogue of Gladstone Papers, heading W. E. Baxter.

Dundee.'[1] Town Council meetings degenerated too often into occasions for insult and accusation. Nothing in the experience of Carmichael and his acquaintances was likely to tempt him from the books and pictures in his library at Arthurstone. Only his conception of his duty to his work-people, and the surviving hope that 'something of notable note may yet be accomplished',[2] kept him at his drawing-board in his old age.

The attractions of having a country seat had appealed to other industrialists as well as to Carmichael, and it is fitting in conclusion to look at the growth of this movement in Dundee; for in this corner of life also industrial expansion produced great social and geographical changes. In Dundee, as in other fast-growing cities, overcrowding of the original settlement areas, pollution of the water supply and the fear of fever drove those with wealth to move away from the centres of industry. An earlier pattern had seen town houses for county gentry built within, or just outside, the walls of the ancient city and used in the winter to allow the 'county' to take part in the social life of the town. As the town's centre decayed, the town lost its attraction as a cultural magnet, and by the end of the eighteenth century the gentry had given up their habit of keeping town residences.

The first wave of mansion-building for the newly rich industrialists took place between 1810 and 1835 in an area then far enough from town on the eastern outskirts. A very severe typhus epidemic, the first serious wave of cholera to reach Britain and a decade of very profitable trading, all falling within these years, serve to explain the interest in suburban building. Springhill, Peter Carmichael's home for many years, was one of the houses built during that period and stood on a wooded hillside overlooking the sea.

The rapid growth of the town, hastened in the Dens area by the success of Baxters' mills there, soon reached out and overtook this once pleasant district, bringing the attendant ills of filth and noisome smells. From about 1849, when the second serious cholera epidemic excited new fears among the middle classes about the dangers of living among the teeming poor, and the town council's plans to improve drainage raised the town's rates, the pace of the move from

[1] *Advertiser*, 1 Jan. 1868.
[2] *Jute and Flax Machinery Advertiser*, 1891.

the city increased. The opening of the Dundee to Arbroath railway in 1838 had eased commuting from the suburbs and encouraged the building of a group of very large houses in Broughty Ferry, about three miles east of Dundee. Crimean War profits brought a sudden enormous increase in the wealth of Dundee textile men and resulted in conspicuous spending on mansion building, each one rivalling the other in extravagance if not in taste or convenience. Ashcliffe, for W. E. Baxter, Arnhall, Fernbrae and Cidhmore were built between 1850 and 1860, Hazel Hall and Farington House in 1854, Duncarse in 1858.[1] These all stood in large gardens and had beautiful views over the Tay Valley, interrupted neither by the chimney stacks which brought the wealth nor by the high tenements in which the mill-workers were increasingly crowded. The purchase of estates in the country and at a greater distance from the town was less common and possible only for those able to keep up a number of carriages with attendant staff. One or two of those whose fortunes were made early in the century, of whom William Baxter of Balgavies, near Forfar, is perhaps the most notable, had settled to the lives of county gentlemen before 1830, and the sharp rise in land values experienced in the first decades of the nineteenth century contributed to their prosperity. But they were exceptional. At that time many Dundee industrialists had only lately left the country districts, often as poor men, and there was greater prestige to be drawn from owning a town house. Only when the town became uncomfortable and a danger to the health of their families did a move to the country begin to seem attractive. The medieval settlements around the water courses were the first to be abandoned to the poor. The Reverend George Lewis, writing in 1841, condemned the rich for leaving his district and taking no thought for the wellbeing of those forced to remain there.[2] But if fear of disease was the first motive in clearing the middle classes from Dundee, the display of wealth and social power began, in the second half of the century, to exert as strong an influence. As villas for the moderately well-to-do sprang up in the immediate outskirts, it became necessary to their prestige for the really wealthy to move even further out. Perhaps, too, some of them

[1] For a full account of the various mansions, see David M. Walker, *Nineteenth Century Mansions in the Dundee Area* (privately printed, Dundee, 1958).
[2] G. Lewis, *St David's parish: its economic state* (Dundee, 1841), p. 6.

wished to dissociate themselves from the rather vulgar rivalry which gave rise to such edifices as Castle Roy, for the Gilroy family, and Carbet Castle, for the Grimonds, in Broughty Ferry.

Arthurstone, the house to which Peter Carmichael moved in 1869, was built on land originally belonging to the abbots of the Cistercian Abbey at Coupar Angus. The present house was built by Captain James Rattray, of Hook, in Hampshire, between 1797 and 1799. Large additions were made in 1838 by Patrick Murray of Simprim, who bought the house from James Munro MacNab. Murray left the house to his son-in-law, Admiral Brunswick Popham, who dismantled part of the new additions. It was bought in 1858 by Edward, Lord Wharncliffe, along with other lands in the neighbourhood, the house itself being purchased for his retirement by Christopher Kerr, then town clerk of Dundee. Carmichael made several improvements when he bought it from Kerr and added to it a number of farms from the Wharncliffe estates.

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The Carmichael papers have been preserved in three boxes at Arthurstone. The first part, the 'Autobiography', was divided into eight chapters. Alexander Monfries, tutor to the family, who collected the papers and wrote the narrative contained in the other two boxes, divided his contribution into two 'Books', each containing eleven short chapters. The whole manuscript extends to something like 225,000 words. In cutting it to about 90,000 words some redivision of the material has been necessary. The titles of the five chapters into which this volume is now divided have been taken by the present editor from the original text but are not the titles given by Monfries to his chapter divisions. Wherever possible Peter Carmichael's own words have been preserved at the expense of those added by Monfries, who was rather verbose and tendentious. Cuts have been made where the subject is of the narrowest family interest, and in particular where it concerns, as it often did, the ill-health and misfortune of Carmichael's children, none of whom outlived him. Cuts are indicated by dots. As the paragraphs written by Monfries to introduce letters have often been cut, a standard form of date heading has been adopted throughout. Punctuation and the use

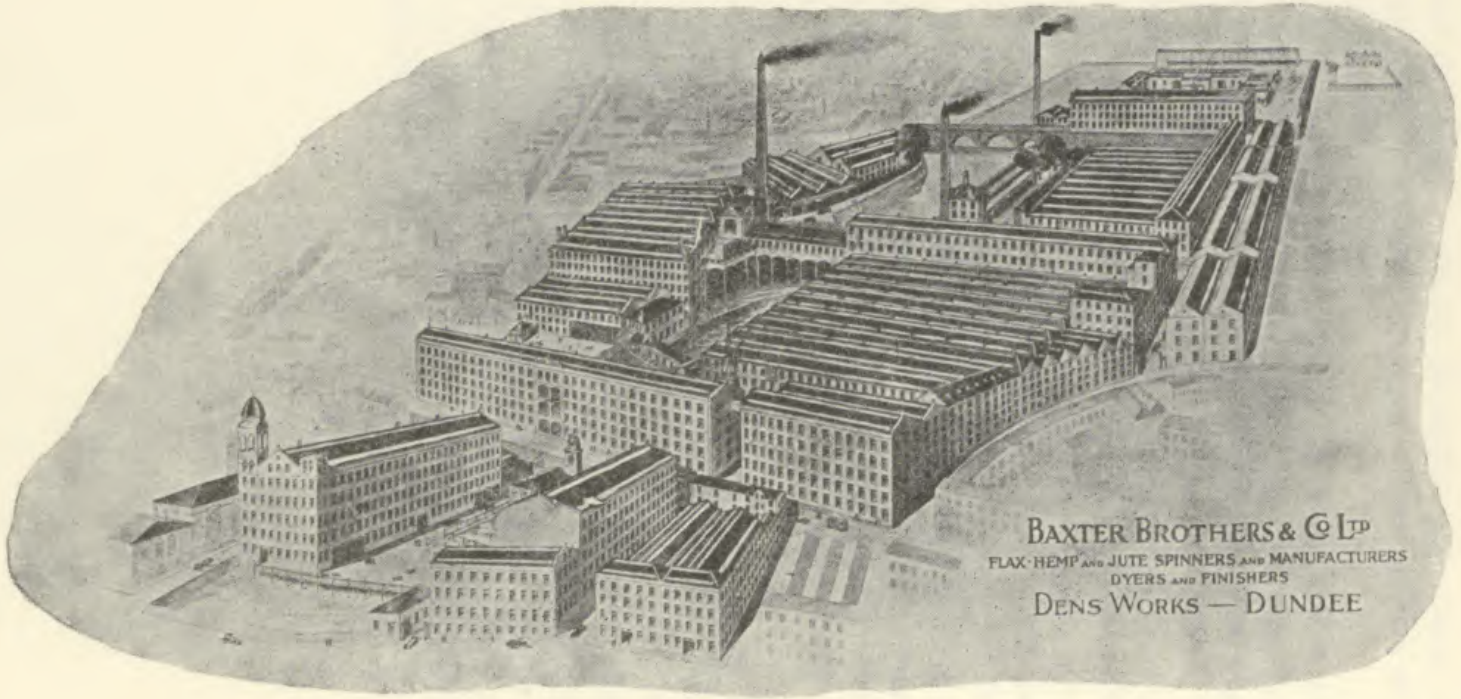
of capitals have not seemed to require alteration. Peter Carmichael was more restrained in his use of capitals than many of his contemporaries and where he has chosen to use one his wish to give emphasis has been respected.

It is impossible not to regret that the Scottish History Society's members could not have read the whole of Carmichael's letters rather than those extracts from them which their Victorian collector thought suitable for preservation. But there is some reason for gratitude to Monfries that so large a part of the writings of an interesting and inventive Dundonian has been preserved at all.

The chief sources used for biographical material about Dundee are William Norrie's *Dundee Celebrities of the Nineteenth Century* (Dundee, 1873), obituaries in the *Dundee Year Books* and a catalogue of portraits exhibited in the Dundee Art Gallery in 1892. The *Dundee, Perth and Cupar Advertiser* is referred to in footnotes as the *Advertiser*. Another valuable source is the Lamb collection of books, pamphlets, news cuttings and manuscript notes in Dundee Public Library.

The maps of Dundee used to illustrate this volume have been redrawn by Mr Ian G. Scott from the following: *Plan of the town, harbour and suburbs of Dundee . . . from a survey in February 1793 by William Crawford and Son, Landsurveyors at Cameronbank near Edinburgh* (in Dundee Public Library); plan of Dundee in *Reports from the Commissioners upon the proposed boundaries of the several Cities, Burghs and Towns in Scotland* (London, 1832), pp. 16–17; and *New Plan of Dundee to accompany Directory, 1874* (in Dundee Public Library).

Autobiography of Peter Carmichael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DENS WORKS — DUNDEE

1790–1833

THE FLAX TRADE IN DUNDEE AND DISTRICT

'The psalm of the shuttle'

SINCE I REACHED the age of three score and ten several friends at various times have urged me to write the story of my life and some of them have hinted to me that if I did not do so it would be done by some one else who could not have the same knowledge of the facts. I cannot say that I quite understand the desire for a record of the past in which I have acted a part and I do not see that I can now awaken sufficient interest in it in my own mind to be able to interest others. At the same time I should like to gratify the desire of my friends so far as I am able and I therefore make a beginning in the hope of being able to jot down a few things which may give information or guidance to those who will live after me.

And first I shall tell what I have learned of my forbears, the Carmichaels of Speyside and the Drummonds of Crieff.

About the middle of last century there were in the parishes of Knockando and Mortlach[1] several respectable farmers named Carmichael. There was Alexander in the Mains while Duncan and Peter were together in the Bruntlands of Knockando. James had the farm of Wakemill in Mortlach and William had the two farms of Mains of Tullich and Mid Third in the same parish. Whether these five were all brothers or whether the relationship between some of them was more remote the parish records do not make clear. All of them were or soon became the heads of families and as their children grew they seem to have felt that the place was too strait for them, for they

[1] In Moray and Banffshire respectively.

either emigrated or went into the army. Duncan was the first to leave his native strath. He took his wife and family to America in 1761 or soon after, leaving his brother Peter in the Bruntlands. A few years later Peter Carmichael married Helen Thomson and in the Bruntlands were born seven children whose baptisms are recorded in the Parish Register. In 1783 they also set out on their pilgrimage and the place that once knew them now knows them no more.

Those who have read of the condition of Strathspey in 1782[1] and the year following will not wonder at my grandfather then leaving the district and preparing to follow his brother to America. So great was the destruction of the crop of 1782 by the early frost that had it not been for Government bounty and supplies from distant countries many of the people would have perished. . . .

Before leaving the Bruntlands my grandfather had a roup of his gear. More than seventy years afterwards the Minister of Knockando found that William Cumming, one of the oldest men in the parish, still remembered the roup. He did so because his father succeeded to the farm and his mother bought at the sale an old oaken chair with curiously turned feet. Going forth from Speyside with his wife and family my grandfather went to Greenock and took ship there for America, but a few days after sailing they were shipwrecked on the coast of Ireland, losing everything but their lives.

They returned to Scotland and my grandfather began afresh and must in some measure have redeemed his fortune, for at his death he left some property in Glasgow still called by his name and a small patrimony to each of his children. My father, his son James, who was baptised on third August 1777, would at the time of the shipwreck be about six years of age. . . . [A lengthy description of grandfather's brothers and their families is omitted here.]

After what must have been a good schooling he was trained as a mechanic, a term then used in the strict sense to denote a man who worked in metal as distinguished from a mill-wright who worked in wood. As a young man he got ample employment at the cotton mills being erected in the neighbourhood of Glasgow and when his

[1] Famine conditions were widespread in Scotland in 1782-3. In 1782 Knockando had 'a sufficiency of neither seed nor bread'. This was a parish not touched by the spirit of improvement. Land was still unenclosed, leases short, the heritors uninterested. (*Old Statistical Account of Scotland*, iv, 302.)

father died he returned to the city and spent his share of his father's estate in taking classes at the Andersonian University which had been started by Dr George Birbeck in 1800.[1] There he learned much and was deeply impressed by a remark of Dr Birbeck's at the close of what was his second session. The class was dismissed with the words: 'Now young men, remember this, that all you have learned here will be of no use if you have not good common sense.'

On leaving Glasgow my father went to the Ballindalloch mills between that city and Stirling about fourteen miles to the west of the latter. They were amongst the first of the cotton mills established in Scotland. Two events in conjunction had led the cambric and lawn manufacturers of Glasgow to try the manufacture of cotton muslin. One was Arkwright's invention of the mode of spinning cotton by rollers in 1769 and the other was the outbreak of war with America in 1775 which checked their business with that country and forced them to look out for other ways of investing capital. The first mills were built chiefly by Glasgow men but set up at a distance from Glasgow, a convenient supply of water power to drive the machinery being what mainly guided the choice of a site for the works. The Ballindalloch mills were established as early as 1780 and the village of Balfron has grown around them.[2] It lies upon a hillside facing the south and looks down on the Endrick winding its course to Loch Lomond with the beautifully wooded Lennox fells on its borders and the lofty peaks of Ben Ledi, Ben More and Ben Lomond in the distance.

My father's companions at Balfron were William Drummond and George Lockhart and a happy life they seem to have led. The manse was their favourite resort in the evenings. Mr Jaffray the minister[3] had a scientific turn of mind and a taste for the study of astronomy. He seems also to have been of a jovial disposition and, as was the fashion of the time, sometimes imbibed more freely than

[1] The Andersonian developed into the Royal College of Science and Technology, which later became the university of Strathclyde.

[2] Ballindalloch muslin factory was started by Robert Dunmore and taken over by the brothers John, Archibald, James and George Buchanan to become Ballindalloch cotton works (*Old Statistical Account*, xvi, 116–17; H. Hamilton, *Economic History of Scotland in the eighteenth century*, Oxford, 1963, p. 172).

[3] This must be James Jeffrey, 1750–1824, minister of Balfron 1787–1824 (*Fasti Ecclesiae Scoticanae*, 9 vols., 1917–51, iii, 330).

would be considered proper in our day. The story ran that a happy pair of moonlight lovers found him on his return from a christening reclining on a bank at the roadside sound asleep with his feet in the ditch. On being aroused he opened his eyes on the image of the moon in the water and quietly turning round said: 'Hap my feet Jean, and pit oot that cawnl'.

It was not the society of the minister however that drew the young men to the manse. The minister had a niece called Jean and there was boarded with him a dark young lady, a eurasian, Mary Munro, the daughter of Alexander Munro, an indigo planter, and the niece of Sir Thomas Munro,[1] the distinguished general who rose to be governor of Madras. Her brother and she were to be sent to this country for their education but the boy died before the ship sailed and so she arrived alone and was taken care of by her aunt. She lived with her aunt till 1804 when that lady became the second wife of the Hon. Henry Erskine the brilliant advocate and brother of the earl of Buchan. Mary was then sent as a boarder to the manse of Balfron. William Drummond and she fell deep in love and a run-away marriage was planned. It was arranged that the banns should be proclaimed in the church just as the service was about to begin. A horse was held ready and at a signal that the proclamation had been made, George Lockhart rode off as fast as he could to Glasgow where the pair of lovers had found refuge in the house of my aunt Grace and there they were married. The lady's relations were naturally very indignant at first but the bride, warm-hearted and impulsive, went to her aunt and, falling on her knees, implored her forgiveness. Then she introduced her husband to her friends and they were pleased with his appearance and manners.

For a year or two prior to this, several members of his family had been settled at Kirkland near the mouth of the Leven in Fife, his brother John being a partner of the firm that owned the works there. With money advanced by his wife's relations William Drummond built a flax mill at Balgonie some miles further up the same river, and there he settled. My father was also drawn to the vale of the Leven and became a manager in the mill at Kirkland. There he

[1] Sir Thomas Munro, 1761-1827, was a Glasgow merchant who entered military service in India after his Scottish business failed. He became Governor-General of Madras in 1819. (*Dictionary of National Biography* [hereafter *DNB*].)

married Rachel, a sister of the Drummonds and so the first home of my parents was at Kirkland. . . .

My mother's father, James Drummond, had become a feuar in Crieff in 1762 when the commissioners for the forfeited estates, to encourage industry there, offered 'feus and other suitable encouragements' to skilled men and good tradesmen. As a young man he travelled for Mr Tainsh[1] a banker and merchant with an extensive business in and around Crieff. . . . When Mr Tainsh died my grandfather carried on in the same line of business. He seems to have helped the trade of the town by relieving the people round about of what they had to sell and by providing for them what they wished to buy. . . .

As my grandfather's daily duties made him acquainted both with the wants of the people in rural districts and with the resources of our larger towns he was led not only to supply the goods that were most sought after but to encourage their manufacture in the village. Visitors to Crieff in the last quarter of last century were most struck by the number of merchants in the place but several manufactures were also introduced during that period. Chief of these was the manufacture of cotton but there was also the making of paper and the brewing of ale. A few other schemes in which my grandfather was interested may be worthy of note. He was so strong an advocate for the sinking of pits in the hope of striking a seam of coal that he was called 'sub-stratum Drummond'. When the Green, the only green spot in the village, was laid out for bleaching webs on 24 May 1780 he contributed his share of the cost. And when Mr James Drummond of Comrie in 1794 set on foot a subscription for making a canal and continuing it eastwards through the strath he was one of many in its favour, but it was given up for a more comprehensive and glowing scheme and neither the one nor the other was ever carried out. . . .

My grandfather's death occurred in the latter half of 1798. It was very sudden. Among his other concerns he had charge of a branch of the Stirling Bank and in it all his means were placed. The Bank broke and on getting the news he took inflammation of the brain and died. . . .

My mother was the youngest of fourteen but only one sister,

[1] Not further identified.

Jean, who became Mrs Pyott, and six brothers were alive when her father died. Of the brothers we have seen that John afterwards settled at Kirkland and William at Balgonie. . . . It was on my uncle John that the fortunes of the younger members of the family mainly depended and his career is deserving of special record. He got his training for business in the bank at Crieff and afterwards went to the office of Mr Forman[1] in Edinburgh, living while there in his house. He must have been much trusted, for while still a lad he was sent to take charge of a bank in Dumfries. . . .

On his return to Edinburgh my uncle married Miss Forman but she, being of a delicate constitution, caught cold at a ball and died within a year of their marriage. . . .

From Edinburgh he went to Dundee and was in the bank there for a time. Then he became assistant to Mr Archibald Neilson who was stampmaster there and had some connection with Tay Street mill.[2] This Mr Neilson was a descendant of the Neilsons of Corsock in Galloway. Mr Archibald Neilson was a bachelor and lived in Bain Square. A brother of his had married a daughter of the laird of Craigie[3] and gone to India, where he died. His children were sent home to their grandfather and lived at Craigie for some time. Then Mr Neilson took the two girls, Jessie and Eliza, to live with him. My uncle being a favourite was often at the house in the evenings when he sang or played on the flute and the young ladies played on the spinnet. He and Jessie fell in love with one another and he asked her in marriage. Mr Neilson and the Guthries were greatly offended at his proposal but two maiden sisters of Mr Neilson's who lived in Edinburgh espoused his cause and arranged the marriage after which all were reconciled. The house in which the young couple lived was called 'Paradise' and not long after the death of my grandfather my mother was taken to live with them. My father, as we have seen, was also led to Kirkland and there they were married. This was in 1806.

[1] Not identified.

[2] Archibald Neilson was a man of some influence in the linen trade. He gave advice to the Privy Council on French yarn duties in 1787 and was referred to by the Lord President as 'a gentleman of excellent character' (SRO, Records of the Board of Trustees for Manufactures, Minutes of Trustees, NG1/1/26, pp. 91–93; NG1/1/29, p. 14, 18 Feb. 1795). His partner at Kirkland was John Aislabie, a London merchant.

[3] James Guthrie, the first Guthrie of Craigie, died in 1788, aged ninety. His son was also James. The lands of Craigie, then lying outside Dundee's boundaries, are now within the town.

The works at Kirkland were for many years outstanding and far famed for their size, the excellence of their management and the quality of the yarn spun in them. They were started by a company with Archibald Neilson as its head in 1788 and like those around Glasgow they were fitted up for the purpose of spinning cotton. The year before they were started however the spinning frame had been invented by Kendrew and Porthouse of Darlington.[1] In that same year, 1787, the year of the patent, Walter Sim and Walter Thom under the firm of Sim and Thom had built a mill for spinning linen yarn on the haughs of Bervie[2] where there was a good fall of water. The machinery was got from England through the patentees Kendrew and Porthouse who gave their advice as to the erection. It consisted of eight frames of twenty four spindles each and was used for spinning linen thread. This was the first flax spinning mill erected in Scotland. The machinery however was not adapted for spinning the heavy yarn used in making Osnaburgs.[3] The first mill where such yarn was spun was that of Brigton in the parish of Kinnettles.[4] James Ivory, teacher of mathematics in Dundee Academy, and others have the credit of starting it. On 17 November 1790 they presented a petition to the trustees for manufactures stating that having purchased a license from John Kendrew and Co. of Darlington they had set up one of their patent machines 'to try the spinning of heavy yarn for the Osnaburg manufacture which hitherto had not been attempted' and praying the board to patronize and encourage them in making the interesting experiment. Two months later on 19 January 1791 a report by four competent judges was read by the board setting forth that the yarn spun at the water mill 'was well and regularly made, more so indeed than the generality of what is spun by hand' and that the cloth manufactured from the mill yarn was 'equal to anything of the kind they had seen'.[5]

[1] The frame invented by John Kendrew and Thomas Porthouse was for dry flax spinning. It was not until James Kay introduced his wet spinning process in 1825 that flax spinning by power became really successful.

[2] Inverbervie, Kincardineshire.

[3] The coarse linen cloth known as *osnaburgs*, Forfarshire's best selling line, was made in deliberate imitation of the cloth made in Osnabrück, Germany, in a successful attempt to capture that product's popularity in the American colonies. See W. H. K. Turner, 'Osnabrück and Osnaburg', in *Osnabrücker Mitteilungen*, bd. 73 (1966), pp. 55-70.

[4] Near Forfar, Angus.

[5] SRO, NGI/1/27, pp. 301-2, 19 Jan. 1791.

The proprietors of the Kirkland mill were quick to note the importance of this invention, for from the first Statistical Account[1] of the parish of Wemyss we learn that as early as 1794 the mill had been adapted for the spinning of flax and that the company imported the flax direct from Russia. . . . Only a few years after this account was written a great calamity befell the prosperous work and village, for on 28 February 1800 the spinning mill was burned to the ground. . . .

The company did not lose heart. A new mill like the fabled phoenix sprang out of the ashes of the old one. As a structure it surpassed anything of the kind that had been. It was spoken of as a palace and many came from far and near to look at it. It was situated on the right bank of the river half a mile above the town of Leven and the part of the river rented had a fall of over twenty feet. The works were moved by a water wheel sixteen feet in breadth and nearly twenty feet in diameter. The place was kept neat and clean and trees were planted around it. The workmen were celebrated for their literary taste, their public spirit and their independent feeling. . . .

The firm showed their enterprise by introducing all the newest improvements in their works and one of these was the lighting with gas. The apparatus was made by Boulton and Watt superintended by Murdoch[2] and it was used in lighting the place for the first time on 25 January 1810. It was the first mill in Scotland that introduced 'the new light'. . . .

The enterprise of the Kirkland firm is the more creditable because it was undertaken at a trying time. It required not a little nerve and faith and money on the part of the pioneers of flax spinning to hold on steadily through the first fifteen or twenty years of the century, owing to the wars on the continent. . . .

With closer reference to my father and his family I have a few interesting events to record. My sister Jane was born at Kirkland in 1807 and there also I was born on 2 March 1809. My sister Euphemia however was born at Balgonie in the parish of Markinch. At the

[1] *Old Statistical Account*, xvi, 521.

[2] William Murdoch, an Ayrshire man, had already used gas successfully to light Muirkirk Iron Company's workshops in the late 1790s (John Butt, *Industrial Archaeology of Scotland*, Newton Abbott, 1967, p. 148).

urgent request of his old companion and now his brother-in-law, William Drummond, my father had left Kirkland and gone up the river to help him in the management of his new mill. The mill had been expensively, I may say extravagantly, built and fitted up and the stern reality of keeping it going through bad years was in striking contrast to the romantic marriage that led to its erection.[1] I have heard that my uncle William used to go every night to the window of the room in which the man who had charge of the yarn lived and ask 'Well, William, what's the spin?' Whatever the answer was, whether the number was large or small, his invariable remark was 'Is that all?'

My father did not stay long at Balgonie. Sometime in the year 1812 he got the offer of an important situation in Limehouse, near London. He saw its advantages but was not sure if my mother would like to live there. My uncle John sounded her on the subject and her answer was prompt. She would rather stay among her friends but she would go to the ends of the earth with her husband. And so it came to pass that when little more than an infant I was taken to London and there passed four of the earliest years of my life. The moving of the family to the south was quite an undertaking. We sailed in the 'Lord Kinnaird' and my father used to tell that we were three weeks and two days on the voyage having amongst other adventures to put in at Holy Island and lie there for three days. We were put up on our arrival in the house of the shipmaster. The house in which we afterwards lived was connected with the works and it had a park in front of it. . . .

What was called the Limehouse Reach of the Thames used to be distinguished by several wind-mills on the right hand shore of the Isle of Dogs. The Limehouse factory[2] for the making of ropes and the manufacture of canvas stood at the north-west extremity of the Isle and on the north bank of the canal. The entrance to the grounds,

[1] It was described as 'a very fine new mill, like a king's palace for beauty inside and out with machinery far superior to any in the trade. The very woodwork was mahogany instead of pine as the other mills were and all the machinery run in brass whilst the rest of the mills were running in metal and beech-wood.' (*Advertiser*, 23 July 1870.)

[2] The founder of the Limehouse firm was Joseph Huddart, 1741-1816, a sea-captain who patented an invention for rope-making machinery in 1793. From 1815 onwards the firm belonged to Charles Turner and Co. (Information from footnote in original MS.)

which were spacious, was through a pair of folding gates at the end of a lane. The best view of the whole was to be had from the mound for the reservoir which looked down on the bleachfield, the canal and the buildings with the rope walks as continuations. The firm that owned the factory was the first to recognise and give practical effect to the fact that on the tow lines, rigging and running gear depended in great measure the security of the sails, masts and yards of a ship and in consequence the safety of the ship itself and the lives it had on board. . . .

Up to 1812 the Limehouse firm had got their flax yarns spun outside, chiefly in Kirkland works, but in that year they erected a mill where they might spin for themselves. It was to take the management of the spinning that my father was appointed. . . .

In the June of 1814 the emperor of Russia, the king of Prussia, Marshal Blücher and other generals who had distinguished themselves in the war just brought to a stop by the treaty of Paris visited London and were entertained by the court and the City in right royal style and with true English hospitality. During the bright and busy fortnight of their stay in the metropolis they manifested an intelligent interest in visiting our national institutions and manufactories. My father had the honour of showing some of them the Limehouse works and my sister Jane remembers that she and I were taken to the gates to see them pass. . . .

The last great public event while we were in London was the opening of Waterloo Bridge with great pomp on 18 June 1816, the first anniversary of the momentous battle. But for some time before this the exhaustion of the country after the excitement of the war had begun to be felt. The year 1816 was one of great distress. Values had risen enormously during the war and naturally when the war was at an end they fell in a corresponding degree. Trade, too, which had been very brisk in some departments, became stagnant and thousands engaged in the manufactures yet in their infancy were thrown out of employment. The works at Limehouse were affected by the sudden change like many others. The number of ships in the navy was greatly reduced and there was not the same demand for canvas. The spinning mill which they had set up only a few years before was stopped in 1816 and my father left Limehouse in that year. The condition of London was bad enough but it must have

been a difficult problem to know where to go for the country was suffering in every direction. In autumn the distress was aggravated by the bad harvest which was so poor that wheat rose to a hundred and six shillings the quarter. This, together with scant employment and low wages caused much misery and discontent.

Naturally my father decided to return to Scotland and in it to Fife though the prevalent distress was as great there as anywhere else; but he did not again settle on the banks of the Leven, for on learning that one of the flax spinning mills in Dundee was to let he resolved to take it and make his home in that town. To Dundee therefore he went.

In 1816 Dundee was a town of about 30,000 inhabitants. Stretching itself out from the High Street it had grown along the line of the road that led to other towns, its streets being called by the Danish name of *gates*. To the west the Overgate, or upper way, and the Nethergate, or lower way, led into the road to Perth. From the West Port in the old wall of the town, the upper way to Perth, which was very old, lay over the Hawk Hill, and from the same gate another road led up the Scouring Burn towards Coupar Angus. From the east end of the High Street there were also two outlets, the Seagate, or way by the sea shore to Arbroath, and the Murraygate, continued by the Well gate up through the Hill-town and so north to Forfar, an easier road leading round the hill by Cowgate, King Street, or Princes Street, being made later on. In the beginning of the century Castle Street had been opened as a way to the Harbour and Tay Street as a better way out to the country towards the north west, but in both of them there were still gaps in the rows of houses and Dock Street did not then go farther east than the foot of Castle Street.

The immediate effects following on the close of the war with Napoleon were felt in Dundee as severely as in other places. Upwards of sixty failures occurred in the town during 1815 and there were several more in 1816. The stagnation of trade coupled with the high price of provisions had brought many families in the town to the point of starvation. A local writer referring to this time says that 'before Waterloo the weavers were paid twenty shillings for working an Osnaburg web of 150 yards but the price fell to five shillings before the close of the year'. He tells further that in many families

breakfast then 'consisted of water put into a pot amongst a quantity of mashed potatoes left from supper for the purpose' with a very small quantity of meal to thicken it a little, and that this was taken without milk; dinner consisted of potato soup made with a little suet and supper of mashed potatoes and suet, the younger members being allowed a little milk as a great luxury. This state of privation roused angry feelings and on 5 December 1816 a riot known as the 'Meal Mob' broke out in the town. It began in the Overgate and rapidly spread to the foot of the Hill-town, the presence of the rioters being indicated by furious attacks on the shops of the meal-sellers.[1] These were broken into and their stock of provisions thrown out on the streets where they were greedily laid hands on by the ravenous poor. I have heard that as the goods were being trundled out of the shop of Alexander Wighton in King Street a cheese went rolling through the scrambling crowd when a woman on the outskirt who had not been able to get nearer the shop door for the press of the rabble nimbly picked it up, put it in her apron and made off with her prize.

Such was the condition of Dundee when my father brought his young family to it in that year. But the Provost and magistrates roused themselves to meet the emergency. A subscription for the relief of the suffering poor was made and nearly £2,000 was soon collected. This money was carefully dispensed to the most needy by committees in the various districts of the town and in a short time the poor were satisfied with bread.

The mill which my father took on lease was a little one in the Dens.[2] It was built in 1798 and had had a chequered history during the eighteen years of its existence. In 1816 spinning by machinery was hardly an accomplished fact in Dundee. It had not succeeded in the town as it had done on the banks of the Leven and other streams. This arose from several causes but amongst others it was due to the imperfect nature of the machinery driven by steam. Naturally the first mills in Dundee were planted by the water-courses and these were not important. There was only the Dens burn to the east of

[1] Compare account by S. G. E. Lythe in *Scottish Historical Review*, xlvi (1967), 141, of an earlier 'Tayside meal mob' and its links with radical political movements.

[2] 'The Dens' was that part of Dundee then lying just outside the eastern boundary and now built over, between Dens Road and Blackscroft.

the town and on the other side there were only the Scouring burn from Balgay and the Logie burn through its own den, both flowing into the Tod's burn which escaped into the marshy ground of the meadows, whilst out of the marsh flowed the Mause burn across the Murraygate and Seagate to the river. It was on steam therefore that the Dundee mills mainly depended for power.

The first flax-spinning mill in Dundee was started by Messrs Fairweather and Marr some time in 1792.[1] The building was formerly an old currying shop and was badly lighted. The steam engine was one made by James Watt with sun and planet wheels for crank and the machinery was all on the old plan with wheels instead of belts. Breakdowns were frequent and the difficulties to be overcome were great. Messrs Meldrum and Archibald[2] who made the spinning frames used to tell that when the frames were first started the breaking down of the machinery was so great that they had to fly out at the door and look in at the window to see how the pieces were thrown about. It was sometimes weeks before the damage was repaired and they got begun to spin. Their only consolation was that all the weak parts of the machinery had been found out.[3]

By the end of the century five mills were going in Dundee but in all of them together there were not more than two thousand spindles. They were too small to yield a fair profit and nearly all of them were stopped. In 1806 James Brown[4] erected the West Ward mill and it was the first of any size in the town. In 1809 his sons James and William[5] bought the East Ward mill and set it a-going. Two years later, in 1811, this East mill and the Dens mill were the

[1] In Chapelshade. James Fairweather is given as a manufacturer and member of the Merchant Company of Dundee in *Dundee Directories* from 1783. A. J. Warden, *Linen Trade*, p. 588, mentions the mill as having little success.

[2] Messrs Meldrum and Archibald, engineers and machine-makers, Chapelshade, Dundee, dissolved their partnership in 1822 (*Advertiser*, 7 Mar. 1822).

[3] For fuller details of the troubles of early flax-spinning machinery, see 'Flax spinning by machinery prior to 1832', *Advertiser*, 23 June 1870.

[4] James Brown of Cononsyth, near Brechin, Angus.

[5] James Brown of Lochton, 1787-1869, was provost of Dundee from 1844 to 1847. William Brown, 1791-1864, wrote *Reminiscences of flax-spinning* (Dundee, 1832) and an unpublished manuscript in Dundee University Library, 'Essays on flax spinning and management of East Mill, Dundee'. See also Dennis Chapman, 'Management in a Scottish flax mill', *Explorations: Publications of Research Centre in Entrepreneurial Studies, Harvard*, iv (1952), 3.

only two at work in Dundee. Even they had a hard struggle to keep going till 1816.

The Dens mill stood on the right bank of the burn and the side of the court behind it opened into King Street. Its 240 spindles were driven by an engine of six h.p. Two buildings detached from the mill stood on the right hand side of the Dens Brae, a road leading up to the Bucklemaker Wynd. The one was used as a shop for handloom weavers and the other as a warehouse with a hackler's shop above.

My father being a practical mechanic as well as an experienced spinner began by renovating and improving the machinery, so that when the mill was started again he was able to produce yarns both in flax and tow that gave entire satisfaction to the manufacturers.[1] The opinion of those well qualified to judge was that his ideas of spinning were far ahead of those entertained by his contemporaries in Dundee. 'An old mill manager' has left on record the following account of his methods:

> He was the first to say that the nearer the size of the rove[2] was to the thread the more even and level would be the yarn. To secure this he spread the flax very thin on the spreading tables with as little draw on the spreading as possible. The flax was adjusted to equal lengths as near as could be and the spreading moved on slowly not to heat the flax so that it came off very even, for he held that the even yarn must come off the spreading carriages to make the yarn even or level. In tow spinning he held to a light body of tow on the main cylinder and keeping the teeth on it as sharp as a razor to split the fibres of the tow as fine as the finest wool. Had workers and clearers been on his main cylinder his tow yarns would have been very fine but at that time workers on cards were not known and besides workers on cards take power from the steam engine and of this he had none to spare.

These first carding engines or 'cards' as they were called gave the early spinners much trouble as they could not be got to work well.

[1] 'Manufacturers' at this period meant 'hand-loom weavers', not necessarily factory owners, although a few 'manufacturers' owned shops in which a number of weavers worked together.

[2] For 'rove', 'workers', 'cards', and all following technical terms, see glossary below, p. 245.

They had only two feeding rollers and the doffer to card against the main cylinder. Many spinners found that the main cylinder wrapped itself round with tow every two or three hours. This of course caused the loss of much time as the machine had to be stopped to let the tow be taken off and to obviate the difficulty a 'clearer' was invented. This was a small cylinder put on the card above the doffer to clear the cylinders of the fibres of tow. This small cylinder was called the 'friezler' but it did not work well. When made to go too fast it clothed itself round with the fibres of lights and shorts it caught from the main cylinder and when made to go too slow the main cylinder kept all the tow to itself. It was thought that if the friezler could be brought to the proper speed it would do its work well and all speeds were tried but without success. The machine makers of Leeds were ahead of those in Dundee and the spinners in Kirkland mill brought an Englishman from Leeds who was to bring the carding all right, but after a few trials with the friezler sometimes above and sometimes below the main cylinder it was found one morning that he had decamped and was away over the border again. At the Grandholm mill in Aberdeen they also tried an Englishman from Leeds and with the same result, for when sought for one morning he was not to be found. The real drawback was found to lie in the speed of the main cylinder being too slow. When it was raised from 80 to 250 turns per minute the friezler was not required.

As a demand for yarns increased in Dundee several of the old mills were set agoing again. In the Dundee Directory for 1818 the following are given as at work:

1 West Ward Mill, or the 'Bell' Mill: John and Andrew Brown[1]
2 East Mill: James and William Brown
3 Dudhope (north) Mill: John Scott
4 Tay Street (east) Mill: Charles Chalmers
5 Dens Mill: James Carmichael

When the demand for yarns became brisk, new spinning mills were built and before the close of 1822 there were no less than seven-

[1] Andrew Brown, 1785-1847, was also a son of James Brown of Cononsyth (see above, p. 15, notes 4 and 5). He succeeded his father as proprietor of Bell Mill and did an extensive business with South America (*Old Dundee Exhibition Catalogue*, 1892-3)

teen mills in Dundee with an aggregate of 178 nominal h.p. and containing nearly eight thousand spindles. A list of these has already been published in several works but it may not be out of place to insert it here:

	NAME	OWNER	DATE	H.P.	SPIN
1	East Mill (Witch Knowe)	J. & W. Brown	1798	20	900
2	Upper Dens	James Carmichael	1798	6	240
3	Tay Street East	Chalmers & Hackney	1798	12	600
4	Bell Mill	Andrew Brown	1807	25	1152
5	North Dudhope	Mrs John Scott	1813	6	288
6	South Dudhope	P. Davie & W. Boyack	1818	6	420
7	Ward Road	Henry Blyth	1820	6	300
8	Chapelshade	Bell & Balfour	1821	12	600
9	Tay Street West	Chalmers & Hackney	1821	20	1056
10	Scouringburn	Alexander Milne	1821	6	240
11	Lower Dens	William Baxter & Son	1822	15	600
12	Anchor Mill	George Gray	1822	8	294
13	Ward Road	James Hynd	1822	4	210
14	Lower Dens	Kinmond & Company	1822	12	360
15	Ward Road	John Sharp & J. Preston	1822	10	288
16	Ward Road	David Lawson	1822	4	168
17	Cowgate	William Shaw	1822	6	228

It will be seen that the first five are those formerly noted as given in the Directory of 1818. Seven mills with an aggregate of eighty-one h.p. were going in 1820 and no fewer than ten new mills were set agoing in 1821 and 1822. To meet the demand for yarns during these years the great aim of the spinners in Dundee was quantity rather than quality. To get a frame of thirty spindles to throw off from ten to twelve spyndles[1] of yarn per day was the great ambition of the mill masters. To do this they introduced new spindles of fine steel with light flys and light bobbins. Some of the mills introduced frames having forty spindles and one of them was filled with frames

[1] The different spelling used by Carmichael has been deliberately maintained because it differentiates most clearly between the machine part, with an *i*, and the flax processed by it, with a *y*.

of fifty spindles each. Manager vied with manager till the quantity reached about the end of 1822 was half a spyndle per spindle for the day of thirteen hours. This enlarged spin was not got without great waste, as the following letter from an over-seer in one of the mills will show:

> We are told every night that we must have more yarns off tomorrow night. That's what we receive in good words for our day's spin. We are doing all we can to get up our frames to half a spyndle per day but we are kept back by so much breaking down on our spinning frames. They talk of our new Tay Street mill but if they only saw our waste – some thirty or forty per cent I suppose. On my flat I have a man for carrying our waste away in back burdens. I am in the tow spinning flat. The roves are very thick and very uneven and constantly choking up our conductors so you will at a glance see our position to be anything but a pleasant one.

My father did not share in this rage for increased spin. His chief aim was to improve the quality of the yarn and in this he to a certain extent succeeded. Mr Charles Mackie, then manager of the Anchor mill, wrote of him some time after this: 'Mr James Carmichael of the original Dens mill was the only spinner in Dundee that was making decent tow yarns to please the manufacturers at this time and this he did by keeping his carding engines very sharp'. But his 'cards' were all on the old plan, his engine was only 6 h.p. and he had too little room in the mill. With these drawbacks he found it difficult to cope with those who had more advantages. The highest price then paid for yarns in the Dundee market was obtained by Mr George Moon of Russell mill near Cupar in Fife and they deserved it for Mr Moon paid great attention to the preparation of the tow and his new carding engines as well as to the roving and spinning frames. 'Give me an even rove' he used to exclaim 'and I will spin you even, dead level yarn over a cart wheel.' My father used to think that Mr Moon's yarns would have been finer still if he had shortened the draw on his spinning frames.[1]

[1] 'Mr Moon is making the best tow yarn that comes to Dundee – he is determined to be foremost whatever the cost. He carries everything before him through force of money.' (Brown MS., p. 43.)

For two years after 1822 spinning was carried on with great spirit in Dundee. Existing mills were enlarged, other mills were built, new and improved steam engines were set up and better machinery was introduced. Manufactories or weaving shops were also built in increasing numbers, for the weaving in Dundee was all done on the hand loom and there were by this time two or three thousand of these engaged on linen fabrics in the town. Many of them were heir-looms, having been handed down I was going to say, but they were too heavy and cumbersome for that, having been left by father to son for generations. In the Bucklemaker Wynd, up the Hill, and in other districts of the town, nearly every house had one or more looms. As boys we used to listen to the motion of the treadles, the clanking of the ley and the flight of the shuttle and hear in the mingling of the sounds something like music, saying:

Will you go to Egypt?
Na faith ah, na faith ah
Will you go to Egypt?
Na faith ah, na faith ah

and so on perpetually. How differently the venerable contrivance has been regarded by different people at different times! By many it was looked upon as the 'four stoops o' misery' and the last hope of the unfortunate; in the eyes of others it was surrounded by a halo of romance and poetry and to their ear its rhythmic cadence was in the words of George Gilfillan[1] 'the psalm of the shuttle weaving its ever-lasting lyric to the praise of honest poverty'.

At the door of the old hand-loom weaving shops was a flat stone on which the weavers beat or hammered the yarn with a heavy wooden mallet. They liked the yarn to be a little damp when it was beaten and the beaten hanks were afterwards laid down on the damp earthen floor. Careful weavers put only a small quantity of the yarn on the pirns at a time so that the weft might be driven in when in a damp, moist state. This primitive method of beating afterwards gave place to the yarn-beating machinery in which the beaters or

[1] Rev. George Gilfillan was born at Comrie in 1813 and died at Dundee in 1878. He settled at School Wynd Church, Dundee, in 1836. A prolific writer and progressive thinker, he opposed the union of the Free Church and the United Presbyterian Church, of which he was a member. (*Old Dundee Exhibition Catalogue*, 1892-3.)

stampers, usually twelve in number, rose and fell alternately, striking the yarn which was spread over a large flat stone for an anvil.[1]

The hand-loom manufacturers in Dundee sold nearly all their productions to green cloth merchants and delivered the goods just as they came from the loom tied in loose-fold. The merchants received the goods in their warehouses and made them up for the markets. I remember the lappers in the Cowgate and elsewhere working in cellars. Their table was a large smooth stone about six feet long by four feet wide. They put the piece of cloth on the table and after going over it all they stretched the best woven and thickest driven part for a sheet. Then two men fell upon the sheet with large wooden mallets and beat it till it was perfectly closed. The quick tap tap of the beetlers was then one of the common sounds of the town. The cloth was folded with the beetled sheet outside and tied up. It used to be said that the manufacturers instructed their weavers to weave a few yards of each piece thicker than the rest that they might form a good sheet but many such stories were afloat as common gossip.

The manufacturers were as a rule a very respectable class of men. They were usually called 'household weavers' and each employed several men to work the hand looms that stood in a room or small hall which was called the 'shop'. Many of them were worthy, godly men ruling their households in the fear of God, and from them some of the best families in Dundee have sprung. Near us in the Dens there were the Fergusons and Patrick Hutton.[2] There was also John Lamb whose descendants have been distinguished by their successful efforts in the cause of temperance,[3] and there was Thomas Anderson, the maternal grandfather of the Smietons.[4]

[1] The last of these water-driven beetling machines survived until 1968 at Baluniefield Works, a bleachfield near Dundee, and is now in the Royal Scottish Museum, Edinburgh.

[2] The Ferguson family founded Dudhope Works, near Dudhope Castle. Patrick Hutton was the father of William Hutton of Kinmond, Hutton and Steele, railway and textile engineers, Wallace Foundry, Dundee.

[3] John Lamb's son Thomas, on joining the Temperance Society, founded Lamb's Coffee House, where Dundee's literary groups met, and, later, Lamb's Temperance Hotel, opened in 1852. He died in 1869, aged 68. It was he who began the collection of pamphlets, books and cuttings on local history which bears his name in Dundee Public Reference Library. (William Norrie, *Dundee Celebrities of the nineteenth century*, Dundee, 1873, p. 342.)

[4] Panmure Works, Carnoustie, of which James Smieton was the founder, was established in 1857.

There was not a little good fellowship among the spinners and manufacturers of that time. Managers and masters of mills in the town were somewhat jealous of the country spinners, but they visited each other in a friendly way to learn the result of introducing a second boiler, a gill, or any other recent improvement. In the summer evenings too they were wont to meet in the Fish Market at the shore where the Green Market[1] now is and there mill spinners, managers and manufacturers conferred on affairs of mutual interest, such as what orders had come from America, what news of the flax crop from Russia, how the new mills were getting on, how the broad looms Bell and Balfour had introduced into their manufactory in Chapelshade were working or whatever else might be stirring at the time.

Both the spinners and manufacturers in Dundee had been doing well during the four years from the end of 1820 to the close of 1824 and it was generally allowed that the manufacturing and commercial interests of the whole country were as sound and satisfactory as could be wished. The bill on the currency providing for the gradual return to cash payments which Sir Robert Peel had carried out against the opposition of his father in 1819 seemed to be working admirably and there was great abundance of money in the country.[2] When parliament met in the beginning of 1825 the Royal Speech congratulated it by announcing that 'there never was a period in the history of this country when all the great interests of the nation were at the same time in so thriving a condition or when a feeling of content and satisfaction was more widely diffused through all classes of the British people'. In the first number of the *Noctes Ambrosianae*[3] also, which came out in *Blackwood* for March 1825, Christopher North gives expression to the same feeling as he says: 'The population of Britain is throughout employed, tranquil, happy and contented. Agriculture and trade are flourishing. Direct taxation in all

[1] The Green Market continued as an open-air market until 1932 when it was removed to make room for the bus terminus at Shore Terrace.

[2] The Bank Suspension Act of 1819 suspended the acts of 1816–17 which had provided for an immediate return to cash payments to counteract the effect of over-circulation of paper money during the war. Peel's 1819 Act allowed for gradual payment in gold beginning in February 1820.

[3] Anon. [John Wilson, J. G. Lockhart, etc.], *The Noctes Ambrosianae of 'Blackwood'* (4 vols., Philadelphia, 1843).

probability will ere long have ceased to exist at all here. Everything in Britain is peace, industry and plenty.'

But these descriptions proved sadly elusive. The glut of money was caused by the increased issue of notes by the Bank of England and the other banks that were being opened all over the country. The extraordinary activity of commerce arose from the sanguine spirit that a time of prosperity generally induces and production was far in excess of the general demand. Through the influence of Canning, also, Mexico and the Spanish colonies in South America were recognised as independent and speculation in the mines of these countries became a mania. Before the summer of 1825 was ended prices began to fall; in the autumn old-established firms became insolvent, in November the country banks began to give way; and before the year was out there was a monetary crisis in London the like of which had not been known before. For a time exchequer bills, bank stock and even consols were unsaleable.

The calamity fell heavily on Dundee. William Sandeman the chief bleacher failed for £70,000 and his estate was calculated to yield five shillings in the pound.[1] The Dundee banks, which during the abundance of money had all been tempted to make advances on securities not easily realised, now bridled up their discounts at once, as nearly all the spinners and manufacturers were either directly or indirectly involved with the great bleacher who bought yarns or cloth from them. In 1826 the spinning of three pound yarn for hire was down to sixpence a spyndle and was not always to be had even at that low price. Throughout the year there were many failures, some of them large, and it seemed as if the trade of the town were to be brought to a standstill. To save themselves from further loss the Dundee banks took payment from the manufacturers in cloth; but it was to the Government, of which Canning and Peel were the most active members, though Lord Goderich, 'prosperity Robinson' as he was derisively nicknamed, was chancellor of the exchequer, that the Dundee men owed their ability to tide over the difficulties of the time. Exchequer bills were granted on a deposit of goods and many

[1] William Sandeman of Douglasfield, 1767–1834, son of William Sandeman of Luncarty. This family was responsible for Perth's importance as a bleaching centre, for the import of Sandeman's port, for the 'Sandemanians', an American nineteenth-century religious sect, and for founding Manhattan Jute Works, Dundee.

took advantage of the relief thus offered. The outlook in Dundee was not cheering. Many a boy and lad was then taken from school and set to work or to learn a trade who would otherwise have been allowed to continue learning from books. It was so with me.

These recollections of the early years of flax spinning in Dundee are mainly from the conversations of my father and his friends. When I try to recall my own impressions of that time the Dundee of my early boyhood comes back to me like a half-forgotten dream. My father's house with its large garden stood on the height above Dens Brae on the side of a romantic wooded den which sloped steeply down to the burn in which there was a reservoir called Wattie's Dam. This dam was for keeping a supply of water for my father's mill which at a previous period had been driven by water power. Beyond the burn to the east the land on both sides of what is now Princes Street was under cultivation. There was no house nearer than a cottage called Athole Brose at the turn of the road to Lilybank. Every nook and cranny of the Den was familiar to us. One part where there was a cleft in the rock was called 'the De'il's score' and another where there was a projecting rock was called the 'wrannie's poopit' or wren's pulpit. Further up where the ground was more level was 'Foster's meadow' where children played and on Pace Sunday rolled their eggs. So open was the town then that we could see the High Street from the window of our house and the view took in Hawkhill on the west and Broughty Ferry on the east, the Bell-rock light, still a novelty, being easily seen. Blackscroft was then a suburb. Our house also was well out of town; in fact it had been built as a country summer house by Captain Hutton[1] who lived in Fish Street.

There were six town officers but only two of them live in my memory. These were David M'Cormick the drummer who took his Hebrew bible to church and William Mackay who from the striking outline of his nose was familiarly known as 'Coulter'.[2] But these worthies did not come out as far as the Dens and we boys were allowed great freedom of action. Our jokes were rather practical and our fun was somewhat wild at times. One of our chief amusements was smoking certain families in their houses. The mode of

[1] A William Hutton is listed among ship-masters in *Dundee Directories* of the period.
[2] A coulter is the iron blade of a plough.

doing this had been handed down by tradition. A cabbage stalk, or 'kail-runt' as we called it, was hollowed out and a bunch of tow put in with a red-hot cinder in the heart of it. Then one blew the smoke through the key-hole into the room. As 'the hoast-provoking reek' began to take effect those inside made a rush to the door. But before beginning operations the 'sneck' of the door had been firmly fastened to the sneck of the door on the opposite side of the passage, so that we could fill the room pretty well and enjoy the justifiable but impotent rage of the inmates before making our escape. I think we generally had a reason that seemed satisfactory to ourselves for inflicting this torment on any one. A man named 'Cuttie Ha'' whose daughter was described by her teacher as 'a star of the first magnitude' came in for a large share of it. But sometimes the ease with which the trick could be played made it too tempting to resist. Projecting into the foot-way of the Bucklemaker Wynd stood a low house which we named Leather Castle, calling its sole inhabitant the King of the Castle. A boy by mounting on the shoulders of another could easily place a slate on the top of the chimney and we had time to be off and round the corner before the king got to the door breathing vengeance. My recollection of this old man has a touch of tenderness in it. A little later than the time of these frolics, while two or three of us were playing on the burnside, we heard a peculiar sound proceeding from the thick foliage on the opposite bank and, not making out the cause, we crossed the burn and discovered the king of Leather Castle coiled up under a sycamore tree giving vent to his feelings in groans. There was a spiritual revival at the time and he had been moved. We never trifled with him after that. There were then a good many half-witted men and imbeciles in the neighbourhood or employed in bringing parcels from the town and they now and then had scenes with the boys; but the Lunatic Asylum which had been a-building for some time on the lands of Craigie to the east was opened in 1820 and afforded refuge to the worst of those who suffered under this sad calamity.

At that time a good many of our amusements, such as 'French and English' and 'prisoner's base' were associated with war and we frequently had actual fights, the consequences of which were sometimes serious. These were 'bickers' with stones or 'traps' as we called them. There was a standing feud between the boys attending one

school and those attending another and very little cause was needed to make our chiefs, like kings going forth to war, lead us on to the combat. The ease with which stones could be got before the streets were paved no doubt often made the entrance on a quarrel be little thought of and the temptation to have revenge irresistible. The Brae-ers and the Croft-ers had their 'traps' too and sometimes the workers at one mill attacked those at another in the same way. It was a common pastime but a dangerous one, now happily given over.

Notwithstanding my share in these childish pranks I was naturally of a timid disposition, more disposed to lie on the top of my bed and read than to go out and play and there was too little fun in my life during these early years. I read all the books that I could lay hands on at this time and supplies of new books were periodically brought to the house by Jock Hamilton who kept a library in a room on a flat in the High Street. . . . The taste for reading then awakened in me has been one of the blessings of my life. The thoughts of the poets and prose writers in which my mind was then steeped have hung around it like the scent of roses ever since and been a pleasure or a power through all these years.

I have more to tell about our part of the town however. The Seagate, the Cowgate and King Street leading out of the town, all stopped at the west bank of the Dens burn. At the end of King Street the burn was spanned by what was then considered a handsome bridge of one arch which may still be seen within the Dens works.[1] The lane leading in a steep slope down the right bank of the burn from King Street to the Seagate was then, as now, called St Roque's, or more familiarly *Semarookie*. It got its name from the chapel of St Roque which formerly stood on the rising ground near the upper end of the lane, but of which no vestige remained. . . .

The sea then came up close to the Seagate, the houses on the south side of that street having timber-yards and ship-building yards at their back. From the foot of St Andrew Street a pier, now Trades Lane, was run out and boys used to catch 'Wally dogs', a species of eel, in the pond on the one side and 'podlies'[2] in the river on the

[1] It is still possible to detect the presence of a bridge within Dens Works, but it is of a later origin than this one.

[2] Strictly the pollack or the young of the coal-fish; but any small fish of indeterminate species may be known on the east coast of Scotland as a 'podlie'.

other side. All the time I was a boy at school great changes were being made on the harbour. An eastern and a western protecting arm were being stretched out so as to embrace a tidal harbour with a graving dock. The wet dock was first opened towards the end of 1824 when the 'Lord Kinnaird', one of the smacks belonging to the Dundee and London trading company, passed through its gates amid the cheers of the assembled inhabitants.[1] An annual event of this kind was the launching of the whale ships. They were drawn up in winter and launched in the spring, when the whalers left the port amid the cheers of the crowd that gathered to see them depart and wish them a successful voyage.

Great improvements were also made on the ferry across the Tay. The accident in the year 1815 when seventeen lives were lost had directed attention to the risk with which the passage was attended. Up to that time there were twenty-five boats on the ferry mostly in the charge of old men and playful boys, who sailed when asked to do so if they got a fare that pleased them. After the accident the number of boats was reduced to eight, each manned by a strong and efficient crew. In 1819 low-water piers were erected, one at Dundee and the other at Newport and then the idea of employing twin steam-boats suggested itself to the Trustees. The 'Union' was first put on and the traffic increased so rapidly that another, the 'George the Fourth' was built in 1823. Only one of the steam-boats was used at a time except in harvest or when numerous droves of cattle came from the north when both were needed. The 'George the Fourth' was the better boat and it was one of the wonders of that time to see with what rapidity and precision she could be moved. By an admirable contrivance of the engineers this was done with great ease. The passage was usually made in about twenty minutes. The charge made was ninepence for the first cabin, sixpence for the second cabin and threepence for a child under twelve.

But the short voyage was a luxury we did not often enjoy. Sometimes we crossed the Ferry and walked down the other side to Tayport but my chief excursion from the town in those years was to

[1] The opening of the wet dock was reported in the *Advertiser* on 1 Dec. 1825 and it was then said to be better than London Docks in design. The improving of the harbour represented a great triumph for the progressive element in the town against the reactionary, self-elected town council.

Balgonie. My Uncle John then lived in the Castle which down to the beginning of the century had been the residence of Lord Balgonie and his worthy lady. In their day it was a hospitable resting place for all engaged in the spiritual movement of which the Haldanes and Rowland Hill[1] were the leaders. My uncle also was hospitably inclined and entertained not a few remarkable men in the mansion. He was very good to us, but the antiquity and the stateliness of the Castle awed me. I liked to stay in the cottage at my Uncle William's better than in the castle because I had more freedom there. . . .

There was in Dundee at that time much open ground, most of it laid out as kitchen gardens all around and through the town. The Meadows were then a great bleaching green; the 'East Ward' was a large park with walks and trees where old men sat in the sun and children played on the sward; the Bonnet Hill was a district by itself and the Constitution Road was hedged-in bridle-path over the shoulder of the Law.

The streets were lit with oil lamps. These were globes set on posts or, where convenient, resting on iron brackets projecting from the wall. At dusk the lamp lighter rested his light ladder on this bracket, took off the lid and lit the lamp with a torch which was a cylinder of tin, about eighteen inches long and an inch and a half in diameter, having a bulb in the end in which was a cork stopping the hole through which the oil was poured in. The Town let out the lighting to a contractor who upheld the lamps and employed *leeries* whose duty it was to clean, trim and supply the lamps with oil during the day and light them at night. These men came in for their share of abuse and derision from the boys on the street. A broken-down-like man appearing with a light and lantern as the night was getting dark and gloomy was sure to attract attention and a little band was pretty often ready to hail him with the vulgar rhyme:

Leerie, leerie, licht the lamps
Lang legs and crookit shanks
Tak a stick and break his back
And send him through the Coogate.

[1] James Alexander Haldane, 1768-1851, and Robert Haldane, 1764-1842, were both religious writers and congregationalists. James was first minister of the first congregational church in Scotland where he was helped by his brother. Rowland Hill, 1744-1833, was also a religious writer, for whom Surrey Chapel, London, was built (*DNB*).

What changes in producing artificial light since then! In winter nights these lamps were often just enough to make the darkness visible. When we went to town at night we had to carry a lantern with us. 'Pe-Koo' or 'Hide and seek' was better fun then than it can be now.

Water was then got from springs, the chief being the two Lady wells, the old and the new, a number of public wells or conduit fountains being supplied from them. When the water was low or the wells got out of order, the supply was scanty and crowds with pitchers of various patterns gathered round the wells awaiting their turn. They thus became great centres for gossip and tittle-tattle. In the Dens there was a well of excellent water so that we were independent of the public supply.

The Post Office was then in New Inn Entry and the Letter-carriers, of which there were only two, carried a bag at their side for holding the money that they got for letters.

The Town churches were well attended and the magistrates then marched in procession to the East Church, or St Mary's as it was also called. But, like most of the families residing in the east end of the town, we went to St Andrew's church which had been built by the Trades and the Kirk Session in 1772. Standing on a rising ground ornamented with shrubberies it had the pretty look of a country church especially when approached by St Andrew Street which led up to it from the Seagate and its suburbs. When we went to it first an ugly coal-shed near it spoiled the view, but in course of time it was removed and then the beautiful proportions of the church were fully revealed. We came down to it by King Street, the new road that was made between that part of the Cowgate off from which the church stood and the Dens burn. The substantial, regular and handsome buildings then erected on each side of this street made it one of the most ornamental parts of the town and it was as we have seen the main outlet to Arbroath, Forfar and the towns beyond them. On weekdays the mail coach 'Saxe-Coburg' with the other coaches, caravans and carriers' carts came and went along this route making it a lively road, and on Sabbath there were streams of well-dressed people in their sober but picturesque Sunday costumes.

There were seats for the conveners of the Trades and other dignitaries in the front of the church-gallery and there they sat with their

gold chains and other insignia of their office. The minister bowed to them at the close of the service and they stood up and returned the bow. . . .

The two principal schools in the town when we came to it in 1816 were the Grammar School and the Academy. . . . I was too young for either of these schools at first and of schools for teaching the elements of education there were at that time very many in Dundee, for indeed the work of teaching the young was then looked upon as the last refuge of the unfortunate. Not only stickit ministers but those who had failed in any employment or were rendered unfit for other work by the loss of a leg or an arm were then considered quite fit to open a school. Near our house at the top of the Dens Brae was a school, mainly for girls, kept by one whom we called 'Pussy Allen'. To it I was not sent. Of the best elementary schools one was kept by Daniel M'Intosh in the Meadowside and another by John Gilbert in Meadow entry. It was to the school of Mr Gilbert that my sisters and I were first sent. It was entered by a wooden stair and consisted of one room somewhat resembling a barn, having a closet adjoining in which the girls were taught writing by Mr George Brown who was afterwards cashier in the Dens Works for more than fifty years. Mr Gilbert was a preacher in the Baptist church and I fear that he was better at speechifying and story-telling than at teaching. The number of boys he had educated who had turned out successful clerks and ended by marrying the daughters of their masters was truly wonderful and his stories of the idle scholars who had turned out badly and brought disgrace on their parents might have stimulated us to greater diligence if there had not been so many of them. Personally I was rather a favourite with the master and my having lived in London was made an excuse for setting me up to read before visitors, as I was supposed to have an English accent.

From this school I went to the Grammar School where I remained for four years. It was situated in School Wynd on a large piece of ground near the Tower or Steeple and was taught by a Rector and a second master. John Millar was then Rector and John Black was his assistant while William Wyllie was master of the parochial school which had some time before been added to the Grammar School. He was a brother of Sir James Wyllie, the famous physician settled

in St Petersburg,[1] and he taught English well. I was placed under the tuition of Mr Black and I record with some regret that I did not learn much from him. He read or rather recited the Latin lesson of the day with great fluency and apparently with much satisfaction to himself but we were left to master the difficulties of learning it as best we could and were never very interested in our work, nor were we ever shown any of the beauties of the language or the advantages we might reap from its study. He was a severe taskmaster notwithstanding and our legs were often black and blue with the marks of his tawse. The fees charged at the Grammar School were ten shillings and sixpence a quarter. Five shillings was looked for on Handsel Monday and at Candlemas we vied with one another as to who should present the biggest candle.

The last year of my school education was spent at the Academy. It was part of the old Hospital which stood on the south side of the Nethergate opposite Tay Street. Mr William Murray had succeeded Mr Thomas Duncan as Rector and Mr Gauld was his assistant. From Mr Gauld I learned much. The discipline of learning geometry taught me to reason more accurately and the habits of exact calculation I then acquired proved very useful to me in after life. . . .

Among our indoor amusements dancing was not neglected, much less forbidden in the house. We were taught by a man named Finlay Robertson. He had been a hosier in Perth but was unfortunate in business and then, to use his own words to my mother, he could not look the world in the face and fled. His brother was a dancing master of some celebrity in Edinburgh and as Finlay could play the violin he went to play for his brother and from him learned how to teach. Besides being a dancing master he was a Baptist preacher and a very good man.

Nor must I forget to tell what we owe to old May the nurse who used to sing to us and croon old ballads, swinging her body backwards and forwards to the rhythm of the metre and never failing to extemporize a verse when her wonderful memory for traditionary lore proved at fault, or when she wished to give the story a practical turn for our benefit. Our imaginations were further excited by her wonderful stories told as we sat around the fire on a winter night.

[1] Sir James Wylie, 1768-1854, entered Russian service in 1790 as surgeon to the Eletsky Regiment and was appointed physician to the Imperial court in 1798 (*DNB*).

Many a time after listening to one of these stories I have gone down the Den or even to the door with great fear and trembling. Yet we liked them and asked for more.

While still at school I had begun to work. I used to keep my father's books in the evenings and by going about the mill had learned in a general way the various operations of hackling, carding and spinning. It seemed natural that I should follow my father's occupation of mill spinner of flax and tow and it was therefore decided that I should begin by serving my apprenticeship as a mechanic.

By the year 1825 there were several foundries in Dundee and its neighbourhood. The first steam engines employed in the Dundee mills were not made in Dundee. They were made by English firms, chiefly by Boulton and Watt, Fenton and Murray and the Messrs Rennie of London. Later some were supplied by Messrs Robert Napier and Co. of Glasgow. But since 1820 nearly all the engines set up in the new mills had been constructed by engineers in Dundee and the spinning machinery had been supplied by local machine-makers. The 'Dundee', the 'Ward' and the 'Douglas' foundries[1] sent out the heavy gear and the foundry at Monifieth[2] from an early date had held a prominent place in the construction of machinery for the preparation and spinning of flax yarn. It was also one of the first, if not the very first, where machines for carding tow were made. The work was started, in what was then a primitive village of turf huts, by James Low and Robert Fairweather. James Low was still alive and was assisted in the management by his son William. My father, who knew their machinery well, thought that I could learn more about the machines I should have to use under them than I would do anywhere else and so I was entered as an apprentice at

[1] James Stirling, manager of Dundee East Foundry Company, had a formative influence on the development of engineering. A number of important men trained there, among them Archibald Sturrock of Great Northern Railway and Sir Daniel Gooch of Great Western Railway. Stirling built early narrow-gauge locomotives for Arbroath and Forfar Railway as well as textile machinery. J. and C. Carmichael of Ward Foundry, famous in hot-blast and marine engineering, also built locomotives and stationary engines as well as textile machinery. John Kerr and Co., Douglas Foundry (earlier Umpherston and Kerr), trained, among others, Joseph Lindsay of Urquhart, Lindsay and Co., Blackness Foundry. (*Jute and Flax Machinery Advertiser*, 1891; For Sale columns of *Dundee Advertiser* throughout nineteenth century; C. Hamilton Ellis, *Twenty locomotive men*, London, 1958, pp. 75-82.)

[2] The firm of J. F. Low and Co. Ltd., Monifieth Foundry, is still in existence.

Monifieth. Mr James F. Low, the founder of the business, died shortly after I went and my prentice master was Mr William Low who afterwards became a valued friend. He kept up the good name of the foundry for making cards and spinning frames till his death in 1840 and its reputation has not only been sustained but extended by his two sons who now conduct the business.

Among my fellow apprentices at Monifieth were William Lyall, Harry Walker, David Brown, James Bowman and John Downie.[1] Our life was much harder than that of a mechanic's apprentice now is. Our hours for work were from six in the morning till six or seven at night with half an hour for breakfast and half an hour for dinner. It was thus work, work, work all day long and every day for six days of the week. Yet we were merry at times and in the evenings we had our diversions and fun. Some of us formed ourselves into a little mutual improvement society also, and I received much kindness from our foreman, Andrew Brown, in return for communicating to him some of the information I had gained at school.

I usually walked up to Dundee[2] on Saturday after six and down again on Sabbath evening after six or seven. Very long and eerie some of these walks were, for at that time there was no house from the first Established Church in Broughty Ferry to the Milton of Monifieth. It was a weary walk over the moor, rendered more melancholy when the night was stormy by the rushing sound of the waves on the sea shore. As a whole our life was rather monotonous, yet now and then an event which produced some excitement amongst us would occur.

Once we ran away to Dundee to see a man hanged. This was in 1826 and the man's name was David Balfour. He was a sailor and on returning home after a voyage he was shocked to find that his wife was living with another man. Possessed by grief and rage he went into a butcher's shop and asked for the loan of a sharp knife. His appearance was wild but the master of the shop was out and after a short parley with the lad in charge he lifted a knife and went out. Within an hour he presented himself at the jail as the murderer of

[1] William Lyall went to Amiens in France with Carmichael's brother James to run Baxters' mill there. Harry Walker was the founder of Dura Works, Dundee (J. and H. Walker, 1833), amalgamated with Jute Industries, 1920.

[2] A distance of about six miles.

his wife. In due course he was tried when he frankly admitted his guilt and was sentenced to death. But much sympathy was felt for the unfortunate man and crowds attended his execution. I went with the others but paid dear for my temerity. The High Street was packed with a dense crowd. When the hour drew near M'Allister the Gaelic minister[1] engaged in prayer and gave out the hymn beginning 'Wherewith shall I, o'erwhelmed with sin', which was sung to the tune 'French'. The excited crowd caught sight of a crow flying over the gallows and became more excited. It swayed and the crush was fearful. Then a rumbling sound as of a chariot of horses was heard as if coming from the east. There was a general push as if to get out of the way, which drove many up the stairs and into the entries leading off the High Street. Then the direction of the rumbling sound changed and it seemed as if the chariot were coming from the west. The crowd was seized with panic but I saw little that happened after that for I sickened and went home.

Another cause of excitement, and it lasted in varying degrees through the greater part of my apprenticeship, was the robbing graves of their dead. The reader who wishes to learn the horrors and mysteries of resurrection as it then existed will find it graphically depicted in the *Life of Sir Ashley Cooper*[2] and the *Life of Sir Thomas Knox the Anatomist*,[3] the former having special reference to London and the latter to Edinburgh. Medical men were in a real difficulty. Without a practical knowledge of anatomy they could not be appointed as army or navy surgeons and at the same time the hangman was the only official from whom a dead human body could be got without breaking the law of the land. No one who did not live through that time can have any idea of the wide-spread terror and indignation aroused by the atrocities of Burke and Hare. Women were afraid to go to their work in the morning and when they did

[1] Rev. Charles McAllister was minister from 1822 to 1843 of the first Gaelic chapel in Dundee, which had been erected in Long Wynd in 1791 (*Fasti Ecclesiae Scoticanae*, v, 333). Many Gaelic speakers had been attracted to the district, first by the bleachfields in the 1780s and 1790s, later by the flax mills.

[2] Bransby Blake Cooper, *Life of Sir Astley Cooper* (2 vols., London, 1843).

[3] Henry Lonsdale, *A Sketch of the Life and Writings of Robert Knox the anatomist* (London, 1872). Robert Knox (not Sir Thomas), 1791-1862, was the Edinburgh anatomist who accepted bodies from Burke and Hare for dissection. Note the Edinburgh street song: 'Burke, the murderer, Hare, the thief, Knox the man who buys the beef'.

they kept their hand upon their mouth to prevent the application of the dreaded plaster. Churchyards were watched with sleepless care and no mercy was shown to the ruffianly resurrectionist or the adventurous student when he was caught. A set of men were detected at their horrid work in the Dundee Howff[1] one night and after that, in 1827, the inhabitants of the town held a meeting in the Steeple Church and resolved to keep watch over the newly buried bodies. The air was full of fearful whisperings and my walk to and from Monifieth on the dark nights was, as I have already said, sometimes eerie enough. . . .

By and by the extreme tension was relieved and as is usual in such cases the excitement was followed by hilarity. When the public saw the extent of the desecration and the prospect of its being put a stop to, they were disposed to make light of the matter. Comic songs were sung on the streets and those who still entertained grave fears were laughed out of them. As lads we were ready enough to enter into this phase of resurrectionism and I must plead guilty to a trick or two. In the neighbourhood of the Dens one of those most frightened of being gagged and *burked* was Lucky Drummond, an honest woman who kept a provision shop in King Street. One day while out on holiday two or three of us had been roasting some potatoes in the furnace fire at my father's mill before going into town.[2] On coming down King Street we saw this woman leaning lazily over the lower half of the door of her shop. I had a roasted potato in my hand. The temptation was irresistible. I broke the potato in two and placed one half of it on her mouth. The effect was more alarming than we had imagined and I was glad when I saw her come round again.

After my time was out at Monifieth I worked in the Dundee Foundry for nine or ten months and while there enjoyed living at home. The foundry belonged to a company[3] and was one of the oldest in the town, having commenced iron founding as early as

[1] The Howff is the name of the medieval churchyard in Dundee, now opposite the *Courier and Advertiser* buildings, Ward Road.

[2] It was quite common for workers to come early to their work so that they could warm themselves or bake potatoes in the furnace. Very few workers' houses at that time had cooking facilities or even grates.

[3] Dundee Foundry Company, see above, p. 32, n. 1.

1790.[1] In 1820 they began to construct steam-engines and while I was there in 1829-30 they were making their first paddle-engines. They were of thirty-four h.p. and intended for a tug steamer. Mr James Stirling was one of the partners in the concern and he, along with his brother, the Rev. Robert Stirling, had for some years been experimenting on an 'air engine'. They had taken out a patent in 1816 and a second in 1825 but the engine was, and still is, 'in the air'.[2]

The character of mechanics, according to the evidence given at that time by the leading engineers, had greatly improved since the beginning of the century. Fewer of them were given to drinking and the opinion that it was necessary to acquire some scientific knowledge to enable them to be the best in their line was beginning to spread and leading some to embrace every opportunity of doing so. Still I must say that among the men at the Dundee Foundry then there was a good deal of drinking after leaving the work before going home. I had been reading Lyman Beecher's lectures on temperance[3] and I reasoned quietly with some of them in the shop on the folly of the custom. Several of them told me years afterwards that they were indebted to me for having spoken to them. . . .

My attendance at the work was regular and punctual and Mr Gunn, the time and book keeper, told me long after that my name was conspicuous on the books as never having had a mark opposite it for absence or being late in the morning all the time I was there. This shows that I enjoyed good health and it is a satisfaction to reflect also that I was very industrious at that time. William Lyall and I spent our evenings drawing in my father's office and the designs I then copied, one of which is still preserved, were executed with great care and attention to the minutest details.

It was a foregone conclusion however that I should not then settle in Dundee but 'go forth in the world and push my fortune' as it was

[1] This may have been the first iron-foundry in the north-east of Scotland. Henry Cort's invention of the puddling process in 1784 stimulated the establishment of a number of ironworks in the last fifteen years of the century.

[2] Rev. Robert Stirling, D.D., 1796-1874, was suspended by the General Assembly in 1842 for holding communion with the deposed ministers of Strathbogie. He took out further patents in 1840 and 1841, and one 45 h.p. engine, whose motive power was heated air, was built and used at Dundee Foundry (*DNB*).

[3] Lyman Beecher, 1775-1863, an American Presbyterian clergyman, published *Lectures on intemperance* (London, n.d.) and many other works.

expressed. I therefore set out for London in July 1830 and arrived there with Nine Pounds and a big trunk. My father had written to his friend Mr Inglis at the rope factory in Limehouse and through him I found employment in Seaward's Canal Iron Works in that district of London.

The London of 1830 was much changed from the London we had left in 1816. The city had grown enormously. Belgravia had been built in 1825; and in 1829 the palatial clubs and residences in Pall-Mall were begun; in 1830 it was estimated that no fewer than 2,000 houses were added to the already overgrown city and that its circumference in that year was nearly thirty miles. The population had grown to be 1,000,000 and on each side of the principal streets dense masses of human beings kept hurrying to and fro. The number of Scotch then in London was nearly 130,000, or rather more than the population of Edinburgh. But the greatest change was in the middle of the streets. 'Cabriolets', soon abbreviated into 'cabs', had been introduced into the city from Paris in 1823 and already there were nearly 1,000 of them in use. 'Omnibuses' or 'omnibii', as they were then named, first began to be run in 1829 but there were soon two or three hundred of them on the streets and roads. These, with the hackney coaches, the private carriages, carts and waggons, made a tremendous bustle and the loud incessant rattling and din were at first quite bewildering. It was even then a great city. Its population seemed to be for ever on the move and always shifting, thousands coming into it and thousands leaving it every day. Into this great, ever-changing sea of human beings I was dropped as a unit and lost in the crowd.

I found the great city a great solitude. My going to Seaward's was a mistake. The chief occupation of the works at that time was the construction of engines for steam-boats. One was for the 'London Merchant', the first steamer to Rotterdam. But there was not much to be learned in the Foundry. It would have been better for me if I had gone to Donkin's, Taylor's, Bramah's or Maudslay's.[1]

[1] Bryan Donkin, 1768-1855, civil engineer and inventor of paper-making machinery, was founder of Donkin, Son and Wilks. Philip Taylor, 1786-1876, patented a horizontal steam engine in 1824 in partnership with his brother John (*DNB*). Joseph Bramah, inventor of the Bramah lock, trained Henry Maudslay, founder of Maudslay, Sons and Field, Lambeth, 1810 (*The Life of Sir William Fairbairn, Bart., partly written by himself*, ed. William Pole, London, 1877, p. 41).

One of the letters I wrote to my father at this time has been preserved and as it may reveal my life in London better than I could describe it now, I shall insert it here. It is written on three pages of a square gilt-edged sheet folded after the fashion of the time in letter shape and addressed 'Mr James Carmichael, Flaxspinner, Dens Mill, Dundee'.

Limehouse, Oct. 22nd 1830

Dear Father,

As I have again missed the ship I have written by post in case you should be uneasy at my long silence. I perceive it is high time to give up the steward of the 'London', for the box you sent me dated the beginning of September I only received on Thursday, the 20th of October, so it must have been twice in London. The blue paper parcel I also received at the same time for which I had to pay freight and wharfage amounting to 3s, and when I went down in the evening with a parcel I had ready the ship had sailed. I think it would be better to write only every second voyage with the 'Perth'. I have not received any parcel from the 'Perth' this time, but perhaps I will yet. You do not mention the receipt of the £6 3s. which I sent with the steward of the 'London'.[1]

I have not occasion for any money yet, having £2 odds beside me. It is the only thing that vexes me to think of requiring any from you now, when I ought to be a *help* to you instead of a burden. I can however safely say that I will not require any from you if God grants me health as I am almost sure of a job at Maudslay's. I shall know by Monday week; and if I stop here I shall have 20s. a week soon, which I think will keep me.[2] As far as I can learn Mr Inglis had said in the note he sent to Seaward that 'I wanted information' which accounts for my low wages as I am sure I work as well as the average in the shop. We are very busy now, having two sixty and two eighty steam-boat engines to make.

[1] The *London* and the *Perth* were two of the many sailing smacks then leaving Dundee regularly for English ports. In 1834 the Dundee, Perth and London Shipping Company replaced them by two paddle-driven steam ships.

[2] A skilled mechanic earned 33s. a week in London in 1834. See C. S. Pell, 'Homes and habits', in G. M. Young, *Early Victorian England* (2 vols., London, 1934), i, 128. As a millwright in Dundee at the same period Carmichael would have earned 16s.

I have never seen Mr M'Farlane yet nor indeed any one that ever I knew. I have plenty of work always to do. I draw two nights in the week, read two nights and I am about to begin to learn Algebra; the other two nights I have been going over arithmetic this some time past and will continue to do for some time yet, but I think I will learn Le Français, as you advise, if I think I can dispense with any of these. My mind is unsettled with the thought of removing to Maudslay's.

I think I feel a great difference on myself already. I used to be all of a tremor and blushing like *a fullblown rose* (a red one to wit) if I had to speak to a stranger even, but now I can go anywhere or speak to any one, and blush for nothing save a mean or sinful action. I am in good heart and spirits now, thanks to the Dispenser of all good, but I was very low-spirited some time back. I could see no beam of hope through the thick clouds of doubt and despair. I am glad to hear that Mother is getting stout again.. 'May she be long spared to be a blessing to us all' is my heartfelt prayer, but always tell me the worst for I would be miserable if I thought you concealed anything.

I intend going to Walthamstow on Sabbath first if the day be fine, with Miss Black's letter. I was three days idle about a fortnight ago, on account of the engine repairing, which I took advantage of to see some of the Lions which you shall have an account of when Peter 'writeth next to his Kinsfolk'[1] which shall be with the 'Perth' when I can hear of her. I have had a packet made up to send this some time with some paints to Jamie. You all appear to be very knowing about Mr Fletcher[2] but I am sorry to say you are all mistaken, for the one I speak of is an Independent. I have now discovered a Scotch church called St Andrew's at the back of the London hospital, which I go to twice a day and to Mr Fletcher in the evening. The minister's name is Crombie[3] – a man frae the Mearns – but I am sorry to say he is a very cold preacher. I have not taken a seat on the thoughts of flitting. I have not room

[1] *Peter's Letters to his Kinfolk*, by J. G. Lockhart, published anonymously in 1819, was a description of Scottish men and manners.

[2] See below, p. 41, n. 3.

[3] John Crombie, 1789-1872, became minister of St Andrews National Scots Church, London, in January 1819, and Moderator of the General Assembly in 1856 (*Fasti Ecclesiae Scoticanae*, iv, 252).

for more at present but conclude with prayers that the blessings of God may rest on you all.

Yours for ever,
Peter Carmichael

Then written crosswise, is the Postscript:

Mother thinks of sending me flannel shirts, but I really think they would be a superfluity, considering that the climate here is warmer, me in good health and washing very expensive. Tell William Lyall I have a letter wrote to him and am cheering myself with seeing him soon. I have got two letters from him which I shall repay. Remember me to Thomson Drummond, Aunt and all the rest. When John next goes a-swimming may I be there to see! Tell May Baxter I have not forgot her and among all her afflictions to keep a good conscience for

'The heart's ay the part ay
That maks us right or wrang.'

I took James Mill's letter to the shop last night but he was not in. Trade is very dull here too and no prospect of better. Would Mother work me some stockings and send them, for those I have are all holes in the heels already. My landlady however mends them. Also I would like 'a drop of the cratur' for I have not drunk a glass of spirits since I came to London. I am a perfect Cruikshank[1] and held up as a pattern by the neighbours in the street. I think you have now got words if not sense for your money.[2] Adieu! God bless you all. It is past ten and I have to go to the Post Office yet.

The reading of this letter calls up from 'the dark backward and abysm of time' forms and feelings that rise before me as in a dream. I did not go to Maudslay's after all but sat still at Seaward's. It was on the whole a gloomy, cheerless period of my life. The mechanics there were as a rule men who had no aspirations beyond doing their work, getting their wages and having a drink. I had few acquaintances, made friends with none and was often home-sick. I was greatly

[1] William Cruikshank, 1785-1850, founder of Dundee Temperance Society (Norrie, *Dundee Celebrities*, p. 124).
[2] A letter from London to Dundee then cost 1s. 1½d., paid on receipt.

distressed throughout the winter and the following spring by the thought of my mother's illness and suffering and it was a great aggravation of the trial to be so far away from her and not to see her. But I knew that all was done for her by Dr John Crichton[1] that could be done and tried to wait on God's will in patience. She used to talk lovingly of me and look towards the door with fond longing as if she desired me to enter the room and my father offered to send for me but she said 'No, better not'. She bore her severe affliction with great fortitude till God relieved her of her pain and took her to himself on the 16th May 1831. My sister Jane, left in charge of the others, clasped our mother's feet and prayed to God for strength to act a mother's part to our brothers and sisters. And her prayer was answered, for well she did it.

On the Sabbath after getting the news of my mother's death I went to hear Edward Irving[2] preach. His congregation then met in the Caledonian church, the handsome edifice that had been erected for him in Regent Square. But his popularity was by this time on the wane. He had begun to adopt his peculiar views and the period of his life that lies within the time of my stay in London is that of his trial for heresy by the presbytery. The charge was brought against him in November 1830 and was then in process. Still he was a grand man and a noble preacher. His figure rises before me now as one of the most striking I have ever seen and his rapt utterances sounded like the tones of a Hebrew prophet.

The letter I have quoted indicates the churches I went to oftenest. There was no lack of churches in the neighbourhood. At St Philip's the first district Gothic church built in the east end of London was erected in 1829 and the new church was convenient for the Episcopalians of Limehouse. The Mr Fletcher I went to hear was the Rev. Joseph Fletcher.[3] The other referred to as more widely known was

[1] Dr John Crichton, 1772-1860, married in 1794 the daughter of John Baxter the Dundee manufacturer. He was a Glassite and was described as 'one of the most eminent lithotomists of the age' (*Old Dundee Exhibition Catalogue*, 1892-3), i.e., a surgeon expert at cutting for stone in the bladder.

[2] Edward Irving, 1792-1834, friend of Thomas Carlyle and protégé of Dr Thomas Chalmers. His eloquence had transformed a small poverty-stricken Highland congregation in London into a large and influential one. He was accused of heresy on account of his hearing of pentecostal tongues and his miracle cures (*DNB*).

[3] Rev. Joseph Fletcher, DD, 1784-1843, theological writer and chairman of Congregational Union, 1837 (*DNB*).

the Rev. Alexander Fletcher, a native of Doune who had been called to the charge of the Secession congregation in Mills Lane and who a few years before this had been notorious by the *fama* of a breach of promise. He was then a man of over forty, one of the most popular preachers in the east or north-east of London, and unrivalled as he long continued to be in addressing the young. He is now best known as the author of the *Manual of Family Devotion*.[1]

But to return to my work. During the latter part of my stay at Seaward's I was employed along with a German and some others in working out the designs for Lord Cochrane. It was about this time that he became Earl of Dundonald, but, as it was a title without an estate that he inherited, the former designation which he had made famous was usually kept up. By means of his autobiography and the story of his life continued by his son the striking incidents in the chequered career of this remarkable man are now well known.[2] The fame of his intrepid daring and brilliant exploits on the sea, of the Stock Exchange trial, of his escape from prison, of his bearing in the House of Commons and of his services to Chili, Peru, Brazil and Greece in their struggle for independence was still fresh in men's minds. He was then in his fifty-sixth year, a tall man, over six feet in height, and his stalwart form led one to imagine him in the 'Speedy', the first ship of which he had command, a sloop no bigger than a coasting brig and in which his cabin was so small that when he shaved he had to put his head out at the sky-light and make a table of the quarter deck. But it was as a mechanical genius and not as a seaman or a politician that I saw him. He was a man of fertile invention and great ingenuity. In 1814 he had invented an improved street lamp for oil, which, but for the introduction of gas at the time, would likely have come into general use and a few years later he

[1] Rev. Alexander Fletcher, 1787-1860, minister of *Miles* Lane Chapel. After the breach of promise case most of his congregation followed him to his new church. His book was *A Guide to Family Devotion* (London, 1834) (*DNB*).

[2] Thomas Cochrane, 1775-1860, tenth earl of Dundonald, joined the Navy in 1793 and was appointed to command the *Speedy* in 1800. Always at odds with senior officers, he was judged guilty of libel in 1813. The Stock Exchange trial, at which he was accused of influencing share prices by leaking naval information, took place in 1813. He inherited the earldom in 1831 and thereafter devoted his leisure to mechanical inventions. He wrote *The Autobiography of a Seaman* (2 vols., London, 1860). His son, Thomas, eleventh earl of Dundonald, and H. R. Fox Bourne wrote *Life of Thomas, tenth earl of Dundonald, completing the Autobiography of a Seaman* (London, 1869).

suggested several improvements in the construction of steam vessels. Having some leisure on his return from Greece, and drawn to the subject by the success of the railways newly made, he was then trying by a series of studies and experiments to construct a steam-engine better fitted for locomotive purposes than those then in use. His idea was to construct an engine which would at once produce circular motion without any intermediate beams, cranks or connecting rods. The idea was not a new one but all the rotary engines hitherto planned had proved of little use in practice. The cause of the failure as he well knew lay in the want of a base of resistance within the machine itself against which the steam might act in propelling the piston. He did not quite overcome the difficulty, but he succeeded in producing a rotary engine far superior to any that had been projected before. His revolving engine was especially well adapted for vessels, for, as he himself said of it, 'the diminished bulk and weight and the absence of tremor add to the capacity, buoyancy, velocity and durability of vessels in which it is placed'.

He also had strong cigar-shaped vessels, old retorts got from the original gas-work, filled with highly compressed air to be used instead of steam in driving locomotives. The pressure of the air in the vessels was extreme but they took a long time to charge and were soon emptied. I remember that they were set to drive a circular saw one day and some planks were cut by the air pressure under the guidance of Lord Cochrane's own hand. A mercurial gauge to indicate the pressure was tried. The mercury was held in a cast-iron reservoir and on turning the cast-iron in the lathe after it had been so used I found that the mercury had been forced into the pores of the iron and ran together in small globules.

While working at the carrying out of Lord Cochrane's designs, some of which were failures, I was brought into contact with him once or twice a week for a considerable time and I made careful drawings of all his designs and sent them to my father who was deeply interested in them.

Among the events that took place during my stay in London at this time one of the greatest was the opening of New London Bridge by the King and Queen on the first of August 1831. But even by that time I had begun to avoid rather than to join a crowd and was not there to see the ceremony. Neither did I take much interest in

the political discussions of the time, though I could not help feeling the agitation of the City, for it was very violent especially on the rejection of the Reform Bill by the House of Lords. The Duke of Wellington was insulted on his way to Westminster, the Marquis of Londonderry was stoned and many of the nobility had the windows of their mansions broken. Besides the outbreak of the lamentable riots, another evil fell on the metropolis in the visitation of cholera. In 1830, as is well known, this dreaded disease had appeared in Persia and not long after entered Russia in Europe where it caused great mortality and struck the inhabitants with panic. Notwithstanding the efforts made to keep it out of this country, it appeared in Sunderland in 1831 and broke out in London about the beginning of 1832. Trade was dull at the time also and I became anxious to get away from London and to set my face towards the North again. . . .

I made known my wish to return to my uncle John among others and he sent me a letter of introduction to his old friend Mr John Marshall of Leeds.[1] This letter I never delivered but as I have kept it till now and as it records some interesting facts about my uncle and his family and shows the kindly interest he took in my welfare, I shall insert it here:

Orkie House by Falkland. April 1832

Dear Sir,

It is a long time since I had the pleasure of hearing from you. Since I saw you in Leeds many changes have taken place in the manufacturing, commercial and political world. Time, I trust, will bring all to a favourable issue and that before it is long. For my own part (whether fortunately for me or not) I have been leading a quiet life for ten years past, having so long ago retired from the firm of Neilson and Co. at Kirkland. I would not, after so long a pause and knowing how much you are engaged, have given you this trouble had I not been importuned by a nephew of mine, a young man who will deliver you this. His father, Mr Carmichael, was some years with Messrs Charles Turner and Co. of Lime-House, London, and for some years has had a small spinning concern in Dundee. His father has no employment for him and in Dundee everything is at a stand. Being thus situated, he has

[1] See W. G. Rimmer, *Marshalls of Leeds, flax-spinners, 1788–1886* (Cambridge, 1960).

urged me to give him an introduction to you. From what I know of him I can vouch for his good character.

Now, Dear Sir, I have to request and I will esteem it a most particular favour, and as if done to myself, that you will, if possible, give him employment for a time, and that if you cannot do so, you will interest yourself to procure him a situation. I trust I need say no more. I am certain he will be industrious and grateful.

My son has been in India for ten years. He was here for twelve months on account of his health and returned in June last when he will arrange as to his indigo factories and I trust he will be able to return soon. Three of my daughters were married some time ago: one still remains with us. So much for my domestic concerns. Mrs Drummond continues to enjoy good health and joins me in wishing that all that is good may attend you and your family.
I am, Dear Sir, yours sincerely

John Drummond

John Marshall Esqre. Leeds

On leaving London I went first to Manchester and the journey north is associated in my mind with the voice of the nightingale which I then heard for the first time. The story of the rapid growth of this town during the early part of the century is well known. Its population had increased from a little over eighty thousand in the beginning of the century to well on for two hundred thousand in 1832, and it had become the chief seat of the cotton manufacture. It had several works for the making of machinery and one of the best was that of William Fairbairn who had been settled as a millwright in Manchester since 1817.[1] His partnership with Lillie had just been dissolved and he kept the works in Canal Street. I had introductions to my father's cousins the Grants[2] and others, but with Mr Fairbairn I found the employment that I wished and there I stayed.

Mr Fairbairn was at this time a man of about forty-five and had

[1] Sir William Fairbairn, 1789-1874, took partnership with James Lillie in Manchester in 1817 and dissolved it in 1833. Thereafter he became interested in shipbuilding and boiler design. He was created a baronet in 1869 (*DNB*).

[2] William Grant, a farmer on Speyside, left that district at the same period as the Carmichaels and became a cattle-drover. In 1806 he and his sons founded the important cotton firm of Grant Brothers in Ramsbottom, Lancashire. The sons were said to have been Dickens's originals for the brothers Cheeryble in *Nicholas Nickleby*.

raised himself by his genius from a lowly position. Up to the age of fifteen he had led a hard life, sometime as a mason's labourer in Scotland and sometime as a carter in Percy Main Colliery where owing to his Scotch accent and peculiar ways he was, as he tells himself,[1] a good deal laughed at and had to fight seventeen fights before he could command a proper respect from his fellows. At fifteen he was apprenticed to a mill-wright and while serving his time of five years made the acquaintance of George Stephenson. As a journeyman he changed his place over and over again but ultimately settled in Manchester. During the fourteen years he had been there he had done much to improve the shaftings for transmitting the motive power in machines and had been consulted about several great engineering works both in this and other countries. He was then busily engaged making small engines and immense water-wheels and it was on the former that I was occupied.

But it is not easy to escape from care. The two troubles that were exciting London, the Reform agitation and the cholera, were even more actively at work in Manchester. In every time of distress or excitement this thriving town had ever been ready to speak out and St Peter's field had been the scene of several great gatherings, from the memorable and fatal one in the Radical agitation of 1819 down to the time I was there, when 40,000 men met on it to protest against the action of the Lords. When the Bill at last passed into law and the news reached Manchester that it was enfranchised, the joy of the people was unbounded. But the cholera was very bad here too and to this day I remember the shudder I felt on coming out of my lodgings after dinner and glancing down the narrow street at seeing several coffins being carried out of one house.

Among the many wonderful things in Manchester the greatest was the railway to Liverpool which had been opened in 1830. On the New Year's Day of 1833 a party of us went by it to Liverpool. The sensation of being whisked through the air without a shake, almost without any perceptible motion, was as delightful as it was novel. The thirty-four miles were gone over in about an hour and a half and the same marvellous travelling was enjoyed on our return. How little a railway journey is thought of now for as great a wonder as it was then!

[1] Fairbairn, *Life*, p. 70. Percy Mains colliery was in Northumberland.

While at Manchester I was honoured by a visit from Mr James Carmichael the engineer in Dundee.[1] His firm was engaged in making the first locomotive engines for the Dundee and Newtyle Railway at the time. He had come south to see the working of the engines on the Manchester and Liverpool Railway and, as my father had shown him the plans I had sent home of Lord Cochrane's rotary engines and air vessels, he wished to learn more about them. In course of our conversation he hinted to me that I was not learning enough at the work I was at and this stimulated me to go elsewhere.

From William Fairbairn's in Manchester I went to his brother Peter's in Leeds. The two brothers were a contrast to one another both in personal appearance and mental characteristics. William was a heavy man and everything he did or said carried weight. Peter Fairbairn, who was ten years younger than William, was nimble and quick in all his motions, taking in the various points of what was laid before him with a comprehensive glance of his dark eyes and ever prompt in executing his designs. Shortly before I went there, there had been a combination of his workmen and a strike. He had fought the men and won by introducing new tools and tool machinery which reduced the human labour required to a kind that less practised hands could perform. He employed large numbers of clockmakers and other skilled artisans and put his tools in their hands. If they succeeded they stayed; if not, they went. The relation between him and his employés was then a very free and easy one. If he was not pleased with a man he bade him go for his wages and leave at once, any man being free to give up his work on similar notice. At that time he was not particularly fortunate in the foreman he had and of many of the men it might be said that drink was their day's and night's desire. I was not in favour with them at first through having set my face against 'a custom' which, as I thought, was 'more honoured in the breach than in the observance'. This was that each new-comer should give his shop-mates a debauch at his expense. As I did not do this of my own accord I got the hint that my 'footing' was to be drunk on a certain night at Spring Grove, a little inn on the Wellington Road. As I neither went nor would pay the cost I got a more certain hint that it would be drunk again on a

[1] James Carmichael and Peter Carmichael were not related in any way prior to Peter's marriage to James's daughter Margaret.

certain night and that it would be better for me if I fell in and did as they wished. I told them plainly however if they chose to drink it would not be at my expense and after a show of ill-feeling my unneighbourliness was forgot.

At this work I got an insight into the nature of the machinery for spinning flax that was then being set up in the mills of Leeds and its neighbourhood. It was Barnsley that was the centre of the Linen manufacture in England as Dundee was in Scotland and Belfast in Ireland. But the yarns for the English manufacture when not imported or home-spun were made chiefly in Leeds. In the years preceding 1832, however, the flax-spinning trade in Leeds had not increased, as we have seen it had done in Dundee. In 1821 there were in and around Leeds nineteen mills with an aggregate of 700 h.p. and 36,000 spindles, throwing off on an average about 9,000 spyndles a day. The chief of these belonged to Mr John Marshall,[1] who was the foremost man in the trade. In 1831 there was little if any increase, for the twenty-four engines then employed had an aggregate of only 705 h.p. This want of development was not owing to foreign competition, for the duty on foreign flax was then only five or six shillings a ton and the spinning machinery then in use in Leeds was far superior to anything of the kind in France, while in Silesia and indeed over the rest of Europe all the flax yarn was still spun by the hand. An attempt had been made by the late Empress of Russia to set up machinery for spinning flax in that country and models had been sent from England as patterns but it proved a very losing concern. The want of progression in the Leeds trade seemed to arise from the careful preparations that were being made for a great effort. In their old mill of dark brick situated in the suburb of Holbeck, the Messrs Marshall had introduced many improvements and now they were preparing to build a magnificent new mill and fit it up with the most approved machinery.

While at Leeds I had a visit from Mr William Baxter of Dundee. His thoughts were at that time occupied with the new mill he was building in the upper Dens and he had come to Leeds accompanied by his manager Mr Singers to see some of the machinery that was being made. But he had another object in view. He was on the outlook for a man to help him in fitting up and starting the new mill

[1] See Rimmer, op. cit.

and who would afterwards act as its manager. From what he had learnt of me he thought I might do for the post. He invited me to the hotel at which he was staying two or three times in the evening and learned from me what was being done in the machine-shops of Manchester and Leeds. Our interviews however did not lead to an engagement and Mr Baxter on his return to Dundee told my father that he found me very intelligent and well-informed but that 'I was only a boy', a remark with which my father was not very well pleased. At my father's request I left Leeds and returned home in the month of August of this year, 1833.

1833–1842

FIRST APPOINTMENT WITH BAXTER BROTHERS

'Bevel gear and siclike matters'

BY THE TIME I returned to Dundee the beneficial results of passing the Reform Bill began to be seen and several spinning mills had been or were being built in the expectation of better times.[1] In spite of the commercial disasters of 1825 and 1826 the linen trade had continued to expand in the town. One or two of the seventeen spinning mills at work in 1822 had been given up, but several of the others had been enlarged and by the end of 1833 nearly as many again had been erected. There were then thirty-one mills at work and the fifty-three engines that drove the machinery showed an aggregate of 930 nominal h.p. Fifteen thousand tons of flax and three thousand tons of hemp were imported during the year ending in May 1833 and the value of this flax and hemp was about £700,000. The value of the linens exported was estimated at £1,500,000 and measured about fifty million yards of linen, nearly four million yards of sail-cloth and fully four million yards of bagging. The quantity of the imported fibres consumed in the mills of Dundee was over fifteen thousand tons and produced between seven and eight million spyndles of yarn. The machinery in the mills was valued at £250,000 and the amount of capital required to carry on the trade was by this time very considerable.

[1] The old 'sett' or constitution of the burgh had allowed a reactionary, self-perpetuating town council, dominated by the old families, to hold up the development of the town. Many of the most active entrepreneurs of this period were incomers to the town and therefore without a say in the town's government.

The great increase in the spinning trade of the town was owing to several causes. The bounty granted by the government on the exportation of linen was not one of these and it was withdrawn in 1832. The convenience of the port for getting supplies of raw material from the Baltic provinces and for sending out the manufactured linens to the various markets was what gave Dundee its main advantage. What the country mills saved by the use of water power instead of steam was more than consumed, in the case of many, by the increased cost of conveying the raw material inland and the yarn or linen back to a profitable market. Then the vast sum of money laid out on the improvement of the harbour during the preceding twenty years manifested a spirit of energy, enterprise and determination on the part of the spinners, manufacturers and merchants of the town that deserves success and generally commands it. As an immediate cause for the increase in the number of mills erected about 1833 there was the anticipation of the Factory Act, the effect of which would be to lessen the production of yarns in the existing mills unless they were extended. This led the most prosperous of the manufacturers to invest capital in new mills, that their occupation might not be curtailed through want of yarn and as it was seen that the investment was a fairly profitable one townsmen who had made a bit of money at other trades or in the professions joined in the general rage for mill-spinning. The mills then going employed over 3,000 persons, of whom more than one third were under eighteen and about one fifth were under fourteen years of age.

The mill-workers in 1833 had a much harder time of it than they have now. Those employed even in the best mills worked twelve and a half hours a day, from half past five in the morning till seven at night with two intervals of half an hour each for meals. The long hours then common undoubtedly produced weariness, especially among the children and they often fell asleep over their work. The evil had been attracting public attention for some time. In the beginning of 1832 a petition had been presented to Parliament by a meeting of the inhabitants of Dundee interested in the hours of labour in spinning mills, representing that the number of hours during which young persons between six and eighteen years of age were employed, was by far too great and praying that the hours might be reduced on the ground that the overtaxing of the powers and consequent

deterioration of the physical and mental qualities of so large a portion of the rising generation amounted to a national evil.

A few weeks later another petition was presented by some of the millspinners of Dundee, headed by the firm of Baxter Brothers and Co., in which they admitted that the hours of labour were too long for the health of those employed in the mills and that it would be advantageous to have a law limiting them to a certain number as it would put all the proprietors on the same footing, but pointing out that the reduction from seventy-six hours a week to fifty-eight would not only be unjust to those who had erected the mills on the faith of being unrestricted as to the hours of working, but bring distress upon the weavers by reducing the quantity of yarn that could be supplied to them by one fourth. They therefore suggested that the limitation of the hours should be to sixty-six in a week and to eleven and a half in any one day. The evidence given before the Factory Commission in June of the same year by Peter Smart, Charles Stewart, William Urquhart, Alexander Dean and James Paterson, even allowing for exaggeration caused by strong feeling, reveals a state of matters in some of the mills in and around Dundee before 1833 that it is painful to recall. But a better state of things was at hand as we shall see by and by.

The mode of weaving was as yet unchanged. The common hand-loom with the fly-shuttle, and here and there the broad-loom for floor-cloth, were the only instruments for weaving yet in use. There were now about four hundred manufacturers in the town and they had between four and five thousand looms at work. Altogether there were about seven thousand families dependent on the linen trade. The wages then paid were not high. Those of flax-dressers ranged from ten to twelve shillings, those of weavers from seven to ten shillings, of women from five to eight shillings and boys and girls from three to six shillings a week. But as the clergymen of the time in their Statistical Report observe, 'Though the wages were low, the work was regular and that tended to comfort'.

My first occupation after my return to Dundee in August 1833 was the starting of a new mill belonging to Thoms Brothers and Co. It stood at the corner of Barrack Street and is now part of the works of Don Brothers, Buist and Co. The machinery, which was of the

most approved kind, was driven by an engine of sixteen h.p. The mill was kept going busily and produced good yarns. The brothers of the firm were William and George and they had a younger brother David who was employed as a clerk at the works. I had not been there long when he did some things which displeased me and it was reported that I was going to leave. Upon this Mr William Baxter had a consultation with me and engaged me as manager of the new mill his firm were building in the Upper Dens and I entered on my duties there on Friday the sixth of December 1833.

And here I have to make a note on Mr William Baxter and his sons. In 1806, when spinning by water power was being tried in various parts of the country, he established a flax-spinning mill on the burn at Glamis, which, with a water-wheel of sixteen h.p., span yarn for about 4,000 pieces of osnaburgs in a year. In 1813 he was joined by his eldest son Edward, then a vigorous youth of twenty-two, and the firm was then known as William Baxter and Son. In 1822 they set up their first mill in the Lower Dens, Dundee. I may mention here, what I omitted from the recollections of my boyhood, that I remember watching the ceremony of drinking 'the riggin' stane' of this mill. When the mason – one of the Butcharts[1] I think – was ready to lay the last stone on the chimney stack, a glass of whisky was hoisted up to him by means of a pulley and he drank it off when the stone was laid amid the cheers of the people gathered below. In 1825 two younger sons, John and William were taken into the partnership and the firm assumed the title of Baxter Brothers. In 1826, a second mill called the Bell Mill was built. In it they proposed to set up, besides the machinery for spinning, ninety power-looms for the weaving of linen. The power-looms were actually tried but without success and in 1828 they were finally disused and laid aside. By that time Edward, who never cared for building mills, had retired from the spinning concern and, still in company with his father, confined himself to the business of a merchant. David, the second brother, was then and for some years after, the manager of the Sugar House in Dundee. When I began my work as manager of the mill in the Upper Dens, therefore, the firm of Baxter Brothers

[1] William, David and Robert Butchard appear in lists of masons in *Dundee Directories* of the period.

and Co., consisted of Mr William Baxter and his two sons, John and William and Mr Singers had then the management of the two older mills.

The new mill was built on the left bank of the burn, across the bridge from the others, and was the building out of which grew the eastern portion of the present mill. The mills created a demand for houses in that part of the town and, the grounds of Wallace Craigie having been feued, an extensive suburb named Wallace Feus was being reared, with a street called Princes Street as a continuation of King Street running through it. It was along this new street that the mill stood.

Reserving my description of the mill for the next chapter, I shall here try to give a sketch of the town as it existed at that time. It had changed and was changing. By the end of 1833 Dundee was a town of about 50,000 inhabitants. After 1815 Dock Street was reared on the old sea bottom and the ground, or solum, between it and the old Seagate was left comparatively dry. In 1828 Union Street had been opened but was not yet completed and the great improvement then being contemplated was the opening of Reform Street to take the place of the humble grey houses that had long clung to the protruding rock on the north of the High Street. The enlarged boundaries of the burgh as given in the Police Act of 1831 are Mayfield on the east, the back of Stob's Muir, Clepington, the Fair Muir and the Law on the north, and Balgay on the west; but a line from the river up Union Street, along the Nethergate, up Tay Street along by Bell Street to King Street and down St Roque's Lane to the river again would embrace nearly all of Dundee that was town in 1833 and include several open spaces besides. By that time some goodly buildings had been erected in place of the old style houses and though the inhabitants were still as boastful of their 'furrowed' streets as of their busy markets and crowded docks, the rough pavement was being replaced by the system of Macadam. Gas had already been introduced into most of the shops and mills and into not a few dwelling houses but it was not yet general. In connection with this a witty saying by James Chalmers[1] the bookseller used to be

[1] James Chalmers, 1782–1853, suggested the adhesive stamp system for Rowland Hill's penny post. Citizens of Dundee presented him with £200 in recognition of 'services to postal reform'.

quoted. Several of the houses in Union Street stood empty for a good while after they were built and those interested had to consider the question whether gas-pipes should be introduced into them. On Mr Chalmers being appealed to for his advice on the subject he quietly remarked: 'Well it's my opinion we should make sure o' the *livers* before we think o' the *lichts*'. It was not till February 1835 that the Parish Church was lit with gas. Water was being conveyed from the chief wells through the town in pipes but it was still sold on the streets also. Like most towns of the period Dundee had within its compass too little room for the dead and a very inadequate supply of good water and pure air. In July and October 1832 the cholera had carried off 512 persons and in this autumn following it had re-appeared and made sad havoc especially in the Seagate and Blacks' Croft. At the end of the year the minds of the inhabitants were filled with fear and they were roused to a sense of the wants of the town. There was then something like a general cry for a new burying ground, a new jail, a larger supply of water, better watched streets and better lit suburbs.

For a long time back there had been a good deal of enterprise in the town and the old trades were still indicated in such names as Bucklemaker Wynd, Bonnet Hill, Butcher Row, Brewery Lane, Candle Lane, Cotton Road, Dyers' Pend etc. The most noteworthy of the trades that had arisen and decayed before 1833 were soap-making, glass-making, sugar-refining, the brewing of ale and the spinning of cotton. Among the ventures that had succeeded were the seal and whale fisheries, the manufacture of leather, gloves and linen thread, the making of machines and the building of ships. But the trade that had seated itself in Dundee was, as we have seen, the making of linen. The words of the old historian who wrote that 'the people of Dundee travail painfully in the weaving and making of linen cloth' were truer at this time than when they were first penned.[1]

There was no lack of comfort among the honest, steady workers for, though their wages, as we have seen, were not high, provisions were not dear. Wheat, which sold at six shillings a bushel, was certainly an exception, but barley was sold at three and sixpence and

[1] The 'old historian' was Hector Boece, c.1465-c.1536, of Dundee, author of a history of Scotland which was first published in 1527.

oats at two and nine. Beef was to be had at from fourpence halfpenny to sixpence a pound, mutton from fourpence to sixpence and pork at fourpence or fivepence. Tea was still an expensive luxury and when a workman got it as a treat his frugal wife made him 'grund weel wi' the parritch first', as one of them expressed it. Chickens were sold at sixpence, ducks at a shilling and a pair of pigeons could be bought for sevenpence. Great quantities of fish were brought over from Fife, supplies were also brought from Broughty Ferry and women after the style of Maggie Mucklebackit still came all the way from Auchmithie with crabs, lobsters and dried fish in their creels. Nearly a hundred acres of vegetables were grown in close proximity to the town so that these could be had in abundance. Eggs, butter and cheese were also to be had at prices which we should think very cheap.

That the workers of that time were not without their share of material prosperity and habits of thrift is evidenced by the Savings Bank that had been opened in the town. In 1831 it held more than £8,000 lodged by more than 1,200 depositors. It was noted however that among these there was a large number of domestic servants and very few factory workers. Up to 1833 the business of the merchants and manufacturers had been carried on through five banks – the 'Dundee' and 'Dundee New', not yet united, the 'Dundee Union', the 'British Linen' and the 'Dundee Commercial' and in this year two new Banks – the 'Bank of Scotland' and the 'National Bank' opened branches in the town.[1]

Nor were the people without the means of education. There were about eighty schools in the town and they were attended by nearly four thousand children or about one in twelve of the population. Five of these schools were in connection with the mills, for the convenience of the children working part of the day.[2] The chief of the others were the Sessional School, the School in Tay Square, the Grammar School and the Academy. The two last were soon to be united in the handsome Public Seminaries then being built and now called the High School. Among other means of enlightenment for grown-up people, there were a subscription library of six thousand

[1] The first Dundee Bank had been founded in 1763.

[2] The five were A. and E. Edwards, Boyacks, Johnstons, Thoms and Baxters (*Reports of Factory Commissioners, 1839*, p. 75).

volumes, a reading room for artisans and an exchange coffee-room.[1] There was also the Watt Institution, opened about seven years before with a membership of 460, and which, though it had already shrunk to one fourth of that number, still by its library, museums and lectures created and gratified a desire for intellectual improvement and drew out the talents of Gardner and Jackson the botanists, James B. Lindsay, C. W. Boase and many others.[2]

Two newspapers, the *Advertiser* and the *Courier*,[3] which had prefixed to its title the word '*Constitutional*' the year before, were published once a week, but as there was a tax of fourpence on each copy, their circulation was not great. Intelligence did not then travel at lightning speed. An important act or event in London was not known in Dundee till the fifth day after it had taken place. The local journals of the time, however, discussed events with great earnestness and they afforded scope for the literary powers of such men as Gellatly and Davidson, George Buist and George Milne whilst the little book-shop of Robert Nicoll the poet was the haunt of another literary coterie including David Veddar and Andrew Small[4]. . . .

The representatives of the old Dundee families who had shone or

[1] The Exchange Coffee Room still stands at the corner of Castle Street and Dock Street and is now used by a firm of printers.

[2] The Gardner here mentioned was probably William Gardiner, 1808-52, Dundee botanist, author of *The flora of Forfarshire* (1849) (see Edith P. Smith, 'Scientists of the Dundee area' in *A scientific survey of Dundee and district*, British Association, 1939). Jackson remains unidentified. James Bowman Lindsay, 1799-1862, pioneer of electric telegraph and lighting, patented in 1854 his invention of electric communication through water without wire. Charles W. Boase was the author of *A century of banking in Dundee* (Edinburgh, 1866).

[3] The *Dundee, Perth and Cupar Advertiser* was founded in 1801, the *Dundee Courier and Argus* in 1817. The first editor of the *Advertiser* was Robert S. Rintoul, a radical who impressed his own liberal views upon it. He later became first editor of the *Spectator*, founded in 1828.

[4] John Gellatly, 1792-1839, followed Rintoul as editor of the *Advertiser*. He was secretary and treasurer of the Political Union, and a keen reformer. John Davidson, 1804-71, pamphleteer, transcriber for the Spalding Club, was employed by Dundee Town Council to arrange the burgh records. George Buist, a Conservative, worked for the *Courier* for a short time, then founded the *Dundee Guardian* which did not flourish. He later became editor of the *Bombay Times*, joined the Indian civil service, and died in 1860. George Milne, 1761-1854, amassed a very large fortune by investing profits from bookselling in shipbuilding and was publisher of the *Dundee Chronicle*. Robert Nicoll, 1814-37, a poet, contributed to the *Advertiser* on reform, and became editor of the *Leeds Times*. David Veddar, 1790-1854, was an Orkney man and a poet. Andrew Small has not been identified.

stood out from amongst the crowd for generations were still notable. Among them too were not a few worthies more characteristic of the age that had passed than of the new order of things. Dan M'Cormick, the town drummer, with his head full of Hebrew and other learning, had just passed away, but James Paterson, the drouthy and doughty old bellman and James Watson the guardian of the newspaper room at the shore, who had been wounded in the Peninsular War, were still alive and moving about. In a higher circle such veteran townsmen as David Blair, to whom the Lunatic Asylum owed its existence,[1] Thomas Davidson the Burgh Clerk, Alexander Balfour, the ex-provost[2] and George Miln the bookseller still lingered on the stage. George Kinloch, the first member of parliament for Dundee[3] had died in March and his place in the reformed parliament was filled by Sir Henry Parnell.[4] In November Alexander Kay had been chosen Provost by a Town Council no longer self-elected but fairly representative of the town,[5] whilst George Duncan[6] was Dean of Guild and Peter Dron, the improver of the Howff,[7] was Hospital Master. Robert Bell was master of the Post Office but, though there were 'penny-post receiving houses' in

[1] David Blair, 1750–1836, was employed by the Board of Trustees as stamp-master for Dundee. He quarrelled with manufacturers over his determination to enforce inspection of linens. A keen reformer in his youth, prosperity and middle age weakened his political faith. A prominent magistrate, he became known as 'Justice Blair'.

[2] Alexander Balfour, 1765–1855, in partnership with Thomas Bell, as Bell and Balfour, was the first successfully to spin jute. He was provost in 1826, 1827 and 1830. The *Advertiser* called him the 'arch-deacon of the self-elected' because of his opposition to burgh reform. He was the first chairman of the new Dundee Chamber of Commerce in 1836, and had been in 1819 deputy chairman to John Baxter in the Forfarshire Chamber of Commerce, which ceased to exist about 1822.

[3] George Kinloch, 1775–1833, championed reform in Scotland for forty years before his election in 1832 as first MP of the newly enfranchised burgh of Dundee. He was outlawed for his part in protests against the 'Peterloo massacre' in 1819. The present Peter Carmichael of Arthurstone is his great-great-grandson.

[4] Sir Henry Parnell, Irish Whig politician, 1776–1842, was returned as member of parliament for Dundee in 1833 and served as treasurer for the Navy under Lord Melbourne. He became Baron Congleton in 1841 and then transferred to the House of Lords.

[5] The act of 1833 gave a £2 franchise. It had previously been £5.

[6] George Duncan, 1791–1878, was elected MP for the burgh in 1841 by a very small majority but held the seat until 1857. He was a very active town councillor, especially in support of the rights of the Guildry.

[7] Peter Dron, 1784–1862, a shoemaker, was Hospital-master to the Town Council during the first cholera outbreak in 1833. It was the need to accommodate the number of corpses during that year which occasioned his plan for improving the lay-out of the old burial ground, the Howff. (Norrie, *Dundee Celebrities*, p. 219).

the town, the general penny post was not then even an idea. Through the exertions of James Chalmers the bookseller in Castle Street, then a man of about fifty, the mails from London had been greatly accelerated but even then a letter took nearly a week and cost more than a shilling.

Since 1815 a sum of not less than £250,000 had been expended on the harbour and in 1833 a new dock, Earl Grey's, was in course of construction. Besides the twin steam-boats on the Ferry, a paddle-vessel 'Hero' now ran between Dundee and Perth and, before 1833, engines had been fitted into a paddle-boat which ventured as far as Leith. Owing to the genius and skill of its leading engineers Dundee was thus ahead of most towns in its means of travelling by water. Nor was it behind in its means of locomotion on land. Barnie's coach, a rumbling vehicle, still ran, if its motion could be called running, to Broughty Ferry, then looked on as a fishing village, about three miles distant. But it was a relic of the past. A coach ran daily to Glasgow and several passed through Fife. Then there was a railway, the first laid down in Scotland, between Dundee and Newtyle.[1] It had stationary engines for pulling the carriages up or letting them down the inclines, and at first horses were used for drawing the carriages along the level stages. It was opened on 16th December 1831, when the eleven miles were gone over by the coach with forty passengers in an hour and a quarter and by the goods waggon in an hour and twenty five minutes. In 1833 two locomotives took the place of the horses on the level stages of the railway and were running by the end of the year.

It may seem as if I were dwelling too long over this description of Dundee and its people, but in reality the mind takes some time to unravel the mantle of more than half a century with all the figures and structures Time has embroidered thereon and to look back on a Dundee in which there was no factory with power-looms for weaving linen, no spinning mills that could be called large, very few macadamised streets, only a parcel or two of jute,[2] very little marma-

[1] The act for this railway was passed in 1825. The first carriages used were two old stage-coaches, one called the 'Tally-ho', fitted with wheels to suit the rails. (Letter-book of James Cox, 16 Feb. 1883.)

[2] 182 tons of jute were brought into Dundee in 1832, 300 tons in 1833, 828 tons in 1834, 1,222 tons in 1835, only 16 tons in 1836 and 171 tons in 1837; cp. 46,983 tons for 1863 (Warden, *Linen Trade*, p. 76).

lade and no sun pictures,[1] a Dundee to which there was no penny post, no London steamer, no telegraph wires and from which there was only one railway and that a strange one. Looking back on the Dundee of that day and thinking of its men and women, each doing their bit of work in their several places and relations, one is tempted to ask 'Who of all these are the greatest?' It were hard to tell. The two men whom a future generation was to single out as deserving of special honour in all time were James Carmichael the Engineer, and David Baxter, then manager of the Sugar House. With both of these men I was to enter into very close relationship. But this will appear as I proceed with my narrative. It is now time to describe the process of spinning as carried on in the new mill.

The linen trade as carried on in 1833 had four distinct branches and there were few men or firms who were engaged in more than one branch. The *flax merchant* made the importation of flax and hemp his business; the *flax spinner* bought the flax from him and, after getting it hackled, span it by machinery into yarn; the *manufacturer* or household weaver bought the yarn from the spinner and had it woven in hand looms into linen; then the *linen merchant* bought the cloth, and, after having it bleached if necessary, found markets for it both at home and abroad. The chief of the latter were the United States, the West Indies, Mexico and South America. Some merchants undertook the importation of the flax and the exportation of the manufactures. As there were several members of the Baxter family in the trade they were able to undertake several branches. The spinning was done at the mills in the Dens by the firm of Baxter Brothers and Co. while the cloth was manufactured and sent to various parts of the world by the firm of William Baxter and Son till the summer of 1833, when that firm of merchants was dissolved and the business carried on by William Baxter, his son Edward then setting up for himself as a 'General and Commission Merchant'. It was the spinning of the yarn, of course, that was done in the mill of which I had charge, and though it must be very elementary, I shall now give a description of the process as then carried on.

The first operation that the flax underwent then as now was the *hackling*. This is simply a combing out and subdividing of the fibres,

[1] Meaning obscure.

by which they are straightened, cleaned and in some cases split according to the fineness of the yarn wanted. The process at that time was almost entirely done by hand, the men employed being called *hacklers* or *flax-dressers*. In dressing the flax by hand the hackler had before him a bench on which were screwed two or three hackles varying in fineness according to the work wanted. These hackles were stocks of wood in which were inserted long, tapering steel pins brought to a fine point. The *strick* or handful of flax was wrapped round the right hand so as to leave a little more than the half of the length hanging loose. Upon the first hackle or ruffing tool the workman then commenced to draw the flax through the rows of pins, beginning a few inches from the end and gradually advancing toward the hand. After this half of the length was ruffed, the ends were reversed and the other half put through a similar operation. The flax was then treated in like manner on the second hackle which had much finer pins and then on the third hackle which had finer still, if the flax was wanted so fine.

The flax-dressers or 'hecklers', as they were familiarly called, were a peculiar class of men with strongly marked characteristics. As a rule they were great politicians and the 'heckling shop' was frequently the arena of violent harangue and fierce debate. They had an eager desire for news and information and one of their number was usually told off to read while the others worked and listened. This gave them the habit of thinking and acting in concert, for they had a wonderful faculty for combining to enforce their own terms. They were under no law but came to their work and left it as they pleased. They had lots of fads also. At one time it would be a band and they would march about toot-tootin' perpetually; at another they would be teetotal, but that did not last long; and at a third they would all be going in for Morrison's pills, but that did not last long either. As a class they were very drouthy and the most general of their moods was a common bout of drinking. These vagaries made them a dislocating element in the system of spinning, especially when the mill was nearly out of dressed flax, for their knowledge of their importance as the dressers of the fibre for the spinner made them self-assertive, over-bearing, dictatorial and ready to stand out for their demands. Several times they had struck work in Dundee and brought their own families and the families of the workers de-

pendent on them to much misery. One of the worst of these strikes was in the autumn of 1827[1] and it was then that machinery for hackling flax was invented, Robinson[2] having taken out a patent for what was long known as his Belfast Flat machine in that year. Another very serious one against the use of the machine in the Dundee mills occurred in the spring of 1834 and lasted four months. But as the accuracy with which the machine performed its operations depended on the attention of boys and girls, the old hacklers soon learned to scoff at it and hold it in derision.

In this machine the hackles were fixed on travelling sheets and the flax was held whilst the pins passed through the strick. The handfuls of flax were first screwed by boys into wooden clamps or holders and then placed upon what was called the trough of the machine with rather more than half the length of the flax hanging down. This trough was placed immediately above the travelling sheet of hackles and had a rising and falling movement. As the trough rose the holder was put in opposite a range of hackles. It then descended, allowing the ends of the flax to be presented to the pins which gradually approached the holder as the trough descended and thus combed out one side of the flax on the first tool. When the trough or table rose again with the holder the attendant turned the holder, so that, on again descending, the other side of that end of the flax might be dressed. The same operation had to be performed on each succeeding gradation or fineness of hackle. Now in hackling flax by this machine it was requisite for the proper performance of the work that the holder should be placed in the trough precisely as it attained its highest elevation. If the table had not reached its highest level when the holder containing the flax was put in or turned, then the hackles came suddenly into contact with too great a length of the fibre without its having been prepared for them and the consequence was that the part they first entered was broken off from the body of the flax. This reduced the quantity of dressed flax produced from the raw flax, while the tow was injured through having long fibres in it. If, on the other hand, the table had begun to descend before the holder was turned, that side would have less dressing than the side that was

[1] See Dennis Chapman, 'Combination of hecklers in the east of Scotland, 1822 and 1827', *Scottish Historical Review*, xxvii (1948), 156, and William Brown's MS. 'Essays on flax spinning', pp. 150-4. [2] Not identified.

first presented to the hackle pins. I saw that hackling by machinery would not come to much till a remedy for these evils was discovered and I early set myself to look for one. I shall tell of my success later on, for it was some years before I succeeded.

After the flax was hackled it was assorted by men who examined every handful with nicety and put the flax into separate bundles according to the fineness and quality of the fibre, so that it might be spun into the size it was best adapted for. Then, as now, there were three branches in the process of flax spinning. There was first the *dry flax* or *long line* spinning in which the full length of the fibre was prepared and spun in a particular way; second, there was the *dry tow* spinning, in which the tow had to be prepared very differently from the long flax, the process being more like that which cotton had to undergo; and there was third the *wet* spinning, which was mostly used for the finer counts of yarn, in preparation for which the flax was generally cut or broken into two, three or four lengths before hackling, as it was able to bear a much finer degree of combing without loss when thus cut short.

Taking up first the dry flax or long line spinning, the operation the flax was next put through was the process of *spreading* or *drawing*. This was for the purpose of equalising the long and short fibres of the combed flax and of drawing them out straight, which was necessary before they could be submitted to the operations of roving and spinning. On a machine which was attended to and fed by girls the flax was laid down on a movable sheet in stricks or handfuls, the points of each succeeding strick being laid down a few inches behind the one before it. The movable sheet passed on the flax to the holding rollers and these rollers passed it on to gills or movable sheets of fine hackles which passed through the flax as it left the rollers and travelled with it, but at a slower speed, to the front or drawing end. The gills then dropped out and the flax was drawn between the drawing rollers to the size of the sliver or continuous flat ribbon of flax that might be required. The slivers were subjected to two other processes of drawing through rollers or gills, similar to the spreading machine but gradually increasing in fineness. This repeated drawing was for the purpose of equalising or straightening the sliver, a most important operation, as on it the uniform thickness of the yarn depended. A drawback to the machine as then in use was

that each of the hackle-bars of the screw-gill machinery in descending left a slight thickness or rib of accumulated fibres on the sliver at that point and these thicknesses in the after-process of spinning produced an unevenness in the yarn. The slivers from all the machines were delivered into tin or sheet-iron cans. Those for the spreading machines were all made exactly one weight and by an index wheel on the delivery roller, with a bell motion, the can was changed when a given number of yards, indicated by the bell, was delivered into the can. After a number of these cans were filled, each with a measured length of sliver, a set was made up of, say, ten, to give a certain weight. This weight determined the weight of the yarn by a previous calculation of the number of drafts and doublings.

The last of the preparatory operations was the roving. In it the sliver, instead of being delivered into cans as in the drawing, was taken up on a double line of spindles and bobbins to twist. Upon these bobbins the prepared material, at that stage called *rove*, being a soft, twisted, pulpy thread about ten times the thickness of the yarn to be spun from it, was taken to the spinning frame. Of the frame I need not say more than that it was similar to the throstle frame in cotton spinning, the chief difference being that in it there was a greater distance between the retaining and drawing rollers to suit the length of the fibres of flax.

In preparing the dry tow for spinning, the object was the same as in preparing the dry flax, namely, to produce a uniform sliver or ribbon. But as the tow was the shorter fibres of the flax, combed off by the process of hackling and, in consequence, a confused and entangled mass, it had to go through the process of carding in order to bring it to some degree of regularity by straightening the fibres and bringing them to a uniform cohesive sliver. This process, which was referred to in an earlier chapter,[1] consisted of two operations, the *breaking* and the *finishing*. In the breaking card the tow was laid in certain weighed proportions upon a travelling sheet which carried it to the feed rollers of the card. The principal parts of the card were a main cylinder three or four feet in diameter and from four to six feet long, two feed rollers and eight or nine *workers* or *strippers* with a *doffer*. All of these were covered with needle-pointed wire filleting set in leather, presenting points all round like the back of a hedge-

[1] See above, p. 16.

hog. When the tow was fed in by the travelling sheet it was caught by the feed rollers which revolved in the same direction and at the same velocity as the sheet. Between these the tow was conducted to and caught by the teeth of the main cylinder which ran at a high velocity and, the wires or needles on it being slightly inclined in the direction of its movement, they combed out the tow as it was slowly presented to them by the feeders, which partly held and retained it by having their wires inclined in a contrary direction. As this was not sufficient to comb or clear the fibres, however, the workers, which were eight or nine inches in diameter, were placed around and, their teeth being set in the same direction as the feeders and close to the cylinder, they caught up all the lumps and prominences and, as they revolved slowly, they presented them once more to the combing action. To prevent the tow from accumulating on these workers, each was stripped in its turn by its attendant stripper, which, having its teeth in a contrary direction to the worker and turning also in the contrary direction at a speed greater than the speed of the worker though not so great as the speed of the cylinder, hooked the tow off the workers and allowed it to be taken up again by the cylinder and carried forward to the *doffer*, off which it was stripped and, passing through a conductor to a pair of delivering rollers, was received into a can in a continuous sliver. From ten to fifteen of these slivers were then made into a lap or large roll of sliver on a bobbin. This was put to the back of the finishing card which repeated the operation above described, but with finer wires or needles, and the carded sliver was again delivered into the receiving can. These finished slivers were then put up at the back of the drawing-frame and four or six of them were run into one at the delivering roller, thus forming a sliver for the roving frame, the rove being taken from it to the spinning-frame, which was much the same as the frame for flax, the only difference being that there was much less distance between the retaining and drawing rollers.

In wet spinning the preparing process was the same as in dry spinning except that all the parts were closer set, and the gills or needles finer in proportion to the fineness of the fibres to be operated upon. The wet spinning frame however was different. The rove, instead of at once passing to the rollers, went through a trough filled with water kept at a temperature of 150% to 180% by steam pipes

passing through the trough. The roves, passing slowly through the hot water, became macerated and arrived at the drawing rollers in a state something like softened india rubber. The retaining rollers were made of brass and deeply and finely fluted. One of the drawing rollers was also of brass and the other of boxwood, both being finely fluted. The rove, when drawn by these to the requisite fineness, was twisted and laid on a bobbin as in the ordinary throstle frames.[1]

The machines for winding or reeling, that is, taking the yarn off the bobbins and making it into hanks for the market or for sending to the bleachfield, were as yet of a very imperfect kind. The operation was always performed by hand, girls driving round the reel with their hands, and was not unlike a mouse or a squirrel in a mill, except that the girls stood outside. They stopped driving in order to mend a broken thread, shift and empty a bobbin or to tie up the hanks when reminded by an index bell that the *tale*, or number of threads, was complete.

The foregoing is a general description of the processes of spinning as carried on in the Upper Dens Mill. As Mr Singers, the manager of the mills in the Lower Dens, died of typhus fever, which was prevalent in the town at the time, soon after I entered on my duties, I then got the general management, and I may say [I was soon given charge] in the two older mills also. But improvements were constantly being introduced as they were hit upon, heard of, or seen elsewhere.

It was then my custom to make an annual excursion in quest of mechanical improvements. The recollection of most of these trips has faded away, however, leaving only one or two incidents by which I can recall them. There was my first visit to Ireland along with my old Prentice master, Mr William Low, and Mr Mathers, for example. It must have been in the end of May or June, for I remember yet the exceeding beauty of the red hawthorn in Phoenix Park. Mr Low, by that time, had a slight limp and we fell into the

[1] ' Wet spinnning is certainly the least healthful branch of manufactory. . . . I witnessed a more painful sight again and again in beholding the miserable, unhealthy-looking beings in the wet spinning departments than in any other parts of the many manufactories I have now visited' (*Report of the select committee on mills and factories*, 30 Apr. 1846, p. 38). 'I have found at the factory of Messrs Baxter Brothers at Dundee effectual protection afforded to the young persons, which screens workers from hot water and spray with which they were formerly sprinkled' (ibid.).

habit of calling him 'Sir Walter' from his resemblance to a likeness of the great novelist we saw in an exhibition of pictures at Dublin. I was paymaster for the party, and used to think that the title cost us dear at some of the inns on the route. . . .

Trivial incidents. . . are all that remain in the memory of many interesting or profitable trips. On other excursions, however, I made careful jottings by the way, and I have before me now a book of notes with numerous illustrations of a tour made in the spring of 1837, and from it I shall make a few brief extracts to show what were the novelties of that time, though some of them proved of little value.

I left Dundee in the 'Forfarshire' on Saturday night,[1] the first of April and arrived in Hull early on Monday morning. Thence I proceeded to Leeds, Manchester and other manufacturing towns:

> As to the hackling, I found that Peter's[2] machine was then supplanting Robinson's. In Walker's mill, Leeds, I greatly admired the order and regularity of the hackling room in which these machines were placed. They were attended mostly by women and girls, some being under thirteen. The machines were placed in two rows, one ruffer and two Peters alternately, a girl being in attendance at each. At one end of the room they had a circular hackling machine for doing their cut flax. In another mill I saw several machines for what was called *ending*. It was somewhat like a card cylinder on a small scale with four heckles placed in the internal circumference, two set one way and two the other. The flax was fixed in the centre of the machine and revolved quickly round till a bell rang, then it was revolved as long the other way and thus the ends were completely reduced. The spinning frames in Walker's mill were on the long reach wet spinning principle, some of them spinning thread out of Irish and Friesland flax very long, the distance between the retaining and drawing rollers on some of the frames being twenty-four inches. They were all damped with cold water in troughs the length of one carriage, but

[1] The *Forfarshire*, built by Thomas Adamson of Dundee in 1835, became famous after its wreck on the Farne Islands in 1838 because some of its passengers were heroically rescued by Grace Darling. It excelled even the *Perth* which had been until then the fastest steamer on the North Sea routes. [2] Not identified.

there were two methods of damping, one by a cast-iron lever pressing a sponge upon the pressing roller, and the other by having a wooden roller three inches in diameter running in a trough of water the whole length of the frame and placed at equal distance between the rollers and the eye-board. The only thing I saw in their broken-staple spinning worthy of note was an earthen-ware neck for the rove passing through the trough cover which seemed to answer the purpose very well. In winding, the bobbin was run over a friction drum the same as in our machines, only that instead of running upon the shank or barrel, it was driven by the outside diameter of the heads of the bobbins, and the swifts instead of being below were above the pirns, which made them very easy to get at.

At the Albion Cotton mill I saw what I considered a great improvement in reeling.[1] It was the driving of the reel by power. The rats were driven by a cat-gut pulley off the main shaft and they had a lever extending along the front of the reel, which stopped it as fast as it could have been done by hand. They had forty-eight spindles on each reel and ran at a great speed. They had a brush for the threads passing over, and the eye was made the size of the thread, so that a lump on the thread stopped it at that place till the thick part was picked out and a knot tied. Their tyings-up were marked off by a bell the same as our own.

At Peter Fairbairn's in Leeds, where some alterations on machinery were being made for our mill, I learned the newest improvements on cards, and at his brother William's in Manchester we saw the large circular boilers with from one to five flues that they were making and the very heavy marine engines, one to be 300 h.p., that they had castings laid down for. We were escorted over the shop by Robert Smith and one of the most interesting things we saw was Fairbairn and Smith's patent machine for riveting. It was the outcome of a strike of the boiler-makers at a time they were busy.

This patent was then only six weeks old. It is in the name of Robert Smith and is dated February 16, 1837. In his deservedly cele-

[1] Yarn winding, or reeling, remained a hand process in Dundee until about 1850 (James Cox's MS. Diary, in the possession of Miss Margot Cox, Seaton House, Nairn).

brated autobiography Mr James Nasmyth ascribes the invention to Smith of Deanston in combination with William Fairbairn, but this is a mistake. Robert Smith served his apprenticeship in Ward Foundry, Dundee, and was there nick-named 'Betsy' by the workmen because of the gentleness of his manners. Mr Fairbairn, in his autobiography tells the story of the invention and the taking out of the patent in his own way:

> I noted that at several of the works I visited the furnaces were fed by Stanley's patent hopper and I had more than one opportunity of seeing it at work. There was a very thin fire and the coals were thrown over the whole of its surface like peas. By an ingenious contrivance the belt was thrown off when the steam was high and, immediately the damper began to rise, the feeding machinery was again set to work.[1]

These notes will help to show what was being done at the time and how we tried to keep abreast of all the improvements.

In the preceding chapter I told of the long hours those employed in our mills had to work in 1833, but within a month of the time I began my work in the Upper Dens mill the first Factory act came into operation and a change for the better began. After the first of January 1834 no person under eighteen years of age was allowed to work in the night or for more than twelve hours in one day or sixty-nine hours in one week, and after that date no child under nine years of age could be employed except in silk mills. After the first of March the hours of those under thirteen were limited to nine in one day and forty-eight in one week and they could not be admitted without a medical certificate declaring them to be of the ordinary strength and appearance of children of that age.[2] Under the same act factory inspectors were appointed to examine the children and to enforce their attendance at school for at least two hours daily six days in the week.

In connection with the Dens mills a school had been in existence for some time before this. At first the children were taught in the

[1] Fairbairn, *Life*, p. 163.

[2] But see *Report of the select committee on mills and factories*, Apr. 1840, pp. 27, 106: 'There are children who have certificates of their being thirteen who are not so'.

mill, sometimes by over-seers or managers, and then a brick building was erected as a school room. It stood where the office now stands. But the attendance of the children at the school was very poor. In his evidence before the factory commission in 1832 Peter Smart, who was an overseer at the mill, says that there was a night school from eight o'clock to nine and that the workers were forced to go to it.[1] Of the twenty-five girls on his flat, however, not more than three or four went regularly to the school, and the others could not be dismissed for not attending because they were better workers than any girls to be got in their places were likely to be.

Mr Alexander Hutchinson, the teacher at Dens mills, wrote a letter to the commissioner certifying it to be his unqualified conviction that the system of employing children for so long a period each day at the spinning mill was in a high degree unfavourable to their moral and intellectual improvement. He speaks of the languid state of the children through the fatigue of the day and says that many of them fell asleep while writing their copies or learning to read, so that it was very difficult to communicate instruction to them. After 1833 there was a new departure and from this time forward the school has been an important institution in the organisation of the works.

During these first years of my life as a manager I owed much to the kindly counsels and wise guidance of my uncle John Drummond who gave me the benefit of his experience at Kirkland. He had retired from business at the early age of fifty and in 1834 was not much over threescore. He often visited us in Dundee. On these occasions my father and he used to have long chats about the changes they had seen and my uncle became eloquent as he expatiated on the changes that were to be. 'Man, Carmichael,' he would say to my father, 'we've lived before our time; wouldn't it be fine to cut in again and have the next fifty years clear to live in. . . .' The principles he inculcated were very sound. 'At the end of each day', he once said to me with some earnestness, 'always reflect on what you have done and what you might have done. . . .'

On some points I had to take a firm stand. At that time it was

[1] *Parliamentary Papers* (1831–2), xv, 338–43: 'Q: Do you mean to say that when they have got up from their beds at four o'clock in the morning, and have worked from five to eight at night, that then the master has compelled them to go to his night-school? Peter Smart: Yes.'

customary for tradesmen to offer bribes under the name of presents to managers of mills in the hope and expectation of getting orders through their influence. It was a rule with me to accept none of these under any pretext whatever. Some of them were easily enough refused but others could not be returned without a rebuke, expressed or understood, to those who offered them. One of them, I remember, was a complete set of brushes with my monogram neatly engraved on each. But I made no exception to my rule even at the risk of giving offence to those who perhaps only meant to do me a kindness.

On the other hand the tradesmen had been accustomed to wait for the payment of their accounts. If the member of the firm who had charge of this department was not in the office when a tradesman called with his account, or, if in, not in the humour to pay at the time, the tradesman was told to call back and had often to do so two or three times before he got the money. Now I held that if a tradesman had supplied goods or done work he was entitled to the price of his labour without having to dance attendance for it or beg it as a favour. I therefore insisted that when an account attested by me was presented at the office the cashier should be empowered to pay it at once. After a little while this became the rule, but the old way was given up reluctantly and my pressure for the introduction of the new system was not soon forgotten.

As to my own affairs it may be worth while to record here that from the time I began to earn anything till now it has been my constant habit to keep an exact account of my income and expenditure, for to this practice in my early years I attribute in great measure the foundation of any fortune-making that has attended my labours.

I may also note my thirst for knowledge. The period was one of much mental activity and many societies were then formed for the instruction and enlightenment of the people. Chief among these was the Society for the Diffusion of Useful Knowledge, with Lord Brougham at its head. The *Penny Magazine* and *Penny Encyclopedia* published under its auspices did much to spread valuable information throughout the country. In Dundee the favourite of the serials then in circulation was *Chambers' Journal* which I had taken in from the time of its commencement in 1830. In the beginning of 1834 Dundee took as many as 1158 copies of that periodical. Another useful periodical published in Edinburgh but printed in Dundee which

I read regularly was *Tait's Magazine*. It was started in 1832. The Watt Institution, which in 1834 was held in the Hammermen's Hall, Barrack Street, under the presiding of Dr Webster,[1] spread a sound knowledge of several scientific subjects and its library contained a well-selected collection of works on the Arts and Manufactures as well as on the Natural and Physical sciences. I drew largely on these and on looking over my own books find that I had then bought for more careful study the best works on spinning, on the construction of machinery and on the heating and ventilating of large buildings.

The first two years of this period were ones of considerable development in Dundee. In the end of 1833 the engines employed in driving spinning machinery were, as we have seen, of 942 nominal h.p. For other purposes and not including navigation, the engines employed in the town were of 305 h.p. By the summer of 1835 the nominal h.p. employed in flax spinning had risen to 1190 and for other purposes to 329. By that time also steamers had been put on between Dundee and London and they added greatly to the trade of the port. The following years, as we shall see later, were not so prosperous.

At the end of 1833 we found the town alive to many wants and throughout the whole of this period it was in a state of turmoil over the water question. All were agreed that the nine ancient wells within the burgh, supplemented as they were by carts from the country which sold water at the rate of four pitcherfuls for a penny, had become altogether inadequate for the supply of the town. The parties were at first also agreed in thinking that the supply needed should be procured from the Dighty and its tributaries including the lochs in the Lundie district.[2] The question at first was simply whether the water should be introduced into the town by a Joint Stock Company or under a Board of Commissioners popularly elected who would assess the inhabitants. As difficulties[3] arose other questions

[1] Alexander Webster, MD, 1799-1863, police surgeon in Dundee from 1833 (Norrie, *Dundee Celebrities*, p. 22).

[2] The use of the Dighty was effectively prevented by influential mill-owners (*Report on proposed plan for supplying town of Dundee with water, as proposed by G. Buchanan, civil engineer, Edinburgh*, Dundee, 1836).

[3] The difficulties involved Dundee town council in costly legislation and lengthy parliamentary activity. W. Cubitt, FRS, civil engineer, London, reporting on the water plan, wrote: 'I think it impossible to calculate the extent of the expense where so many

were raised and it was found necessary to abandon the scheme of supplying the town with water from the Dighty. It was then proposed by the Town Council to bring the supply from the river Isla, a source supposed to be inexhaustible, but the opponents of the scheme suggested other sources, the district of Monikie in particular. The consequence was that before the end of 1837 the Town had spent more than £15,000 on three schemes and added more than £32,000 to the Town's debts without effecting anything for its good.[1] Meanwhile some of the mills, chiefly those in the west of the town, were very badly off for water. The 'thrice twenty times heated' waters[2] of the stream and its feeders, on the banks of which they had been built, were quite insufficient for the supply of the mills, and their owners, by digging wells, or deepening those already dug, deprived their neighbours of the little supply they had. At the Dens our mills had more water than any other in the town. The firm had paid a double feu or ground duty for the property in the Upper Dens because of the water that was upon it. There was an excellent spring on the ground and in addition to it the 'den' was dammed up so as to retain the water of the burn in ponds. This gave the works in the Dens a decided advantage. It also placed us in a more favourable position in the event of an outbreak of fire. Up to the spring of 1835 no great precautions had been taken against the spread of fire in the town, but in consequence of a series of sixteen fires in about as many months five or six engines were then provided and men appointed to manage them. The largest fire that broke out in 1835 was in the property of Mr James Watt on the quay in Dock Street and in 1826 there were unwelcome fires both in the Dundee and Tay

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parties have their interests involved in that most fertile field of litigation called " Water rights ". Had I but been in possession last year of the local information obtained in the last week I should have advised the parties . . . not to have entered at all into the proposition called the Consolidated Bill; which must, in my judgment, have been a consolidation of difficulties.' (Ibid., p. 5.)

[1] So heavily were the town's resources taxed by the water row that its financial affairs had to be put under a trusteeship from which they did not emerge for nearly thirty years. See Bruce Lenman, Charlotte Lythe and Enid Gauldie, *The development of the Dundee textile industry* (Abertay Historical Society, forthcoming).

[2] This phrase refers to the custom of drawing, for use in steam engines, stream water which after use was returned to specially built cooling ponds from which it could subsequently be drawn for frequent re-use.

foundries. It will remain a blot on the history of the town that, notwithstanding the urgent need for a better supply of water in 1833, it was as late as 1847 before that supply was obtained.[1]

It was towards the end of 1836 before weaving by the power loom was successfully started in Dundee and I shall begin by narrating the previous attempts to introduce it in the weaving of linen. Cartwright[2] invented the power loom in 1787 and, after some improvements by several hands and the further invention of a dressing machine by Johnson,[3] it became pretty extensively used in the weaving of cotton cloth. At first thought it might seem that the loom which manufactured cotton with facility would also weave linen. But it is not so. The two fibres are so different that what suits one will not do at all for the other. A cotton thread is so elastic that it will stretch a long way before breaking, while a linen thread will break if stretched one thirty-sixth of its length. This rigidity of flax yarn necessitates perfect precision in the length of the thread in the warp. If they are of unequal length it is evident that the shorter lengths will have to bear all the strain of the weaving and be constantly breaking. With regard to the threads of the weft also, unless the lengths of the thread thrown across the warp be nearly uniform and of proper tension, the selvedge will have to bear the strain and will either be constantly breaking or jagged like the teeth of a saw. While in cotton, therefore, the inequalities both in warp and weft are compensated by the elasticity of the material, in linen success can only be obtained by the greatest precision in all the mechanical details.

Many attempts were made at the weaving of linen by power before anything like success was obtained. Two years after Cartwright's invention the Trustees for Manufactures awarded a premium of twenty guineas to Alexander Robb, Tongland, on the favourable report of four expert judges, for his invention of a loom to be driven by water or other mechanical power, but I am not aware that it ever came into practical use.[4] Twenty years later, on 4th July 1810,

[1] In 1847 there was no piped water for houses in Dundee, but the water supply at the public wells became more reliable after the Dundee Water Act of 1845.

[2] Edmund Cartwright, 1743-1823.

[3] Not identified.

[4] SRO, NG1/1/26, pp. 339-40. This is quoted by Warden (*Linen Trade*, p. 457) in the extracts he made from the records of the Trustees. Tongland is in Kirkcudbrightshire.

Joseph Crompton of Manchester[1] asked a premium for a sail-cloth loom which he had invented to go by water or steam and he presented a certificate from several manufacturers in its favour, but, Mr Blair[2] reporting unfavourably, the petition was refused. In 1813 a reward of fifty guineas was given to Francis Blair, linen manufacturer, Edinburgh, for the invention of a sail-cloth loom to go by water, its chief excellence being that it gave both an open and close stroke for every thread of weft put in.[3]

It was about this time, when our country was at the very height of the struggle with Bonaparte, that the first really successful attempt at weaving linen or flax goods by power was made. It was in the sail-cloth factory connected with the extensive rope-making works at Limehouse and it will be remembered that my father was there at the time. With the exception of the few years that their own spinning mill was at work, they got their yarns from Scotland and were chiefly supplied by Neilson and Co. of Kirkland. The looms were working and making good canvas when I was shown over the works in 1831. The process by which the flax yarn was prepared for these looms was complicated and laborious. It would be reckoned very slow in the present day, but, for the time, it displayed much mechanical skill and ingenuity.

The yarn came to the factory in large bundles of hanks or skeins and was first taken to the 'bucking house'. There it was steeped in a mixture of potash and pearl ash and hot water, beaten in the plash mill, rinsed in a running stream, squeezed dry and then boiled in alkaline liquor. Thus purified it was taken to the bleachfield where it was exposed for about a week and then hung in the drying shed or

[1] Crompton was at that time living in Dundee, and had erected there a loom adapted to the weaving of coarse sail canvas by power. The Board of Trustees refused his request for a premium without explanation (SRO, NG1/3/20, p. 287, 31 July 1810).

[2] David Blair, the representative in Dundee of the Trustees, was fighting a rearguard action against innovation during the period 1799–1820, largely because so many of the innovations proposed by Dundee industrialists sought economy at the expense of honesty. See, for example, SRO, NG1/3/21, pp. 340–2, 18 Apr. 1816.

[3] The wording of this and the following paragraphs is very close to Warden, *Linen Trade*, pp. 710 ff. It seems more likely that Warden had had access to information from Peter Carmichael than vice versa, particularly in view of the sentence in Warden: 'At the time these [1st edn.] notes were written the previous existence of the London establishment [at Limehouse] was unknown to the author'. It is reasonable to suppose that it was made known to him by the man whose father had worked there, namely Peter Carmichael.

store room.[1] The yarn, after being washed, bleached and dried, was taken to the winding room where the quills for the weft threads were filled at the quill machines and the yarn for the warp was wound on bobbins. Besides these machines there was in this room another machine about thirty feet long in which the warp yarns underwent a special preparation for the loom. It was the dressing machine and on it success in the weaving mainly depended. At one end of it was an upright frame with about 900 bobbins and at the other was the warp beam. The threads from the bobbins passed through little eyes and between reeds to make them form a layer of parallel threads. Thus arranged they passed between two revolving rollers, the lower of which dipped into a trough of starch with which every thread thus became soaked. Moving onwards the threads then passed between two horse-hair brushes, which spread the starch equally over each individual thread. Still moving on in regular order the threads passed round first a copper box and then an iron box, both steam heated, and were in this way thoroughly dried. Then passing through the weaver's harness they were wound on the beam ready to be put into the loom. The yarns that came off the bobbins, rough and pliant, when wound on the warp beam were stiff, smooth and dry.

In the weaving room there were about forty power-looms and in a long gallery near it about the same number of hand-looms were at work.

Besides the Limehouse factory I believe there were others later on in England. At least I have heard that a firm in Preston[2] had a number of looms at work on the finer class of linens to supply the demand for France, which was considerable before the increase of the duties.

The introduction of the power-loom by the makers of linen in Scotland was very slow. In 1821 an attempt to weave linen by machinery was made in Kirkcaldy[3] and in October of that year twenty-four looms were at work. But it is easier to learn what these looms were to do than what they did. In 1824-5 John Maberley and Co. in Aberdeen erected two hundred looms for the weaving of linen by steam power and their factory was in all likelihood the first

[1] Linen yielded less readily to chemical bleaching than cotton. Although by this date cotton bleaching was carried on entirely indoors, linen continued to be exposed to the open air until the 1930s.

[2] The Preston firm is mentioned, but not by name, by Warden (*Linen Trade*, p. 701).

[3] See Warden, *Linen Trade*, p. 565.

set up in Scotland with success. Mr John Maberley lived in London and was one of the boldest speculators of the time.[1] He not only engaged in a succession of government contracts but entered into large transactions on the Stock Exchange and had business negotiations with several foreign governments. The establishment of linen manufactories in Aberdeen and Montrose was the first connection he had with Scotland and the works in both places were conducted with consummate ability and success, though it used to be said that Mr Maberley himself was only twice in Aberdeen. In connection with his manufacturing business there he opened an exchange and deposit bank in 1818 under the firm of Maberley and Co., with branches in Montrose, Dundee, Edinburgh and Glasgow. The office in Dundee was at first on the west side of Castle Street and then in the Cowgate. On Monday, the second day of the year 1832, it was announced in London that the firm had failed and in the course of a week the country was startled with the news.

It turned out that the great speculator had withdrawn from the manufacturing concerns some months before, leaving Mr Richards and other gentlemen of capital in London proprietors of the works in Aberdeen and Montrose so that these ventures were not so seriously affected by the failure and were carried on as before.[2] Other firms in Aberdeen and Mr Reid of Cromwell Park had power looms working with good results before a successful start was made in Dundee.[3]

We have seen[4] that the first attempt at their introduction into the town by Messrs Baxter Brothers was not attended with such success as would induce them to continue and that the looms and other machines were laid aside in 1828. In the *Statistical Account* of the parish of Dundee, which was revised to December 1833 it is written: 'Power looms have not been employed here, or at least not to any advantage, and they are understood to be entirely laid aside'.

[1] John Maberley was an English financier who acquired Broadford linen factory, Aberdeen, in 1811, and had business offices in Dundee and Montrose. He gave evidence in the House of Commons in 1825 about the possibilities for mechanisation of the linen trade (*Advertiser*, 29 Sept. 1825; Alexander Keith, *North of Scotland Bank Limited*, Aberdeen, 1936, pp. 5, 136-7).

[2] Richards and Company of London also maintained a branch office in Baltic Street, Dundee (*Dundee Directories*).

[3] It is interesting that all the firms here mentioned were at first bleachworks, taking in first calico-printing, then spinning, then weaving, as subsidiary to their bleaching activities.

[4] See above, p. xxiii.

It was in 1836 that Baxter Brothers and Co. again took up the subject and in that year they built the original power-loom factory. Mr David Baxter had by this time left the Sugar House and joined his younger brothers John and William. It was he who took the establishing of the factory in hand and superintended the starting of it. It was constructed to contain two hundred and sixteen looms, to be driven by an engine of twenty-five nominal h.p. It was ready for the commencement of operations in the month of August when it attracted a good deal of attention. Whether as regards the extent of the building or the adaptation of the machinery to the purpose intended, it was looked upon as one of the wonders of Dundee. The weaving room was a hundred and fifty feet long and seventy-five feet wide and the other apartments set apart for the preparing processes were relatively spacious. The roof was supported by cast-iron pillars and the upper flat was lighted from above. Though the arrangement is common enough now it was new at that time and as the main shaft and driving machinery were placed under ground the effect of the room when seen for the first time was peculiarly striking. The factory gave employment to from three to four hundred people and led to the making of a finer class of linens than had formerly been manufactured in Dundee. About the time it was started a large number of people came to Dundee from Aberdeen and several of those who had been employed in the factories of Gordon and Barron, Leys, Masson and Co., and Richards and Co., the firm that succeeded Maberley and Co., got employment in the new factory at the Dens. Chief among these were two men called Alexander Mitchell and Hugh MacGowan and they were guided in making a start by Mr John Bruce, a hand-loom manufacturer in the town and well known to the members of the Watt Institution as long one of its most active directors. To these three, under the superintendence of David Baxter, is due the credit of starting the first power-loom factory in Dundee.

But their success was not up to their expectations. The foremen from the north found that their Aberdeen ideas could not be worked out in Dundee somehow and Mr Bruce was not ready in overcoming difficulties, which were occurring every day. As may easily be supposed the machines for winding, warping and dressing were without truth or precision and did their work very indifferently at

first. Nor were those for weaving well adapted to the kind of work they had to do. The looms first introduced were made by Claud Girdwood and Co. of Glasgow and were after the model of the heaviest description of cotton-looms of the day. Each loom had an individuality of its own and the idiosyncrasies of each used to be freely pointed out and commented on. Of one it was said that *she* would only do a certain kind of work, of another that *she* had taken a stubborn fit and had to be coaxed for half a day before she would throw the shuttle or take up. Being so fitful and apt to get out of order, the looms, as might be expected, did not produce much work. The speed did not exceed eighty *picks* a minute. Each loom required a weaver to attend to it and very hard work she had, for the shifting of the temples and the rubbing of the cloth, both of which processes were afterwards done away with, was work enough for a strong woman.

The members of the firm were not a little disappointed with the results of the working of the looms during the first months they were on trial and they were somewhat disheartened by the frequent stoppages of the machines and the complaints of the weavers. In the hope that I would get the looms into better trim, they called me into the office one morning and told me that they wished me in future to take charge of the weaving as well as the spinning. I did so and spared no effort to make it a success.

Looking back to the first days of weaving linen by power the question rises: why was it that fifty years, all but a few months, were allowed to elapse after Cartwright's invention before the power-loom was successfully started to weave linen in Dundee? I have already alluded to the difficulty of the process and the mistaken supposition that the machinery that did for cotton weaving would also do for linen. But if the difficulties were overcome in 1836 why could they not, with skill and perseverance, have been overcome much earlier? Well, for one thing, the yarns spun had been gradually improving in quality and in 1836 they were superior to what they had been before. Then the spinners span for the manufacturers who were a numerous and respectable body of men contented with their lot and their manner of life. The hand-loom weavers also, as a class, were in general well pleased with their occupation; at any rate they were ever jealous of opposition and ready to resist whatever seemed to

them an encroachment on their proper trade. The spinning mills had outlived the attacks to which they were subjected when spinning by machinery first began, but the discomfiting vicissitudes and violent fluctuations of their trade had tended to check enterprise and had induced a timidity which was not lessened by the deplorable attacks on the cotton factories around Manchester during the distress of 1825 when, with two blows of a sledge hammer to each, power-loom after power-loom was shattered and the factory that had held them set on fire. I do not know that all of these causes explain the tardiness attending the introduction of the power loom in Dundee, but each of them, I think, has something to do with it.

When I was in the north of England in April 1837, I saw in Taylor and Wordsworth's the original Bavarian patent loom but it was not at work. I met there, however, the patentee of another power-loom which he was fitting up on a new principle. He called it a pendulum loom and one thing remarkable about it was that it had no rotary motion, the middle shaft only traversing about half a revolution backwards and forwards and the tread was given by the half wheels which could be made to tread two, four or six treddles as required. The picking was done by two strong spiral springs made to come into alternate action, so as to give a sudden jerk at the right time. The take-up was also done by a spiral spring with a ratchet wheel attached. It was ingenious but not applicable to our own kind of work. At Ashton-under-Lyne I saw in Jamieson's some very speedy work being done in getting up power-looms for cotton, especially in the forging and turning of the cranks. Their looms were the handsomest and best constructed of any I saw at that time. While in Manchester I went to Well's shop to order some looms of a particular pattern, but they refused to take an order for less than twelve looms of the same description. I was not sorry, for on seeing the loom I did not like its plan and the workmanship was coarse and generally indifferent.

It was not without some anxiety as well as difficulty that our first power-loom factory was got fairly started. The time was a very trying one. The American market throughout 1836 was greatly overstocked with goods from Dundee as well as other towns in Great Britain and there was in this country a vast number of bills drawn by the importers in America. Numerous joint stock banks

also had been established in this country within a year or two and a spirit of reckless speculation had again become rife as in 1825. The natural consequence followed. In the spring of 1837 all the banks of New York suspended payment and a feeling of distrust spread throughout the Union. Several large and respectable firms in this country suffered disaster and the trade of Dundee received a sudden and serious check. In one week thousands of hand-looms were silenced. The weavers were glad to get a web a week and to weave an osnaburg for five shillings![1] Distress, especially among the improvident, was certainly very great.

Another anxiety sprang from the wild and restless movements of the Chartists, the name given to those who, not satisfied with the Reform Act of 1832, agitated for more and in 1838 embodied their demands in a document called 'The People's Charter'. Its notorious six points, namely, universal suffrage, equal electoral districts, vote by ballot, annual parliaments, the abolition of the property qualification for an MP and the payment of members, were not so wild as the people's manner of enforcing them was illegal and rebellious. Their numbers in all parts of the country grew formidable and their leaders became wild in their indiscretion. Great demonstrations and riots were of common occurrence. and attempts were made to get the working classes to hold a 'sacred month' during which all labour was to be suspended.[2] Though the people were not prepared to carry out the month in its entirety the delegates reported to the convention on 6 August 1839 their conviction that most of the trades might be induced to cease working on the twelfth for two or three days in order to devote the whole of that time to solemn processions and meetings for deliberating on the present 'awful state of the country'. When the day came disturbances were raised in many parts of Lancashire to compel workmen to cease from their labour. In Dundee the call of the convention for a month of idle 'begging' was not responded to and neither was the call for the two or three days. There was a foolish placard or two and a meeting in the Caledonian

[1] A weaver could expect to earn about 19s. a week in 1805 (Don Brothers Wages Book); but only from 7s. to 10s. in 1831 (Warden, *Linen Trade*, pp. 545, 556).

[2] The Chartists in Dundee lacked efficient leadership. Considerable, but weak, support for some of the principles of Chartism by middle-class industrialists, as expressed here, was diverted to the Anti-Corn-Law demonstrations organised by the Baxter family. (Norrie, *Dundee Celebrities*, p. 402.)

Hall at which Mr Hunter[1] and some others talked of 'the pike and torch school' and of physical force having to be applied if moral force would not do. But after much lofty talk of one kind or another a resolution to agitate for the charter was carried and with that the flourish of trumpets ended.[2]

Of events bearing less directly on the trade of the town but deeply affecting Dundee there were not a few during these years and some of them were of startling importance. In the September of 1838 there was the wreck of the 'Forfarshire' when that steamer on her passage between Hull and Dundee struck a rock among the Farne Islands. The story is too well known for repetition, having been kept alive by the heroic conduct of Grace Darling and her father, the keeper of Longstone lighthouse, who pulled through the raging surf in their little boat and succeeded in saving nine of those who had clung to the wreck.

The[3] beginning of the year 1840 is memorable for the commencement of the penny postage, and the beginning of 1841 is specially memorable in Dundee for the destruction of the East, the South, and the Cross churches in the early morning of the first sabbath of the year, when the venerable piles, beginning to show marks of 'the slow consuming tooth of Time' were suddenly devoured by 'the swift licking tongue of Fire' and only the ancient steeple was left. . . .

Altogether the year that began and ended so calamitously in Dundee was one of much excitement. The people of this country were so restless that the Queen's letter to the General Assembly in May recommended ministers 'to inculcate in their flocks lessons of good order and obedience to the constitution'. Work was scarce; in June wheat was at eighty-six shillings a quarter; in October the distress in

[1] John Hunter was a school teacher, a member of the Police Commission which was elected on a £2 franchise until 1850, and very active in support of workers' rights (*Advertiser*, 1850, 1851, passim).

[2] See also below, p. 93. The activities of the Chartists in Dundee are described in detail, if hardly without prejudice, in *Memoranda of the Chartist agitation in Dundee*, published by William Kidd (Dundee, n.d.).

[3] A pencilled note in the margin here questioned whether some discussion of factory legislation should be included at this point. Peter Carmichael himself was called to give evidence before Lord Ashley's select committee on mills and factories in 1840 (*Report of the select committee on mills and factories*, 1840, p. 39). The year was also memorable for some local agitation on behalf of girls sacked by Baxters and this may explain reluctance to discuss the situation.

the manufacturing districts was very great and serious commercial failures in Glasgow two days before the year was out deepened the general gloom.'[1]

Before closing this chapter I may add that my home life during these years was somewhat different from what it had been in the years previous. My father had to make way for the power-loom factory. The property on which his mill stood had been bought and in 1837 he gave up the mill at the Dens and took a lease of the bleachfield at Harestane on the Dighty, not far from the town. Then most of the family went out there to live. I stayed in the house at the Dens with my sister Euphemia as my housekeeper. On Sabbaths she and I went to Ward Chapel and had the privilege of sitting under Dr Russell.[2] Sometimes, however, I walked out to Harestane on Saturday night or Sabbath morning and attended the church of the Mains with the rest of the family.

Sometimes, too, on a week night, we had a dance in the country house. This took place in the kitchen which was cleared for the purpose. The curtains of the bed were drawn and the dresser on which the fiddlers sat placed in front of it. My sisters remind me that on one occasion when Mr Donald M'Intosh and another good fiddler had been invited for a quadrille the two were mounted on the dresser and the dance was going merrily to their lively strains when suddenly there was a crash and silence. Where the musicians had sat nothing was to be seen but two pair of feet. In their excitement they had unconciously hitched back and fallen through the curtain into the bed.

At the close of this period we were mourning the loss of our uncle, John Drummond. His wife, our aunt Janet, had died in the summer of 1839 and left him lamenting and lonely. On 24 August 1841 he had reached the age of three score and ten and nine days later he wrote a reply to a friend who had sent his congratulations on the event. On his way to the post office at Kettle with this letter he fell down on the road and was carried home. A few days after, on 8

[1] Emigration was at this period very high, particularly among skilled workers, and a number of emigration offices opened in Dundee. In 1837 300 Dundonians left for Australia. (David Macmillan, 'Scottish enterprise in Australia, 1798-1879', in *Studies in Scottish business history*, ed. P. L. Payne, London, 1967, pp. 319-44.)

[2] Rev. Dr David Russell, 1779-1848, congregational minister, trained at the Theological Academy in Edinburgh. Ward Chapel, Dundee, was built for him in 1833 (Norrie, *Dundee Celebrities*, p. 115).

September 1841, he breathed his last and was laid to rest beside his wife in Kettle Kirkyard. Within five months their only son, Archibald Neilson Drummond, died near St Helena while on the voyage home from India.

The year 1841, as we have seen, closed in gloom; and the trade of the country continued in a state of depression throughout the year that followed. It was a year of great distress and there were food riots in various towns. In Glasgow the unemployed met on the Green and formed themselves into a begging army and as the year wore on there were many alarming disturbances and attacks on factories, some of them being set fire to by the weavers, till a proclamation was issued against all such lawless persons. In Dundee we had difficulties but nothing like the serious dangers they had in Glasgow, Dunfermline and the English manufacturing towns.

The hand-looms in Dundee at this time were set up partly in factories and partly in private houses. At the beginning of 1842 the number of looms in factories was 3131, and of these only 1232 were at full work, employing 1319 persons, while 554 others, with a weaver to each, were partially employed. No less than 1345 looms were at a stand-still and 1458 factory weavers were without employment. The out-door hand-loom weavers had less to complain of in the way of getting work but the rate of their wages was 25 per cent lower than in 1836 and they earned barely enough to procure the necessaries of life. The butchers of the town reported that the wage-earning class at that time did not consume one half the quantity of animal food that they had done in 1837; some of them said not one fourth. This seems to be in some measure confirmed by the fact that while 150 cattle per week were supplied to the town in 1836 the average weekly number in 1841 was only 98.

Yet it was in the beginning of this year 1842 that we tried to work the power-looms more economically. We had placed in our factory eight new looms from Glasgow and as they were going well we thought that one weaver might look after two of them instead of one. Two of the looms were accordingly trimmed up and one of our best weavers was set to take charge of them. She undertook the work pleasantly enough and the looms being in fair trim she had no difficulty in managing them throughout the afternoon. Next morning, however, she refused to begin, giving as a reason that the other

hands had threatened her. Of course I had no alternative but to dismiss her, yet I felt much at a loss how to proceed. There were, as we have seen, a very large number of weavers without employment at the time and all of them were ready to cry out against any arrangement which in their opinion would add to the number. Moreover I did not then wish to do more than give the system a trial. Still I saw that if I succumbed then, it would be much against our getting one weaver to take charge of two looms at any future time. In refusing to return to her work the first girl had given as another reason for drawing back the fact that she stood alone so I sent for two of the girls and I reasoned the matter with them. I told them that we had been much annoyed by the girls at these looms becoming careless through their not having sufficient work and that we found the quality of the work actually worse when the yarn was good than when it was inferior. I told them, moreover, that it was our wish to encourage good hands and that they had been selected on that account. Before leaving the office they agreed to commence and I afterwards got two others to undertake the other four Glasgow looms. All then went well. The girl that had been dismissed was taken back, on the understanding that she would be set to the first pair of looms that became vacant. The other weavers were quieted and soon became reconciled to the system.

The produce of the factory gradually went on increasing from this time and the quality of the cloth was well kept up. I find from my notes that I had about this time made a series of experiments on starching at the power-looms, trying the effect of strong Stockton flour with and without tallow and when mixed with varying quantities of raw linseed oil. I found that forty pounds of potato flour mixed with three pounds of hot melted tallow and twenty five gallons of boiling water, the whole, when cold, passed through a drainer and used without any reducing, made quite a whole thread and so 'swank' as to 'cloth' with the greatest facility.

In February and March my brother James made a tour in quest of improvements, beginning at Glasgow and taking in Manchester, Leeds and other towns in the district, and I had much pleasure in guiding him as to what he should see and in learning what he saw.[1]

[1] This trip must have been made in preparation for James's departure to manage the Baxter interests in Ailly, France (see above, p. xxii, and below, p. 103).

I wished him to learn specially about flax-breaking machines, also about those for cutting the flax, and the system of roving without a journal in front. He was also to collect information about the wages paid and the kinds of cloth most commonly made. He did not find the English mill-owners so liberal in giving information as those in Glasgow, but he was allowed to see nearly all that was being done. He described the trade of the manufacturing towns as being in a most deplorable condition and in many places there were not more than ten per cent of the engineers and mill-wrights employed then that there had been four years before. In Dundee itself the number of mechanics in employment was only about one fourth of what it had been in 1837. Yet in the midst of all the misery, care and anxiety of the time I had a sweet solace, and all things went light with me in anticipation of the happiness I hoped soon to enjoy. In the end of 1841 I was engaged to be married to Margaret, daughter of James Carmichael the engineer. My leisure hours during the first months of the year were spent getting our house in order and the interviews we held for arranging our plans made all 'go merry as a marriage bell'.

I had long wished to see the scenery of the Rhine and we at one time intended going up that river for our marriage jaunt. My friend Mr William Smith of Neiderbronn[1] gave us a pressing invitation and promised that he and Mrs Smith would go up the Rhine with us to Switzerland. The tempting trip was made more so by the proposal that Charles Carmichael, my dear friend and the brother of my beloved, who had been spending the winter at Malta for his health, should come home by Marseilles and meet us at Geneva. As it drew near the happy day however and we found trade growing worse and worse, we resolved to give up our intention for fear of what Mrs Grundy would say.

Mr James Carmichael was the greatest mechanical genius then living in Dundee. He is the man whom his townsmen have honoured by erecting a statue to his memory, but there is as yet no written memorial of his life which would tell to the future generations that will gaze on the statue the work which he did and the manner of man he was. With the view of remedying this in some degree I, who was admitted into his family and long enjoyed the pleasure of his

[1] Possibly William Smith, shipowner, Castle Court, Dundee.

friendship, will here give a short sketch of his life up to the time of our marriage. In substance it is much the same as one I wrote for the *Artisan* many years ago.[1]

He belonged to a different branch of the Carmichael family from what my father did. He was the Lanarkshire branch and allied, I believe, to the Hyndford family. He was sometimes urged to trace his descent but like all men who hold the patent of their nobility direct from Almighty God he did not think it worthwhile to do so.[2]

He was born in Glasgow in the year 1776. His father George and his uncle James were in partnership and carried on their business as merchants near the end of the Trongate. When he was about ten years of age his father died and his mother shortly thereafter, having disposed of her share of the business, returned with her family of two sons and three daughters to her native place, the village of Pentland in Midlothian.

James, who had been at school in Glasgow, was then put to the village school of Lasswade. Mr Hume the teacher was a worthy man and tried hard to get some smatter of Latin into him, as he was wont to express it, but without success. With arithmetic and geometry it was quite different and he soon excelled all his school-fellows in these branches, thus early manifesting the prevailing bent of his mind. While attending school at Lasswade he lived with his maternal uncle Mr Umpherston at Loanhead, who was a country millwright and the fourth generation of millwrights of the same family in that place.

After leaving school he was bound as an apprentice to his uncle and served for the usual period, living, as was then the custom, with the other apprentices in the house of the master. In the retired village of Loanhead there were no libraries, and indeed there were few books on the subject of mechanics or mill work then in existence. But his uncle seems to have been a person of more than ordinary intelligence and anxious to procure all the information possible connected with his business. He was a subscriber for the *Hall's Encyclopedia*[3] then being published in numbers and the contents were eagerly

[1] *The Artisan: a monthly Journal of the operative arts*, ed. by the Artisan Club (30 vols., London, 1843-72).

[2] James Cox, the other son-in-law, however, did think it worth while and spent a good deal of time and money in the last year of his life attempting to prove his wife's descent from the earls of Hyndford (Letter-book of James Cox, Jan.-Mar. 1885).

[3] Not identified.

read and commented on while sitting round the fireside after the labours of the day, for the master sat with his apprentices and led the conversation. Mr Carmichael was wont to tell that it was from this book he first learned that bevel wheels could be made at any other angle than forty-five degrees.

That the country millwright's fireside was not a bad training school was made manifest by the number of his apprentices rising to considerable eminence in their profession, some of them continuing in close intimacy with Mr Carmichael to the close of their career. For one of them, who emigrated to America, he wrote a lament, one verse of which has been preserved:

> Lament with me my brithers dear
> Who love to talk of bevel gear,
> The various shapes that cogs do wear
> and siclike matters,
> Of sections of the cone and sphere
> and farmers' happers.

He always spoke in the most reverential manner of his uncle the master, whose position seems to have been more like what we conceive of the old patriarch than any relation we have as master and servant in the present day. He led the family worship, at which the whole household attended, every morning and every evening, and in the garden was a summer house to which he retired at a certain hour every day for meditation and prayer.

While still an apprentice Mr Carmichael invented a traversing motion for guiding the threads on the bobbins of the spinning wheel. This motion was not only a saving of time to the spinner but also a saving of waste by building the yarn on the bobbin more equally. It was a country-side wonder and a wheel with the rock and the tow was kept ready to show to visitors.

After the expiry of his apprenticeship he went to Glasgow and entered into the service of Messrs Thomson and Buchanan, cotton spinners in the Adelphi works, and, while there, he assisted Mr Buchanan in getting up the tables for his *Treatise on Mill work*.[1] He often spoke of the difficulties which had to be contended with at that time from there being no data for calculating the strength of

[1] See below, p. 105, n. 2.

materials or the proportionate parts of machinery and he was always very careful to note sections of fracture as a guide to him in his future practice.

His brother Charles, six years younger than himself, who also served his apprenticeship with his uncle at Loanhead, had come to Dundee in the year 1805 and commenced business as a mill-wright in company with Mr Taylor under the firm of Taylor and Co. The contract of co-partnery was for five years and at the termination of that period Charles requested James to come from Glasgow and join him. To this James agreed and having disposed of a small property he had at Crossmaloof to Mr Thomson, his employer, he came to Dundee in the year 1810.

By the time of which I am writing, therefore, he had been more than thirty years in Dundee and during that period the firm of James and Charles Carmichael, by its successful achievements, had come to be regarded as one of the most eminent and practical in the engineering world. Their business at first was confined to mill-wright work, but as the spinning of flax in Dundee was extended, they began to make steam-engines and this they continued to do for the mills, not only in and around Dundee, but in all the towns and villages on the east of Scotland.

As early as 1821 they fitted up the first twin steam-boat, already described,[1] with an ingenious apparatus for regulating the motions of the engines by a small handle on deck. Captain Basil Hall, in describing it, said: 'This ingenious reversing gear does its business most perfectly and is so obviously applicable to every description of steam vessel that I have no doubt it will be universally adopted when it becomes known'. And then he adds: 'The ingenious inventors with the modesty characteristic of true genius not only never dreamed of taking out a patent but were apparently unconscious of having accomplished anything worthy of being made public, and yet by this simple and beautiful invention the means of transit has proved so expeditious and free from danger that millions on millions sterling have been invested in marine steam navigation'. It is said that while James was meditating on the plans Charles remarked, 'Man, can we not make a boat to go backwards as well as forwards?' James simply said, 'Well, that is worth thinking over'; and he thought it out with

[1] See above, p. 27.

complete success. It is neither to George Stephenson, therefore, nor to the Messrs Rennie that the discovery of the first really efficient reversing gear in the link motion is due.[1]

But Mr Carmichael's greatest achievement was the invention and application of the fan blast. In the spring of 1828 he and his brother set about making experiments with the model of an apparatus on the principle of the winnowing machine for blowing a cupola for melting cast-iron. The experiments were varied in every possible way and much money was spent on the alterations. When they were satisfied as to its success they resolved to adopt it in the Foundry. Owing to various causes it was the month of May 1829 before the machine was set to work but then it exceeded the most sanguine expectations. It was soon after applied to blow the forges in the smithy where it was found to be still more useful.

The fan blowing machine speedily came into general use and although it might have been made a profitable patent the partners freely gave the use of it to the trade and were ever ready to show it at work and to give information on the subject. This manifested great nobility of character but it was not good business.[2]

In 1833 the firm built the first locomotives, the 'Earl of Airlie' and 'Lord Wharncliffe' for the Dundee and Newtyle railway. They were fitted with vertical steam cylinders and six wheels with bell cranks transmitting the motion to wheels. They cost about £700 each. The tenders, which were simply four-wheeled waggons with a water barrel at one end, cost £30 each.

At a very early date Mr Carmichael saw in the distance to what importance steam navigation would attain and he had a canal constructed in the Ward Foundry yard where he made experiments, the record of which, as found in his notes, is still very valuable and curious. In the year 1838 the firm built an iron paddle-steamer named the 'Caledonia', for the river traffic between Dundee and Perth and they also built a small iron schooner, humorously but not inappropriately called the 'Tinkler'. These were the first iron vessels

[1] See Samuel Smiles, *Lives of the Engineers* (5 vols., London, 1874-99), ii, 193-382 (Rennie), v (Stephenson).

[2] So poor a business man was James Carmichael that, in spite of the useful work he was doing in Scotland, his financial situation was shaky enough in 1839-40 to force him to consider emigration (James Cox's MS. Diary).

built in Dundee and as there were very few then afloat they attracted considerable attention.

Mr Carmichael's most recent invention was a very ingenious planing machine for straight and circular work or both combined, which gave a continuous cut both in going and returning. It was described and illustrated in several scientific magazines and works on tools and the machines soon came into general use for purposes of planing and boring both at home and abroad. In the steam factories of Woolwich and Portsmouth they were highly prized.

The liberality of the Messrs Carmichael in giving the world the benefit of their inventions without restriction was appreciated by the trade and the iron manufacturers and engineers, headed by the Messrs Houldsworth and the Messrs Napier of Glasgow,[1] raised a subscription and presented each of the brothers with a service of plate. The design of the fan blast was engraved on each piece and the description as recorded on the plate given to Mr James is as follows: 'Presented to James Carmichael Esq., engineer, Dundee, by a few friends in the iron trade in testimony of their deep sense of the liberal manner in which he and his brother have permitted the unrestricted use of their valuable invention of the fan blowing machine. Glasgow, April 1841.'

Both brothers were highly respected as upright honourable men but James was the one who worked out the problems that Charles sometimes suggested. The feeling for James was one of reverence and something like awe. Their men did not like a reproof from either. A man coming in late one morning was approached by Mr James. His face assumed a piteous look as he said, 'Oh sir! I've met Mr Charles at the gate'. The master quietly turned round.

He was a man wholly without guile and simple in all his ways. Yet he was shrewd enough too and did not bow before anyone who looked upon him merely as a convenient help. A gentleman of some consequence once entered his office with an air of importance as he was instructing an apprentice how to draw a certain design. He went

[1] John Houldsworth, 1807-59, was the founder of Coltness Iron Works in Lanarkshire and Dalmellington Iron Works in Ayrshire, about 1835 (Frederick Boase, *Dictionary of Biography*, London, 1965, i, 1547). James Napier and Robert Napier, his son, marine engineers, operated Camlachie Works, Glasgow (ibid., ii, 1079).

on talking to the lad regardless of the gentleman's efforts to attract his attention. At last the visitor said, 'Hm! I'm Mr –'. Still he leant over the lad's drawing board. 'I'm Mr –, the Provost of –'. On this he turned gently and said, 'Well, I'm not denying it'.

Though not a good business man, there was a touch of humour in the way he did it sometimes. The Dundee and Newtyle railway sent him an engine to repair at a time when there was a big account against them in the books of the firm.[1] He duly repaired the engine and sent it back again, but kept the 'eccentric' without which it was of no use, till the account was paid. . . .

His home at Fleuchar Craig was a very hearty and hospitable one. Mrs Carmichael was an excellent helpmeet and full of motherliness, a fine type of the comfortable and comforting Scottish matron. She was a gracious woman. I used to call her 'The piece maker', for all who came to the house on an errand got something. None were sent empty away. My visits, of course, were especially delightful to me, though the story of my courtship is not likely to interest any one else. . . .

We had hoped to be able to fix on a day in April for our marriage, but circumstances led us to put it off for a week longer than we expected and so we were married on the second of May. It was the day on which the Chartists in London made a great demonstration and presented to the House of Commons their monster petition, said to have been signed by more than three millions of people. It was carried on the shoulders of sixteen men and, being too big for admission to the House, it had to be broken in pieces at the entry. But, great as the event seemed in the eyes of some, it was not in our thoughts.

On our return from our marriage jaunt we began life together in the old home at the Dens. We had hardly got settled when the depressed state of the trade was made worse by the failure of Mr William Boyack. I was asked to value the mill and there was a good deal of excitement over the bankruptcy. It was caused by a higher dividend being offered than there were funds to meet and the question arose whether those creditors who applied first and got pay-

[1] The finances of this railway company never did reach a healthy position. See S. G. E. Lythe, 'Dundee and Newtyle Railway: promotion and management, 1825-46', in *Railway Magazine*, 1951, pp. 546–50.

ment of their allowance should pay back part to let those for whom there was nothing left get some.[1]

Then in the autumn there was a good deal of restlessness and commotion among those who were idle and out of work. There were then about four thousand unemployed in Dundee and they were persuaded that, as they had failed in getting work or relief from the magistrates of the town, they should compel the country gentlemen to consider their case. The Chartists were urged to join them. A meeting was held on the Magdalen Green one Saturday afternoon. There were about eight thousand present and it was proposed that they should refuse to work till the Charter was gained. Great threats were held out as to what was to be done on the Monday morning. The fires were to be drawn out and all who went to work were to be mobbed.[2]

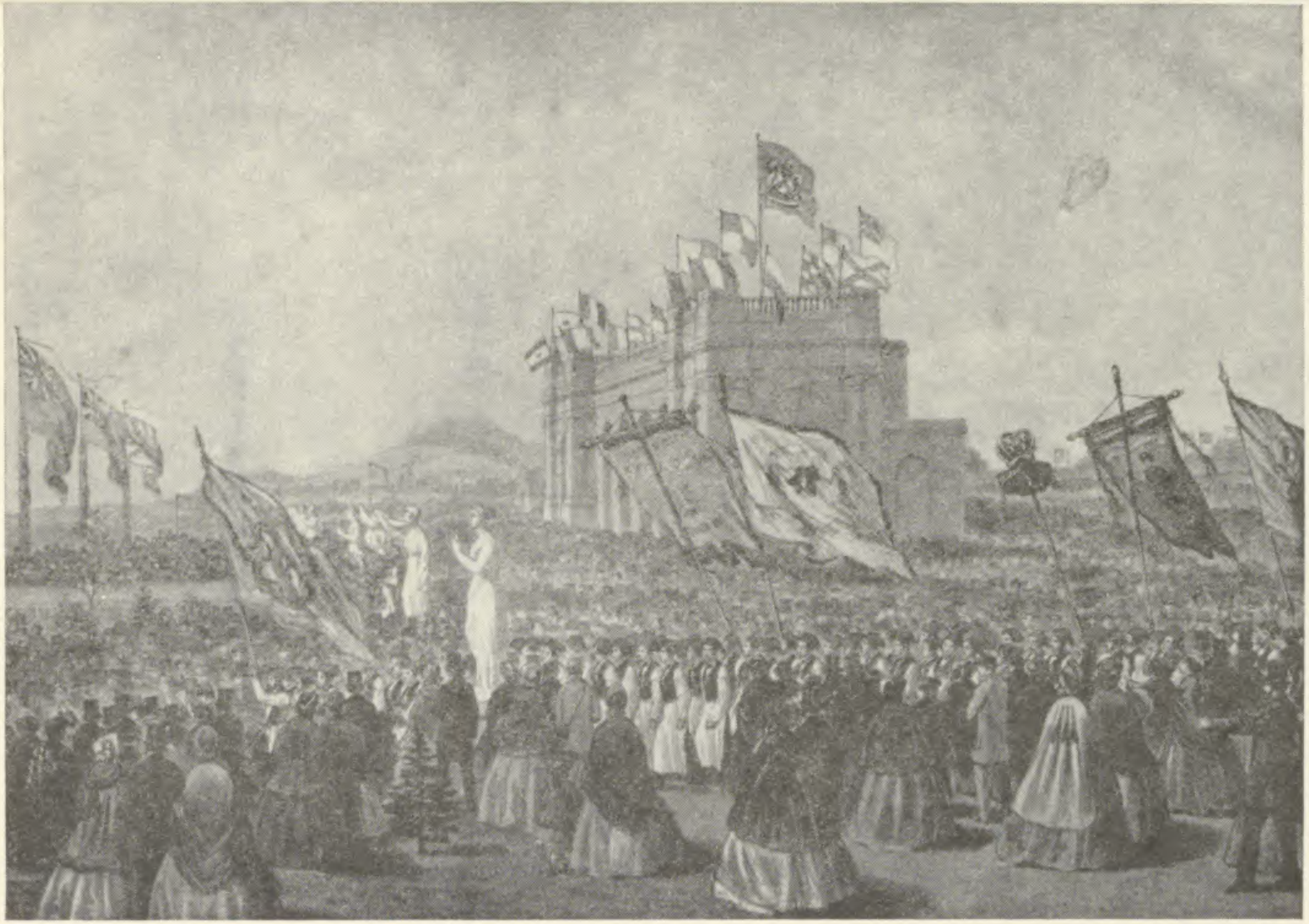
To be ready for a riotous mob on the Monday morning short batons were made and special constables sworn in. Strange to say, some of the wildest of the Chartists became constables. At that time the Chartists had a church in Dundee, the name of the preacher being John Duncan. He was a well-meaning though weak-minded man and on the Sabbath he did all he could to keep his people from being rash, inconsiderate and foolish. On the Monday morning a crowd gathered on the Magdalen Green and a messenger was despatched on 'black Jess' to look on and ride back with the news. The crowd consisted chiefly of an idle, dissolute crew, very few honest workers out of employment being among them. The messenger came back with the news that the Chartists had set out on the march to Forfar by Lochee. This 'pilgrimage of folly', as he calls it, is graphically described by Myles in his *Rambles in Forfarshire*.[3]

[1] The legal action against Boyack's trustees caused something of a sensation at the time. See Charles W. Boase, *A century of banking in Dundee* (Edinburgh, 1866), p. 80, under the heading for 6 June 1842. The Joint Stock Companies Act, which limited the liability of shareholders, was not passed until 1856.

[2] Dundee textile employers were active supporters of the Anti-Corn-Law League. Disappointed in their attempts to enlist working class support for their own lukewarm radicalism, they turned with some bitterness to suppress Chartists' attempts to organise the workers. (*Memoranda of the Chartist agitation in Dundee*, Dundee, n.d., p. 27.)

[3] James Myles, 1819–51, Chartist, published *Rambles in Forfarshire, or sketches in town and country* (Edinburgh, 1850). He also wrote the more widely known *Chapters in the life of a Dundee factory boy* (Dundee, n.d.).

Memoir
of
Peter Carmichael



Opening of Baxter Park, Dundee, 1863: procession of the trades.

1842–1853

IMPROVEMENTS IN MACHINERY

'The ferlies in Manchester'

IT WILL BE borne in mind by the reader that these letters[1] were written not only without the remotest thought of their ever being published, but that they were thrown off without premeditation and often in the bustle of business. For biographic purposes, as revealing the heart of their writer, this is to us their merit. The misfortune is that such of them as are now in existence have been preserved rather by accident than on purpose and that they are, therefore, fragmentary in their character.

The earliest extant is one to his wife on her first departure from home on a visit. It is without date, but from internal evidence belongs to the summer of 1843.

> Being at home lane and weary this evening I cannot resist the temptation of doing the next best thing to having your sweet company to talk with, namely, to write to you. I was at Mr Cock's[2] last evening for a short time and conveyed your message. I have a few requests to make before I go farther in case I forget. Firstly, where is the key of the whisky press, for it is all *up* or

[1] At this point Peter Carmichael's own narrative is broken off and the story of his career is taken up by Alexander Monfries, his sons' tutor, possibly after Carmichael's own death (see above, p. xli).

[2] 'Mr Cock': James Cox and his brothers announced in 1845 their intention of changing the spelling of their name: 'The firm of James and Thomas Cox announce that they will now be known as Cox Bros., . . . they having adopted that spelling' (Letter-book of James Cox, 1 Jan. 1845).

more properly speaking *down*. The well ran dry when Mr M. was here and you may tell Mary that he and I were forced to make *matrimony*,[1] which he declared gave him great satisfaction and it will no doubt induce him to try again. Secondly, would you go to the booksellers and procure for me the *Manse Garden*.[2] It is a small book by a Border clergyman. Thirdly, get at the same time another book entitled *Original diaper designs for the use of damask weavers*. You speak of buying some music. Could you not procure a better and larger copy of psalm tunes than what we have as I am sadly wearying to get some of them learned?

The great event of the time in Dundee, as throughout Scotland, was the Disruption of the church. After it took place, the cause of the Established Church in the town for a time looked almost hopeless. The saintly and zealous McCheyne,[3] to the great grief of the town, which now numbered about seventy thousand inhabitants, had died in the spring of the year about two months before the crisis came. Of the fourteen ministers remaining, ten came out and these included all the young and vigorous men with the exception of David Arnot, and he was soon translated to Edinburgh. Of the other three, Archibald Maclauchlan had been fifty years a minister and James Thomson,[4] whose sympathies were with the Free Church party till the end came, had been more than forty. Both were past their best. The one man who had strength for work was Charles Adie.[5] And this was not all that the Church had to bear up against, for the Town Council cut down the stipends of the Town's ministers to one hundred guineas and this made it difficult for the congregations to get, or at least to keep, a good minister.[6] On the other hand new

[1] 'make matrimony': mix their drinks?

[2] *The Manse Garden*: not identified.

[3] Rev. Robert Murray McCheyne, 1813-43, came to Dundee in 1836. He had a very strong influence over a large congregation at the church of St Peter's, which had an unusually large working-class element. He died of typhus. (Norrie, *Dundee Celebrities*, p. 82.)

[4] Archibald Maclauchlan, 1762-1848, minister of the first charge at St Mary's from 1808 to 1848 (*Fasti Ecclesiae Scoticanae*, v, 317). James Thomson, 1771-1857, minister of St Clement's from 1806 to 1857, sometime editor of *Dundee Courier* (ibid., 322).

[5] Rev. Charles Adie, 1785-1861, minister of the first charge at St Mary's from 1848 to 1861 (ibid., 317).

[6] The town council was enthusiastically in favour of the Free Church and refused to release the Hospital Fund, from which stipends had formerly been paid, for the use of

churches were built for the ministers who came out and the denomination grew in strength.

But this was a conflict that Mr Carmichael looked on from without and in which he took no part. Shortly after his marriage he and his wife together entered into Christian fellowship with the congregation worshipping in Ward Chapel under the ministry of Dr David Russell.[1] This placed them outside the great ecclesiastical controversy of the time but brought them into contact with the dissensions that then rent the congregations of the Independents. James Morison, a young minister of the Secession Church at Kilmarnock, had been suspended from his ministry for certain views with regard to the extent of the atonement and the doctrine of election. Three ministers avowed their adherence to his views and were also expelled from the Church, and the four, being earnest in promulgating their views, attracted many belonging to the Independents of Scotland. In May, 1843, they formed themselves into a distinct sect called the Evangelical Union of Scotland[2] and it is to this that the second half of the letter already quoted from alludes:

> The schism among the students is a more serious thing than appeared. We were afraid the Dr would follow up his burst upon Thursday night by dwelling on the subject but were agreeably disappointed by getting two first-rate practical discourses from him today.... He dwelt on the difficulty of reconciling the free will of man with the foreknowledge of God. In talking it over on the way home we came to the conclusion that these difficult points ought not to be a ground of difference but what most concerns every one is his own personal holiness and that each ought to act as if everything depended on himself, looking unto God and asking His aid. I can hardly give you an idea of what has been said

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Church of Scotland ministers. The stipend row dragged on for thirty years, helped to alienate the middle classes from the council, and by absorbing public interest and funds to the exclusion of other affairs, delayed the progress and development of the town. (Town Council Minute Books; *Dundee Advertiser*.)

[1] See above, p. 83 n. 2.

[2] For an account of James Morison's Evangelical Union see J. R. Fleming, *A history of the Church in Scotland, 1843-74* (London, 1927), pp. 10, 48, 109, 248.

and done at the meetings but will send you a *Warder*[1] which will occupy some of your spare time when in the country, as you will require to make yourself master of the subject or you will be behind when you return home. . . .

The next letter, also to his wife, was written after a visit to Mr William Nairne of Mill-hole near Logie Almond, a man who had the gift of speech and much mechanical ingenuity as was evidenced by the machine for reeling on which he was then exercising his inventive faculty, but who failed to succeed as his friends desired through want of continuity in following out his purposes to a practical result.[2]

Dens, Friday 25 August 1843
at 2 p.m.

My dearest Margaret,

I received yours this morning and take the opportunity of my earliest leisure since to write to you a few hurried lines. It was six o' clock last night before I returned, having waited for the steamer which left Perth at three. I had a most delightful jaunt. The business part only lasted a few hours and the rest was pleasure. . . .

On Thursday morning we got up at six and after drinking a tumbler of milk warm from the cow we drove away up the Sma' Glen, about nine miles to Corriemuckloch Inn, by which time we were perfect *ogres* and really the folks did not realise much off us, as I devoured for my own share a pair of eggs with salmon and grouse and all with perfect impunity. Altogether I have not enjoyed anything so much for a long time.

As respects my coming up tomorrow night I am afraid my inclination to be with you, dearest, makes me forgetful of what is really my duty. However I will do what I can to get away with

[1] The *Dundee Warder and Arbroath and Forfar Journal* was founded in 1841, its chief interest being the upheavals within the church in Scotland. In February 1845 it became the *Northern Warder and General Advertiser for the Counties of Fife, Perth and Forfar*, with a wider range of interest.

[2] William Nairne, 1800–57; see below, p. 104. There does seem some reason to suppose that his failure was partly due to the readiness with which some industrialists, not Carmichael, took advantage of his inventions. By 1857 his power-loom shuttle, for instance, was in very general use in England as well as Scotland without any financial gain for himself. (*Advertiser*, 30 Jan. 1857.)

the last coach, but if I do not arrive do not be uneasy as it is possible I may not be able to get without neglecting something of importance. I will attend to your request about the egg box and the coffee. As to bringing a pen that will spell, I will try and get one that will not only do that but speak also.

The next two letters we have to give were written in the following summer while he was away on one of his journeys in quest of improvements.

Talbot Hotel, Manchester. 18 June 1844

. . . I am still far from being through with seeing *ferlies*[1] in Manchester and begin to think now that it will be Friday before I can leave. I am getting quite staunch and fit for anything, as for instance, after breakfast yesterday I went to different places in Manchester until one o'clock, then went to Bolton and got no meat until my return at seven at night, when I *did* make up for it. This morning I went off without breakfast, it being too early, and got nothing until one o'clock in Blackburn when I dined and breakfasted all in one to some purpose, drinking half a bottle of wine to it without being a pin the worse. I can also drink ale and porter to almost any extent. So much by way of the victualling department.

Golden Lion, Leeds. 2 June 1844

I only got into Leeds last night at eight o'clock. Mr Nairne is in Glasgow by this time I hope. He is slowly improving. We have a tryst to meet in Glasgow and have a day or two's walking about together and then I expect to get home by Saturday night. Mr Cruikshank[2] came from Manchester to Barnsley with me on Friday and on Saturday morning by seven we turned out to see the wonders and I saw through all the works I wished.

I was hearing Mr Ely[2] this forenoon and was much pleased with his earnestness. I intend going to Mr Hamilton's[2] in the evening. I dined today *solus* and have discussed the better part of a duck with green peas, potatoes etc. and also a very fine currant pudding or rather pie. This is a new condiment, being the ordinary red

[1] A ferlie: a wonder, a strange event (John Jamieson, *Etymological Dictionary of the Scottish Language*, various edns.). [2] Not identified.

currants pulled green the same as gooseberries and prepared in the same way. Think of all this washed down with half a pint of sherry wine and you have my dinner.

Mr Boyack[1] and his son are staying at this inn but I have not seen them since morning. I shall endeavour if possible to get all done in Leeds by Tuesday night and will then take the railway to Newcastle and thence to Glasgow by the easiest conveyance I can get....

I saw nothing of H. Cox[2] and there is no appearance of the marriage in any paper I have got hold of yet. I have again misbehaved in purchasing a dress which is quite out of the fashion and for which I am perfectly prepared to 'catch pepper', but if it does not please we can give it to some puir body.

... We have said nothing of his work during these years and yet everything was subordinated to his work.... The fact is that the work done by him during the four years that followed his marriage was so great that the results are all we can hope to record, without entering into a description of the processes by which they were arrived at, and these will be gathered together towards the end of 1846. Meanwhile other events have to be noted and fortunately the narrative of them is to be found in a series of letters written to his brother James who went over to France in the autumn of 1845.

The opening up in Dundee of a trade with France began in 1836. The demand was chiefly for yarns which were made into linen in France. The demand became considerable in 1839 and continued for some years. The depression of the linen trade in Dundee during 1842 and 1843 would have been much greater than it was but for the fortunate opening of this new market for its yarns. But the demand was not kept up long. The import duties on linen yarns entering

[1] See above, p. 93 and n. and below, p. 129. Boyack's mill was bought at the end of 1848, after being idle for three years, by Gilroy Brothers, who became one of the two biggest jute firms in the world (extracts at Jute Industries Ltd from the early records of Gilroy Brothers which were subsequently destroyed).

[2] Probably Henry Scott Cox, 1816–84, one of the four brothers who founded Cox Brothers, jute manufacturers, Camperdown Works, Lochee, near Dundee. Henry started life in the office of Alexander Rowan, linen merchant, Dundee, then went to Liverpool to look after the export side of Cox's business. He later presided over the firm's establishment at Cossipore, India. (James Cox's MS. Diary; *Dundee Year Book*, 1884.)

France were raised with the view of stimulating the spinning of flax within the country itself and the immediate result was a serious falling off in the new trade between Dundee and France. At the same time within France itself the linen industry increased by leaps and bounds. This led several parties at the head of establishments in France for the manufacture or the sale of linens or yarns to unite and form themselves into companies having a considerable amount of capital, that they might be the better able to supply the increasing demands of the country. One of these companies had been formed by M. Amand René Cohin and the brothers Anselme and Ferdinand Bocquet under the title of Cohin et Cie and the Messrs Baxter in Dundee had a considerable interest in the concern.[1] Their mill was at Ailly on the Somme not far from Amiens and it was to undertake the management of this mill that James Carmichael, who had for some time been employed as mechanical draughtsman at the Dens works, went out accompanied by mechanics skilled in the setting up of flax and jute machinery.[2]

The new manager propounded to his brother the difficulties he had to contend with in regulating the water power and getting the machinery to go sweetly. The letters in answer are full of suggestions and as they show what was being done at the time and reveal the character of their writer both as manager and man a few brief extracts of a general kind may be interesting and useful even now.

Dens, Dundee. 6 October 1845

We found the same difficulty in keeping the sliver entire which you have experienced. The great secret lies in damping the jute thoroughly before you card it.[3] You may with entire safety put in from 250 to 400 lbs of water in every ton of jute you mix up. Let

[1] In 1848 the 'concern at Ailly' brought in £2,105 9s. 10d. and in 1854 £2,153 3s. 6d. (Baxter Brothers Ledger P 2, 1832-54).

[2] This is one clear case of the emigration of skilled labour from Dundee. The unskilled labour was provided by local French people. In Dundee the place of the emigrants in the population was filled by unskilled Irish immigrants.

[3] This reference points to the fact that jute was at least tried by Baxters before 1845 and conflicts with Warden's account (*Linen Trade*, p. 623): 'This firm is perhaps the only one here who have never, at any period, spun jute in their works.' Baxters may perhaps have stooped to the practice, common enough in Dundee, of adulterating flax with some jute without acknowledging its presence. The firm's books show the spinning of jute from 1867.

it be made up in a batch, every layer being sprinkled with water from a watering pan or squirt as it is put on and let the batch lie as long as it can with safety for the spontaneous heat. But this heating must be carefully watched as it will injure the fibre if it is much heated. In addition to the damping you will find great advantage in causing your sliver to adhere by loading the delivery rollers of the cards so as to calender or bake the sliver into consistency.[1] We have tried various plans of conductors for the sliver machines but have abandoned them all in favour of the wooden plate close to the bobbin, having one half of the slivers running in notches over the top and the other half immediately below them in slits alternating so as to spread the sliver uniformly over the surface of the bobbin.

I am sorry that you are not likely to make anything of William Bates. After countermanding his orders you never can agree with him again and the sooner you part the better. Has there been no want of cordiality on your part with him? If you were on anything like proper consulting terms with him I cannot see how he could have taken so much upon him. A person is very apt when he is displeased with any one to avoid intercourse with him and thus widen the breach which might have been healed by 'the soft answer which turneth away wrath'. I speak thus from a knowledge of my own weakness.

17 October 1845

We shipped to Havre last Tuesday the pair of hand-reels mentioned in my last and hope you will receive them soon. Mr Nairne had promised to have the first pair of his patent reels going here last Tuesday. I have a letter from him this morning in which he says that he has been working almost night and day to get them forward and promises without fail to have one pair down the beginning of next week. They will be a first-rate thing and will certainly be a great saving to you.

I am pleased to see that you have resolved to abide by the jute-spinning in the meantime. There is no doubt that what you can spin easiest and best will be most profitable for you in your pre-

[1] 'Calender' or 'bake': the cylinders, or rollers, of the calender could be steam-heated to 'bake' the material passing between.

sent condition and when your work goes on well it gives the workers confidence in you and ensures a good supply of them. You should take in a few more hands than you require just now as this will enable you to take off more yarn and they will be training to your system.

2 December 1845

Trade is beginning to look very alarming. We have paid off a number of hacklers and also stopped our flax frames in the old mill and dismissed the hands. My father has commenced to manufacture potato flour at Harestane and is likely to succeed with it.[1]

16 December 1845

Having had a long conversation with Mons. Cohin, I am now prepared to answer your last letter of 5th current. I have sent with him a small parcel containing two books and a letter from Harestane. One of the books is your own and the other is Templeton which is a very good text-book. It was not possible to procure the works you mention in Dundee and M. Cohin kindly agreed to procure them in London as he returned. I gave him directions where to get Tredgold's complete works edited by Woolhouse and *Buchanan on Millwork* by George Rennie. Both of these are standard works but very costly.[2]

23 February 1846

I sincerely condole with you on the very great, I may say *irreparable*, loss you have met with in the decease of M. Cohin. He was really a man among a thousand and we shall not soon look on his like again. His loss must be felt over a large circle and no one regrets him more than the Messrs Baxter. For your own part it must certainly be discouraging at the commencement of your

[1] Potato flour was extensively used in the making of starch to give a gloss and finish to linens. Harestane was a water-mill on the Dighty just outside Dundee.

[2] William Templeton, *The mill-wright and engineer's pocket companion* (London, 1833). Thomas Tredgold, *The steam-engine, its invention and progressive improvement*, rev. and ed. W. S. B. Woolhouse (London, 1838). George B. Rennie, *Practical examples of modern tools and machines, being supplementary to the edn. of Buchanan on mill-work* (London, 1842); or, perhaps, Robertson Buchanan, *Practical essays on mill-work and other machinery*, with notes and additional articles by Thomas Tredgold, rev. in third edn. by George Rennie (London, 1841).

proceedings. But there is no fear of matters not being carried on energetically and the party who next comes into immediate contact with you may turn out to be all you can wish.

I am glad you get on so well with work-people. They are taking out a great many to Lille and Dunkirk. More than a hundred flax-dressers have gone from here lately. . . .[1]

There were not many 'playing holidays' for Mr Carmichael at this time but there were excursions on business and, as we have seen, some pleasure as well as profit was got out of these. In the month of June he was away for ten days in the north of England and in the beginning of September he was in Ireland. Of the first journey he writes:

26 June 1846

I spent the Sunday with Rachel and Susan at Greenacres Moor, which by the way is a misnomer as there is neither a green nor a moor to be seen unless you reckon the green on the factory ponds, the acres of cotton factories and weaving rooms and the *moors*, the black faces issuing from the machine shops. In fact it is part of the town of Oldham, a regular, hard-working, shirt-making town, whose only inhabitants are the owners of factories and their work-people, the most of whom are in a state of *barbarism* in the very centre of England and in the nineteenth century. There has been a total want of the means and inclination for education which is hardly yet begun to be remedied. I could not help apostrophising John Knox. I have spun this out too long but the words 'came skelpin' rank and file amaist afore I kent'.

I called upon Margaret McLaren in Manchester who was rejoiced to see me. She has had a sore spring of it with home sickness but is now getting over it. She told me that she saw some flowers for sale in the market which was the first indication she had had that the time of flowers had again visited the green earth.

The visit to Ireland was at a time when that country was suffering from famine.

[1] Lille and Dunkirk were the chief centres of the coarse flax industry in France.

9 September 1846

Having been in Ireland along with Mr Baxter for the last few days I was prevented from answering yours of 25 August sooner. . . . We are very ill off here for the raw material of our trade and both flax and codilla are of very bad quality in addition to the price being exorbitant. You will observe that 9,000 tons less than last year have been imported this year.[1] This in connection with the total failure of the potato crop will be sure to make very bad trade for the next twelve months. The potato fields are the most melancholy sight you can look on, being completely wasted and blighted – not a green leaf to be seen and the odour very obnoxious. It should teach us that in spite of all that man can do we have to look to the Ruler of all who alone giveth the increase.

Towards the end of September he was busy making preparations for getting away to France in October and he looked forward to the excursion with a sense of relief. On 22 September 1846 he wrote:

I need not take up time in replying to your letter in the ordinary way as we will so soon meet face to face and discuss matters over some of your *Burgundy*. You will, I hope, take the hint and look to your vintage, more especially as I have been practising wine bibbing at the rate of a glass a day for a week past by the Doctor's orders.

My mother-in-law[2] is very ill, so much so that Margaret has been with her for the last few days and we are beginning to be alarmed about her. I trust that she will get over it, however, as we would sorely miss her. I am going west this evening and must therefore conclude.

Dens Mills, Dundee. 1 October 1846

My dear James,

You will be in possession through the medium of the newspapers of the melancholy result of my mother-in-law's illness. . . . It would

[1] Compare the two years 1844-5, when 150,090 tons of flax were imported, with 109,959 tons for 1846-7. This figure of 9,000 tons refers to the difference between 1846 and 1847 as shown in Warden, *Linen Trade*, p. 111. The difference over a two-year period was therefore greater. The figures refer to flax imports for the U.K., not Ireland alone.

[2] Grace M. H. Carmichael, 1782-1846, wife of James Carmichael the engineer.

have given me great pleasure if Margaret could have accompanied me, but I must not urge her contrary to what she says is her duty under the present circumstances of affliction[1] in her father's house although I am sure it is a great act of self-denial on her part. Hoping soon to meet with you and your family.

A few days after writing this letter, on Monday fifth October, he set out for France and was away for five weeks. Before describing this journey, however, we shall devote a chapter to the record of his work at the mills and his mechanical inventions during these years.

The size of the works under Mr Carmichael's charge at this time and the number of people employed at them may be learned from a memorandum made by himself. The works were chiefly in Dundee but partly at Glamis. The mill at Glamis was driven by a water wheel of thirty h.p. It contained about 800 spindles and these converted about four tons of flax into 2,000 spyndles of yarn in a week, ninety-one persons being employed in the various operations connected with the spinning. Here also 228 hand-loom weavers, nearly 200 of them being women, were kept busily at work. As a rule Glamis was visited once a week but the many duties to be attended to in Dundee sometimes prevented this, for the superintendence of the works at the Dens took up nearly the whole of his time. In them the motive power was supplied by six steam engines with an aggregate of 240 nominal h.p. Three of these were for the spinning, one of eighty h.p. in the Lower Dens and two, one of sixty h.p. the other of thirty h.p., in the Upper Dens. They kept over 11,000 spindles running, which consumed about fifty-two tons of flax, tow and codilla in a week and threw off 26,000 spyndles of yarn. Two engines, each of thirty h.p., were used for driving the 280 power-looms in the factory. These engines were new, having been constructed in 1845 and set up in the beginning of 1846. They had all the latest improvements and were made with double conical valves on a new principle devised by Messrs J. and C. Carmichael. The power-looms worked up 10,000 spyndles of yarn into about 60,000 yards of cloth every week. The sixth engine was a small one of 10 h.p. for the calender

[1] Mrs Carmichael's uncle Charles, of J. and C. Carmichael, engineers, had died in 1843 and her brother Charles in 1846.

work and the mechanic's shop which had by this time been added to the establishment.

The number of persons employed was 1296. Of these 403 were at the Lower Dens mills, 445 at the Upper Dens and 402 at the power-loom factory, the remaining forty-six being managers, mechanics, lappers or porters. Only seventy-seven were under thirteen years of age. They worked six hours a day and attended school for some hours.[1] The rest worked sixty-eight and a half hours a week. The organisation of the works had been gradually improved and was now admirable. There was a manager over each department who was responsible for its conduct and the discipline though strict was a comfort and praise to those who did well. If the hand with which Mr Carmichael ruled over all was an iron hand, it was sheathed in a velvet glove. He was sensitive to a touch of humour and he kept in sympathy with the men, women and children under him. Each had a set work to do and the work had to be done and done well, but those who did what they could knew that they would get the approving smile, the kind word and, by and by, the looked for advancement. . . . On being asked if there was anything special to which in his opinion the noticeably superior character of the people attending the Dens works was due he replied: 'Well, I have always tried to choose for positions of trust men with the fear of God before their eyes and they have helped to train those of whom they had the oversight in habits of order, punctuality, diligence and thrift'.[2] He set a good example himself. His whole heart was given to his work and no effort was spared in lightening the toil and adding to the comfort of the workers.

A few particulars will serve to show how careful was the super-

[1] The amendments to the Factory Acts between 1840 and 1845 had increased the incidence of employment of children under thirteen: 'The provisions . . . have had considerable effect in inducing two of the most extensive flax-spinning firms at Dundee to employ children in increased numbers, viz. Messrs A. & D. Edwards and Messrs Baxter Bros.' (*Reports of Inspectors of Factories*, 1838-47, p. 56, 5 May 1845). Baxters had employed no children under thirteen in 1840. (*Fourth Report of the select committee on mills and factories*, p. 76, 19 May 1840.)

[2] It is true that the respectability of Baxters' workers was commented on throughout the nineteenth century, but this was due in great part to the regularity of employment Baxters were able to offer and that in turn was largely due to the regularity with which they received government orders. It was just possible to maintain a 'superior character' on a textile worker's wage if that wage was regular over a long period. (Evidence rom local information gathered orally.)

vision of the work done. For several years past a daily account had been kept of the quantity and kind of coals consumed by each group of boilers, the height of the mercury in the barometer being also recorded as having an important bearing on the vacuum of the engine. For about the same time a diagram had been taken off each steam engine every week in order to show the duty performed. A constant check was thus kept upon the combustion of the fuel used and various experiments were made in the hope of making it more perfect. Chief among these was the patent argand furnace of Mr Charles Wye Williams.[1] It was tried under the superintendence of his agent Mr Butter in the beginning of 1844, but the result was not such as to justify the alteration of the furnaces or a departure from the old plan of working, that is with the air valve closed, or open only when the fire was great and giving off smoke. In order to ascertain the quantity of water converted into steam by various methods of building in furnaces and boilers with more accuracy, Mr Carmichael constructed a new water meter. A description of this meter with illustrative drawings was sent to the Institution of Civil Engineers and read at their meeting on 6 February 1844. But it was a simple contrivance compared with some of his inventions about the same time.

The most important of these were protected by two patents. On 5 May 1846 he took out a patent for a hackling machine and a rubbing machine and on 2 October of the same year he, conjointly with Mr (afterwards Sir) Peter Fairbairn of Leeds, took out a patent for improvements in machinery for drawing, roving and spinning. The admirably drawn specification of the former patent, with engravings giving several views of both machines, will be found in the *Repertory of patent inventions* for January 1847, and the specification for the latter patent, also with descriptive drawings, will be found in the *London Journal and Repertory of Arts, Sciences and Manufactures* for June 1847. Here only a general description of each machine need be given.

In his description of hackling as practised in 1834[2] it will be remembered that Mr Carmichael referred to Robinson's machine and

[1] Aimé Argand, 1755-1803, a chemist who invented lamps with a burner which admitted air to the flame. The furnace worked on the same principle; by producing more complete oxidation it was reputed to give greater efficiency. Charles Lye Williams was author of *The Combustion of Coal and the Prevention of Smoke chemically* (Neale, 1854).

[2] See above, p. 62.

pointed out its drawbacks. Robinson's formed the basis of Mr Carmichael's but his improvements on it were so great that several of the most extensive flax-spinners in Leeds and elsewhere at once broke up Robinsons's and substituted Carmichael's. Mr John Hobson who had been foreman of the hackling department first in Marshall's and then in Hive's and Atkinson's of Leeds for nearly forty years described it as the greatest improvement he ever saw in any machinery. The great improvement lay in making the machine self-acting. In it there were three motions, a horizontal one by which the holders containing the flax were pushed from end to end, a vertical one by which the flax to be combed out was gradually presented to the hackle pins and a circular one by which the holders of the flax were turned half round so that the opposite face might be presented to the hackles. These machines were accomplished by most ingenious arrangements which made the working of the machine very simple. It performed all the operations itself and the attendant had nothing to do but to screw the flax into the holders before they were pushed in and to unscrew them for the purpose of changing the ends or removing the finished stricks of the flax when they were pushed out.

First one pair and then a second pair of the machines were made for use in the Dens works in 1845 and it was after finding how well they worked and experimenting carefully on their improvement that a patent was suggested. It was then arranged with Mr Thomas Marsden of Salford near Manchester that he should make the machines to any extent he pleased and grant licenses to other machine-makers, provided he gave to Mr Carmichael and the Messrs Baxter their respective shares of the profits.[1] In June 1846 Mr Carmichael went to Salford to see the first patent hackling machine started in Mr Marsden's shop and Mr Thomson of Belfast, who had been licensed to make for Ireland, was also there. It went off to their entire satisfaction and they saw that it was greatly superior to any hackling machine then in use. The machines were soon introduced into the best mills in Leeds and came to be used on the Continent as well as in the United Kingdom.

But much had to be done before the machines were brought to perfection. Many letters giving particulars of experiments and sug-

[1] In August 1848 the patent rights brought Baxter Brothers and Company £345 5s. 10d., proportion then paid to Peter Carmichael not shown (Ledger P 2).

gestions as to improvements, with clear illustrating sketches, were written to Mr Marsden. In one of these, after referring to no less than twenty-four points that might be improved he closes by saying: 'After all this terrible fault-finding I am glad to be able to say that the first pair of machines you sent us are doing beyond our expectation.' A week or two later, on 26 August 1846, he wrote: 'We have got the second pair of machines started and doing very well. We are anxious to get the next four as we are much at a loss for want of flax and wish to avoid setting on hand-hacklers'.[1] On the thirtieth of the same month he wrote to his brother James: 'The hackling-machine has every appearance of taking the lead and superseding all others. Marsden has more orders than he can execute and where they have been started they are doing beyond expectation'.

The other machine patented at the same time was for rubbing, stretching and equalising the breadth of the cloth after it left the loom. In the old mode of weaving linen, the weaver at stated times rubbed the cloth while it was in the loom with a piece of hard wood or stone. This was done across the warp so as to spread it equally or cause each thread of the warp to be equidistant. Otherwise there would have been open spaces between the threads in the web. It had also the effect of causing every thread to be equally tightened so that each thread of the warp and weft would bear the same tension. Moreover it made the web longer and of the same breadth throughout. But to do this rubbing properly required great skill and attention on the part of the weaver and in the case of heavy fabrics it entailed a considerable amount of labour. If the cloth was rubbed too much in one place the web came out narrower at that place; if it was rubbed more towards one selvidge than towards the other the web would be longer at one side than at the other. With hand-rubbing also it was difficult to get two webs of exactly the same length or the same texture because some weavers on the same kind of cloth rubbed more and some less. The rubber-machine was destined to obviate this and to do the work with more precision and with more economy. In it the finished web was operated on by rollers set round with spiral plates which rubbed the cloth passing under them across the warp, one towards the right hand and one towards the left, thus combining the rubbing across the warp with a continuous circular motion.

[1] See below, p. 118.

There was also an ingenious application of a drag or friction pulley with a variable weight by which the exact degree of tension was put upon the cloth to give it the required breadth.

Writing about this machine many years later Mr Carmichael says:

> Previous to this invention the cloth in the loom was kept out to the breadth so as to save the selvidges by instruments called *temples*, two of which were on each web, one in front of the other. When a few inches of cloth were woven the back temple was lifted over the other and put up close to the face of the cloth and so on. To keep the cloth tight it was rubbed with a short piece of hard wood every time the temple was moved. This fully occupied a weaver's time, making for yard-wide cloth ninety picks per minute. The more careful beaming of the warp yarn by the *flattener* on the dressing machine, an improvement made by me about the same time, together with the rubbing-machine, enabled us to do away with the temples and saved so much time to the weaver that good ones could easily keep on two looms.
>
> It may be worth noting that the rubbing machine did not assume its present form till after many trials, one of which was a crank motion that carried a stick backwards and forwards across the web in imitation of the old method of rubbing by hand. It was found to be too slow and it was difficult to get a uniform breadth with it. The happy thought of the right and left spiral rubbers with the tension rollers for adjusting the breadth solved all the difficulties in a continuous circular motion that could be driven at great speed.

The inventions patented in conjunction with Mr Fairbairn were three in number. Two of these were Mr Fairbairn's and one was Mr Carmichael's. One of Mr Fairbairn's was a regulating roving frame which yielded superior rovings and consequently improved yarns and the other was designed to effect a permanent adjustment of the upright spindles of a spinning machine in their sockets or collars. The invention due to Mr Carmichael was the rotary gill.

In his description of drawing as practised in 1834 he refers to what was a serious mechanical objection to the screw gill. It was that the abrupt descent of the faller made the sliver thick in some places and

thin in others and thus rendered impossible the production of a round and level yarn. After long pondering he had thought out a mode of obviating this and in the letter to his brother James of thirtieth August 1846 from which an extract has already been made he tells how he came to take out a patent for the improvement. He writes:

> As to the new method of drawing, I had thought out the problem after a few trials and failures. We were hesitating how to proceed with securing the invention when Mr Fairbairn of Leeds happened to call on us and having got some inkling of what was going on he pressed much to see the things at work. After certain preliminaries we showed him and he made us an offer to be at all expense and trouble of management for half the patent right or premium. This, as it takes a deal of trouble and work off me, we agreed to and the patents are being taken out in the joint names of Mr F. and myself.

In a *Concise Treatise on the Cultivation of Flax and on the Operations and Machinery Employed in its Manufacture*, circulated by Messrs P. Fairbairn and Co. in 1852, they refer to the patent as follows:

> Clearly perceiving the necessity for some improvement in these respects, a few years since we paid particular attention to the subject and at last succeeded in introducing under a patent a gill, which, to distinguish it from others, is called the 'rotary gill'. It is, of course, constructed with holding and drawing rollers as the others, the difference consisting in the 'gill' movement which is simply that of a roller or cylinder covered with pins inclining in a direction contrary to that of its revolution and of the sliver's traction towards the drawing rollers, so that when the fibres commence to separate and be drawn, they are irresistibly carried to the bottom of the pins and are thus most effectually impaled and retained, for the small size of the gill cylinder sufficient for tow enables this to be done, which the larger one for line would render difficult; and not only this, but the retention is continuous, for the lines of pins being placed spirally upon the cylinder never leave a vacant space and thus, not only does the sliver produced show a

level appearance but all danger equivalent to the choking of the fallers is avoided and the movement being simply circular, without any eccentricity, can be carried with facility and without danger to any desired speed.

This is a sufficiently accurate description of the rotary drawing-frame and its superior advantages, but it will be noted that there is in it no mention of Mr Carmichael's name, an inadvertence not easily excused.

The discovery of these important improvements was the reward of close attention to the working of the machines he had and constant efforts to remedy their defects. He thought intently upon the subject, possibly failed, but tried again and again till at last he succeeded. He had no faith in flashes of inspiration except as the result of long and patient study. Writing to his brother James about this time he says:

I do not see how I can get away. We are continuing to add loom to loom and there is a great deal of superintendence required in what, in tailor phrase would be called 'working button-holes', for I am fully persuaded that although a person may cut a dash by doing one or two great things, yet, if the most minute details in a large concern are not carefully scrutinised, the whole affair will speedily become disorganised.

It was not without much energy and determination that he secured the successful introduction of his improvements for there was still a strong prejudice against power-loom-made cloth.

It was always brought up against it (he says) that it was not so well filled as the hand-loom or Forfar-made cloth. This arose from the lighter fabrics woven by hand being made with unstarched warp. It was a source of great vexation during the transition time, which was one of dull trade, that whenever the buyer said it was naught[1] it was always insinuated or said 'You see what you are doing with your alterations – making such bad work that the cloth will not sell! How can a weaver mind two looms? We had better go back to the old temples!'

[1] Meaning 'whenever the buyer failed to place an order, or said that his order was nothing'.

It must have been with a sense of great relief that he found himself free from his numerous entanglements and set off for France.

Ailly sur Sommes. 13 October 1846

I left at half-past two for Ailly in the *Diligence*. At one o' clock on Sunday morning I was handed out at a splendid-looking gateway in a sleeping village where I commenced a furious attack on the bell and in due time was admitted to James's house and into a comfortable bed. I was quite agreeably surprised at the state of matters here, for altogether the establishment and James's house are in first rate style.

The first letter to his brother after his return home described the incidents on his way back:

Dens mills, Dundee. 17 November 1846

. . . I got to London at six o'clock in the evening and at eight started for Portsmouth, where I found James Spence waiting me on arrival at half-past twelve, thus accomplishing the run between your house and his in little more than twenty-four hours so that you may consider yourselves very near neighbours. I was only sorry I could not stay longer with them, but what I saw of the wonders of the 'Block machinery', the wonderful little steamer belonging to Her Majesty, the 'Fairy' etc., gratified me much. I started from James's at midnight the following night, got to London at five in the morning, went to bed for two hours at Euston Square station and started by the express train at half-past nine for Leeds, accomplishing 226 miles in five hours and forty-five minutes. After getting to Leeds I considered myself at home, and so need not pursue this gossip further. Suffice it that I found a welcome reception at home and all friends well.

On making my appearance at the works I had a long conversation with the Messrs Baxter anent matters at Ailly and they appear to be extremely well satisfied with your progress and the state of affairs generally.

Margaret applauds the taste of the apron and curtains very much. The only thing I get no credit for is that I have lost my relish for 'good Scotch fare' and it is said that I have been too

much pampered and too much made of at Ailly. I tell such tales of the beautiful river-side with the avenues of tall poplars that Margaret is quite chagrined at not being with me. I must conclude this, thankful still to subscribe myself

your affectionate Brother.

Though he found much work waiting him on his return home he found time within the first fortnight to send to the *Practical Mechanic and Engineer's Magazine* an account of the steam-engines employed at Ailly, accompanied by carefully prepared diagrams showing the coals consumed and the work done. The engines, though in general use throughout France where coals were dear, were not well known in this country. They were on Wolfe's[1] principle with two cylinders on the same end of the beam, one for high pressure and the other condensing. The steam was admitted into the high pressure cylinder from the boiler and after performing its work escaped into the condensing cylinder, thus doing double duty.

But apart from his usual routine of duties the getting the new machinery into good working order was what absorbed most of his time. The drawing frame had his immediate attention. On thirteenth November 1846 the sketches for it, with instructions as to the fittings, were forwarded to Mr Fairbairn. These were followed by other letters to Mr Fairbairn or to his partner Mr Greenwood till on twenty second February 1847 Mr Carmichael wrote to Mr Greenwood:

We got the rotary drawing-frame set to work this morning but had to stop it again for some alterations. The pressing rollers were, when covered, too close to the gill, some of them slightly scratching. To cure this we have raised the drawing-rollers one-sixteenth so as to give that amount of clearance. You had brought forward the bearings in the drawing-roller to clear the gill without adjusting the bearing next the driving pulleys. The sliver from the machine is quite level and the laying on to the gill and delivering without front conductors is all that could be desired. The only thing that could be amended would be to give the gill pins say one-eighteenth more angle and make them a little stouter.

[1] Not identified.

The demand for these patent rotary drawing-frames soon became large, they gave great satisfaction wherever they were introduced and the success of the invention was complete.

It was equally so with the hackling-machine. On fourth December 1846 Mr Carmichael wrote to Mr Marsden:

> We are steadily improving our machines and have now parted with all our hand hacklers. The last of them left a fortnight ago.
>
> 18 January 1847
>
> We still continue to improve. Our yields increase the quantities done over the machines and lessen the wages. The abstract of the work done last week is now before me and it is the best week's work we have yet done.

Thus week by week the working of the machines went on improving till in the beginning of this year 1847 their success was firmly established and it was seen that the days of hand-hackling were past.[1]

Turning again to the series of letters to his brother James, we find them full of business and mechanical arrangements, interspersed with words of good cheer and wise counsels. We select, as characteristic, the following from a letter dated thirtieth December 1846:

> The date of this reminds me that before it is put into your hands the year '46, rife as it has been with thick-coming events, will be no longers ours but numbered among things that have been. Allow me therefore to wish you and yours a happy new year with many, many happy returns of the festive season. Having thus made our glasses clink together and said 'Bonne sante' in heart at least, if not in reality, proceed we now to graver matters.
>
> I duly received yours of the nineteenth current, for which I had wearied very much, but can easily see that your time must be fully occupied. It must be very annoying to you not getting up your produce but there are many things against you, particularly the

[1] The prosperous days of hand-hecklers were past, but the trade had not completely died out. There were still hand-hecklers working in the 1860s. (Warden, *Linen Trade*, p. 598.)

season of the year, for in all my experience the months of November and December show the worst results, and if the season is severe it is sometimes February before things take an upward turn.[1] The fault-finding letters from Paris are very annoying, yet on the whole your circumstances are such that you would find it difficult to change for the better. At all events they always speak out what they have to say and allow you to meet it. In most places when trade is not very good and the profits small and you have to meet the parties daily or very frequently, with constant gloom and discontent, the case, you can conceive, is worse. Or suppose another case where you are told that other parties, *without names, of course*, are doing much better than you are, and you are thus put into competition with Giant Unknown and invisible at whom there is no getting a successful hit. . . .

The next letter is given in full. It is addressed to his brother-in-law, Mr James Spence, at Portsmouth:

Dens mills, Dundee. 25 March 1847

I take my earliest opportunity of leisure to reply to your kind letter of twenty-fifth February, for which allow me to express my thanks as I was aware of being your debtor, but time has passed on and with it have passed many resolutions to write to you. You will, however, give me credit that it has not proceeded from sloth 'which eateth like a canker', for with me each day brings so many crowded events that were it not for the return of the blessed day of rest I would never get to a point of vantage from which to look back upon past events or survey the coming future.

When last I wrote to you it was under a cloud of trouble proceeding from (why should I blush to own it to an esteemed friend, seeing that my conscience tells me it was truth?) wounded self-esteem. . . . Suffice it to say that while I feel I did wrong in giving way to feelings of gloom and despondency, at the same time I am sensible of being foully taken advantage of. . . .

Allow me to congratulate you on your improving prospects.

[1] In winter months water-powered works were frequently delayed by ice on their mill-dams; open-air bleaching, essential for linen, was impossible, or at least much delayed; absenteeism by workers without shoes or coats rose in bad weather.

I have no doubt you will prove yourself sufficiently able to cope with the irregularity and untimeous hours which are the worst part of your occupation, but you must be content to fag on for a while, looking forward to further promotion. I was pleased to see in the paper you kindly sent us that the bettering the condition of Her Majesty's engineers is a subject that is gaining considerable attention from those in power.

Margaret and I were out at Harestane and were much pleased to hear your adventure at the Isle of Wight in connection with the unfortunate Sphynx.[1] Your description would make a capital article for *Chambers's Journal.* You should send them a copy of it which I have no doubt they would be glad to insert. She has, I am glad to observe, been got off after all.

We have also had something to do with shipwrecks within these few weeks. I will tell you of it as an instance of how 'sorrow treadeth on the heels of joy'. On a bright sunny morning two weeks since when we assembled as usual in our office at the works, the Messrs Baxter were quite pleased, having by the morning's post received intelligence of the safe arrival of two of their ships, the 'Glammis Castle' at New York and the 'Ellangowan' at Rio de Janeiro, and both having got excellent freights home.[2] By the next post, an hour after, came the intelligence of the total loss of the 'Brechin Castle' with all hands. She was from Adelaide in Australia[3] bound for Swansea with a cargo of copper ore, and was dashed to pieces within twenty miles of her desired haven. She had sixteen of a crew and eight passengers and not one of them was left to tell the sad tale of how the gallant ship met her fate, or how 'amongst the remorseless dash of billows' was hush'd the cry of her cargo of immortal spirits. We have only heard of two bodies being recovered. One, a seaman, had a lifebuoy attached to his bosom. Her captain was a son of John Baxter the stationer and my puir

[1] Evidently a ship.

[2] Baxters' scroll balance books show extensive shipping interests and income from trading. The South American trade was of great importance to Dundee (Baxters' Customers' Order Books).

[3] The growth of the wool trade in Australia resulted in a demand for Dundee bagging, which probably formed the *Brechin Castle's* outward cargo. She was built as a speculation by Stevens' yard in the late 1840s and sold to Baxters along with the *Jules* from the same yard.

laddie Johnny Adamson was second mate. In him I took a great interest from having taken charge of him when he was very helpless.

My visit to you at Portsmouth is like a dream and in fact it was little better, seeing I was so fagged out with night travel that the impressions made were but slightly imprinted upon the tablets of memory. I wish I had to do it again with a few days of leisure, for we need not expect you here for a long time to come and I will be chained to the oar for two seasons at least.

You say nothing of your conical valves or if you are progressing with them. Do let me know about this. I have been labouring for some time past in making power-looms to weave sail-cloth and have succeeded well. We have now twenty looms at work and are making twenty-four more. They will turn out 400 yards a week each, which you would think would almost supply our navy.[1] We whack up the very heaviest kinds with one blow of the lathe and make very superior work to what can be made by hand. These looms do most of the four heavy numbers and besides the quantity stated we do as much again of the light kinds on our ordinary looms. I have made a very nice machine for testing the strength of the canvas in strips an inch broad. It enables us to see the effect of the various things we try for improving the strength of the yarns and at the same time the cloth.

Trade is very bad in Dundee and with the high price of provisions there is much suffering among the poor and I fear the worst has not come yet. Our Free Trade measures are all very good as a means, but we are constantly taught that we must look to a higher hand and trust not in man whose breath is in his nostrils. If it should so please the Almighty to lessen the fruits of the earth next season the consequences are fearful to contemplate. . . .

It will have been noted that trade had fluctuated considerably for a year or two prior to 1847. This arose very much from a passion for speculation that possessed all ranks of people in the country at that time. The extent of this speculative spirit may be inferred from the fact that in the month of September 1845, a time of great distress in Ireland caused by the mysterious calamity that fell on the potato

[1] By mid-century Baxters were, in fact, supplying more than a quarter of the Navy's whole need for sail canvas (*Advertiser*, 16 May 1851).

crop, no fewer than 357 new schemes were announced with an aggregate capital of three hundred and thirty two millions. The speculation in railways particularly was very wild. In 1845, fifteen years after the first railway was opened, the amount of capital involved in railways throughout the United Kingdom was not more than eighty-eight millions; in 1847 it had risen to one hundred and eighty-seven millions and this did not include the vast sums of nominal and uncalled capital. The deluded investors fancied themselves growing rich as prices rose, but before the close of the year a crisis was reached. Many were ruined and trade was seriously dislocated. Writing on fourteenth October 1847, Mr Carmichael said 'Trade is very bad and the appearance of the mercantile world most alarming. Our people have made no bad debts as yet of any consequence, but it is impossible with the utmost care to avoid the widespread havoc that is being made among even the most respectable houses.' It vexed his heart to have to part with servants in various departments who had been long at the mill or factory and the misery of the poor in Dundee at this time was aggravated by the influx of bands still poorer from famine-stricken Ireland.[1] As was his wont however at such times he tried still more to exercise economy and make improvements on the machinery. He did not set the machines he had already invented a-going and leave them to go as best they could. His mind was still in them and he kept on experimenting and trying to improve them being always open to receive suggestions from the manager or foremen mechanics as to any adjustment they thought would work well. His letters to Mr Marsden at this time give the results of his experiments on the hackling-machine and form an interesting record of persevering industry and skill, while the correspondence with Mr Greenwood tells of successes and failures in attempts to improve the preparing machinery, especially to get some mode of putting the twist more evenly on the rove. It also tells of the invention of an improved power-loom for canvas, the one already referred to in the letters to Mr Spence. This loom was

[1] The presence of the Irish certainly helped to keep down wages in Dundee: 'Until lately those in the preparing-rooms of the mills were all imported from Ireland. Whenever there was a want of hands they informed their friends over the Channel and a new importation occurred. Thus there was always an abundant supply of that class of labour and the wages of the preparing hands never rose in proportion to those of the spinners' (*Advertiser*, 26 Dec. 1856).

not patented, though Messrs P. Fairbairn and Co. made a tempting offer for a share in the right.

In the beginning of 1848 trade was still bad and the depression was aggravated by the deplorable state of affairs in France, culminating in the termination of the monarchy by the forced abdication of Louis Philippe on the second of March of that year. About a month later Mr Carmichael wrote to his brother James in answer to a letter describing his troubles.

Dens mills, Dundee. 5 April 1848

Your communication received this morning has, you may be sure, given us a great deal of uneasiness. From the terribly disorganised state of society I do not wonder at your wish to 'flee away and be at rest'; in fact I have wondered at your being so cool and taking things so easy.

The interview you had with M. Bocquet is very disheartening. There is only one palliating circumstance which I would throw out for your consideration, namely that his mind must be terribly harassed by the unfortunate turn that events have taken and he may thus have been led to say captious things which he would never have thought of had all things been going on smoothly. And you must always bear in mind that a manager can only be in a right position with his employers when the concern is paying. When this is not the case, even with employers having the best regulated minds, there will always be a hankering that there is some defect in the conduct of the works and I think it the part of wisdom to give way to this feeling as far as is consistent with self respect and rather try to smooth away any unpleasantness.

Upon reading your letter at breakfast time we agreed with you in thinking that you were right to prepare for leaving. I however showed your letter to the Messrs Baxter and they thought it for their interest that you should remain and suggested that if danger should arise you should send home your family and yourself continue as long as there was any appearance that the concern could be carried on. This I think the proper view of the case and certainly from their consistent goodness it is our duty to labour for their advantage as far as in our power. Mr David is in London just now. Your letter has been forwarded to him by this post and you will probably hear from him in a few days.

Your furniture is a serious matter to remove as you are aware that even had you time to get it shipped properly the duty to be paid on its coming into this country will make it a matter of consideration. We know not what a day may bring forth. At present therefore do nothing rashly. Trade here is very bad with no prospect of improvement and it is much to be feared that more of the works will have to be stopped.

I heard from Lille today. The English are still keeping their ground there. I must conclude as light fails by commending you and yours to the care of Him who slumbers not nor sleeps and I am, Dear James, ever yours.

This letter was written when affairs were at their worst. It is almost needless to tell that the arduous labours which Lamartine[1] and the government of which he was the head put forth to secure peace were successful and that before the year closed a republican government had been set up with Prince Louis Napoleon as President.

1 August 1848

I sincerely hope that your revolutionary troubles are now at an end and that trade will continue steadily to improve. You will see from the papers that we are hourly expecting to hear of a rebellion in Ireland, although from the wise measures adopted by our rulers there is no doubt of the issue[2]. . . . Trade with us is very much improved within the last few weeks. Our stocks of dry-spun yarns are nearly all cleared off and in some sorts we are spinning to order. We have, however, been obliged to stop work in one of our flats for a time, the yarns made in it being very much dependent on foreign or continental orders. The principal cause, however, is that this year's flax is not at all adapted for spinning fine yarns. We are getting large orders for cloth and I am persuaded are making a good trade in the weaving.

[1] Alphonse de Lamartine, 1790–1869, French man of letters and statesman.

[2] The revolutionary flare-up on the continent fanned discontent in Ireland. In the first half of 1848 Lord John Russell's cabinet had adopted repressive measures culminating in the suspension of the Habeas Corpus Act in July, balanced by an attempt at remedial action through the Encumbered Estates Bill.

The tide had turned. From the midsummer of this year the Dens works were kept busy and fully employed, for though there was a slack demand for fine goods they had to fulfil a contract with our own government for navy canvas. For two years previous, government canvas had been made at the Dens works,[1] but it had been made for the contractors. This was the first year that Baxter Brothers and Co. had themselves got the contract for the supply. In making their offer they did not expect to have a profit on the manufacture, but they intended to send up canvas so much superior to what was usually made that they would get the preference in future.

But Mr Carmichael had a great vexation and not a little annoyance in connection with this contract. The first shipment of the canvas to Deptford, the government depot, was rejected. Knowing that there was still a prejudice against power-loom canvas he had been careful to make the cloth considerably beyond the standard strength and he had proved it to be so by an ingenious contrivance he had made for testing it. He honestly believed the canvas to be as good as any then made and it was in every way similar to a quantity that had been passed and highly approved at Portsmouth. The rejection of the goods however made him try again with even more care and also to make experiments on the strengths of the various kinds of flax and the changes to which the flax was subject from humidity and other influences.

Writing about the grievance to his brother James at a later date he said:

> It had however the effect of stimulating us to further improvements both in the yarn and in the weaving. We now pass all the weft in the process of reeling through a bore the size of the yarn and thus get rid of all lumps and thick places. We put weft protectors and other improvements on the looms and by these means

[1] Baxters were involved in a wrangle with the Board of Trustees over the stamping of sail-canvas, during which it was said that they then sold canvas to suit the specification of the Navy (SRO, NG1/1/34, p. 110, 15 June 1819). The more insular foreign policy of Canning, resulting in reduced naval expenditure, cost Baxters their Navy order. 'As the memory of past wars faded ... so the Naval Estimates were insistently reduced. ... In the mid-forties ... after twenty years' indifference ... panic ship-building commenced' (G. A. Ballard, 'The Navy', in G. M. Young, *Early Victorian England*, 2 vols., London, 1934, i. p. 306).

have been able to make our cloth superior to all others. We are at the same time reaping the benefit of these improvements in greatly increased production from our looms. Our other contract for the sailors' trousers (ducks), of which we have now delivered above 180 tons of cloth, has not been attended by a single fault.

His brother had begun a religious service for the work people at Ailly and from a letter to him of date second January 1849 we extract a characteristic paragraph on the subject:

We were greatly interested by your description of the impression made by the *evangile* upon your French neighbours, and earnestly wish that it may be a means of bringing many to the knowledge of the truth in Jesus. You will require to remember the Drummond motto and 'gang warily' or you may rouse a fierce spirit of opposition. Is there no risk in holding the meetings in your own premises? It has occurred to me that one cause of your success is the fact of a small body of foreigners, as you are, living a blameless life among these people. It must often lead them to enquire into the reason of the difference. Yours is a difficult position to occupy, namely so to order your walk and conversation that ye may be 'living epistles of Christ known and read of all men'.

For the sake of his wife's health which was not robust, he had for a year or two taken a cottage in Seafield, Broughty Ferry, and there, a 'lodge in the midst of roses', his son James Drummond was born on the thirteenth of July in this year.

Dens mills, Dundee. 9 August 1849

I now reply to your welcome letter of twenty-first July, having fixed to leave home for a short tour in England on Monday first, returning on Thursday or Friday. My purpose is simply to take William Robertson[1] to see some of the machine-shops and weaving factories in Lancashire and see if we can copy any of their clever methods of working. We are extending our weaving factory to hold another 130 looms and I would fain have got the looms from Blackburn or Glasgow, but after getting sample

[1] Carmichael's assistant.

looms from each of these places we have not been able to work them successfully and I wish to have another look at them working before fixing to make the looms ourselves.

We are all anxious to hear the time you have fixed on for coming to see us, as it will rule other visits and jaunts. I saw my father today. He is thinking of going away with Jane who has not been very well for a week or two. I had also a letter from Mr Grant of Aberdeen[1] this week who writes that Mrs Lyall is living with him and wishes me to say how happy they would be if you could get William Lyall[2] to accompany you and, whether or not, he invites you and me to spend a day or two with him in Aberdeen.

I am obliged by your invitation to come and spend a day or two with you. There is not a journey I would take with more pleasure, but there are so many obstacles in the way of my getting liberty for even a few days that I cannot promise myself the pleasure just now.

I rejoice to tell you that Margaret and our little boy are both getting on as well as could be wished. She has been out of doors for a short walk every day for a week past and our little one visits all our acquaintances in the Ferry. We have abundant reason to thank Him whose mercy endureth for ever for His kindness unto us.

You will see by the newspaper that the cholera is raging to a fearful extent in our filthy town.[3] It has been truly alarming for the last ten days on account of the numbers that have been cut off, some of them very painful cases. We have had only one fatal case yet at our works, but we have two or three men absent with something like it just now and several females. The doctor visits the works every day and we keep several bottles of medicine for administering whenever any premonitory symptoms appear. All this keeps our people in a state of alarm so that we have not had much steady work for some weeks past. The reports of cases for the last three days show a considerable diminution and the doctors

[1] Not identified.

[2] Lyall was an employee of Baxters who went to Amiens with James Carmichael.

[3] There were 542 deaths from cholera in Dundee in 1849, nearly a fifth of the total deaths that year (*Advertiser*, 2 Jan. 1849).

flatter themselves that the means used have had a salutary effect. In the meantime all who can leave the town are doing so and there is a general run to the country.

You will be surprised to learn that we had a visit from Mr Robert Baxter one morning at breakfast time. He had come over on a short visit in company with a Belgian.[1] I invited him to come and take a share of my dinner or at all events to spare an hour to two to see through the works which he promised to do. But I never saw him again. Two or three days after his brother made an apology for Robert for his not coming back to see me. The Belgian, his companion, took home-sickness at the inn and cried like a child until he got started on his way home. They left here on Friday forenoon and Robert wrote from Dover on the Saturday night.

You seem to be making headway in the Republic, attending President's levees. It certainly was a grand sight for you and noteworthy among all your other sights. I am taking a little dignity out of the occurrence myself, for when in company I draw the conversation to France by saying you have fine weather or crops. This generally leads to the desired question: 'How is your brother in France?' and I reply: 'Fine, he was presented to Louis Napoleon a week or two since!' This brings out a little fun.

In the way of trade we are still busy in all departments and stocks even of fine yarns are nearly all cleared off. The crop of flax, 1848, which we are getting to hand is much inferior to the last year's, being soft and towy. The last standing[2] mill in Dundee, Wyllie and Johnston's was sold this week to William Ferguson and Sons, the manufacturers. Workers are scarce and wages are rising. The Kinmonds are giving up their engineering business and are to commence, after selling off their tools, to put in weaving looms.[3] Trusting to hear from you soon, with the time when you expect to be here, I am, dear James, ever truly yours.

[1] Belgium was becoming a serious rival to Dundee's linen trade. By the time of the Great Exhibition the *Dundee Advertiser* (1851, passim) considered her to represent the most alarming competition for Dundee in world markets.

[2] Here, as elsewhere in the memoirs, 'standing' is used as the opposite of 'going' and describes a bankrupt concern.

[3] The Kinmond family were involved in two firms: Kinmond and Hill, flax-spinners, of Wallace Mills, and Kinmond, Hutton and Steele, of Wallace Foundry, who made,

For two or three years from this time the trade of Dundee continued to expand. The largest of the flax mills and linen factories were made larger and another fibre, destined to add prosperity to the town, was beginning to be largely manufactured. This was jute. As early as 1822 a sample of the fibre had been sent to the town from Abingdon, a Berkshire town engaged in the making of carpets, sacking and sail-cloth, and in 1833 the spinning of jute was begun in Dundee. But it was not gone into very heartily at first. In 1838 1,136 tons of the fibre were imported into the town. In 1848, however, the quantity had risen to 8,905 tons and five years later it was to be nearly double that amount. The Cox brothers began weaving by power in 1845 and the Gilroy brothers bought Boyack's mill in the end of 1848[1] and made a good start with excellent machinery and an engine on M'Naught's patent principle in the beginning of June 1849. The Dens works, as we have seen, were also extended that year and in the beginning of 1850 ground was broken for a large new mill, the stately building of five storeys that presents a front of 250 feet to Princes Street and is surmounted by the statue of James Watt.

9 April 1850

Our building operations progress very slowly on account of so many new houses going on at present. It is impossible to get a sufficient quantity of stones from the quarries presently opened. Most of the new houses are villas for the comfortable classes and of these there are many more than I can enumerate. The whole of the lots belonging to the Town in front of the Law[2] are now feued.

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as well as textile machinery, the first locomotives for the Dundee and Arbroath Railway in 1838. Wallace Foundry was taken over by Robertson, Orchar, engineers. Kinmond's decision to give up his engineering business reflects the passing of the initiative in engineering from Dundee to the west of Scotland and the beginning of Dundee's dependence on one trade, textiles. (*Dundee Directories; Advertiser*, 18 Aug. 1890, 1 Aug. 1895; S. G. E. Lythe, 'Early days of the Arbroath and Forfar Railway', *Railway Magazine*, 1953, pp. 53-58, 128-32.)

[1] These two, Cox and Gilroy, having gained a head start in jute, never relinquished their lead and became the two biggest jute firms in the world.

[2] This district is now Prospect Place, Laburnum Place, Somerville Place and all the area to the east of the Infirmary.

Later on, in a letter of which the date has faded, he says:

> Our building is not getting on very fast. It will be a week or two before we are ready for putting on the roof yet. You would observe the untimely death of our millwright Charles Christie. It grieved me very much but I cannot think that any one was to blame. We have just finished our looms and made a beginning on card and frames. Although we have not finally fixed on all the processes of tow-preparing, we have made an elaborate series of experiments on this subject and do not fear being tolerably successful.

In a letter dated seventeenth October 1850 he tells of the new breakers and rotary-frames introduced into the old mills and of the machinery being got ready for the new mill and then adds:

> With all this our mechanics' shop is a perfect Babel. We are doing far too much. It is impossible for any single person to do justice to it. We thought we had done with building for this year, but as you will see from the papers the town is inundated with flax and we have been as short of ware-house room as others. As it is impossible to hire room we are under the necessity of building and have now in progress a large house 100 feet by sixty and two storeys high on the east boundary of the property and in a line with the warehouse erected in 1849.

All these operations in addition to his usual cares gave Mr Carmichael much anxious thought and made him at times feel that he was 'chained to the oar' and that he had to pull hard to get through his sea of troubles. . . .

Manifestations of great and increasing prosperity now began to appear in the town and its suburbs. The Messrs Gilroy had bought the remaining portion of Mr Boyack's property and were beginning to erect their great mill on it. Mr David, one of the Messrs Edward of Logie Works, bought the estate of Balruddery[1] and generally merchants and manufacturers began to vie with one another as to

[1] Situated five miles west of Dundee and adjoining Lord Kinnaird's property at Rossie Priory in the Carse of Gowrie, Perthshire.

who should make the most splendid display. Scarcely a week passed without some one or other 'setting up a carriage'. As usual some built their house upon a rock and others were building theirs upon sand. Mr Carmichael did not look upon the good trade as firmly established and was disposed to regard the ostentatious displays of some as preposterous and likely as in former years to end in disaster. Yet he had at this time to look out for a house less confined than the one in the Dens now was and so make the keeping up of the one in Seafield unnecessary. After looking about on all sides he fixed on Springhill, situated on a steep slope about ten minutes walk eastward from the Dens. At Whitsunday 1851 he moved his household and goods into it and henceforth it was his home as long as he continued to reside in Dundee. At first he only rented it but after eighteen months he bought it with the three acres of ground around it and the houses along the road on the south side[1]. . . .

Only a few days after the family was settled in he wrote to Mr William G. Baxter:

9 June 1851

> We have had a violent gale of wind which continued all Saturday night and all Sabbath day night. It did no damage to the works but the trees in the neighbourhood have been so dashed about that they will not recover their beauty this season. . . . The finishing of the building progresses slowly. It will be the end of this week before the scaffolding can be removed from the front of the mills. I am keeping all the masons on the front until it can be finished although we are now needing the pavement laid in the floors as we could keep part of the dry flax frames on tow as soon as we can get them to work.

Another matter occupied Mr Carmichael's thoughts in the last days of this month of June. It was the trial of Messrs James Combe and William Dunville of Belfast for infringement of his patent for hackling. The hackling-machine, as we have seen, was found to be of great utility and value and machine-makers were quick to discover this. As early as twenty-seventh July 1846 Mr James Combe of Falls Foundry, Belfast, asked Mr Carmichael for permission to use

[1] Springhill still stands and can be seen from the main Dundee to Broughty Ferry road.

the patent in a hackling-machine he was constructing. Mr Carmichael referred him to Mr Marsden in whom the right to make the machines was vested. He then applied to Mr Marsden for the permission and got it on condition of his paying £10 as patent right for every machine that he made. To these terms Mr Combe agreed and in conjunction with his partner went on making machines. But they made no returns. At first they pleaded the difficulties of their firm, owing to the strike of their men; and later they put forth the plea that the machines they were then making had been so altered that they could not be brought under Mr Carmichael's patent. All other means having failed, Mr Marsden asked and obtained the authority of Mr Carmichael and of the Messrs Baxter Brothers and Co. to proceed with an action against them. Various legal formalities had to be gone through and though Mr Carmichael left the conduct of the case to Mr Marsden he was the nominal plaintiff and, as he expressed it, the disagreeable affair came across his mind at intervals like a nightmare.

The trial, which excited a considerable degree of interest in the mechanical world, was held in Dublin before the Lord Chief Justice and a special jury. It lasted four days. Many important witnesses were examined as to the value of the invention and after a clear and comprehensive summing-up of the evidence by the Lord Chief Justice the jury at once gave a verdict for Mr Carmichael with the damages claimed and costs. . . .

On fourth July Mr Carmichael wrote to Mr Marsden:

> It was with deep gratitude I received the intelligence of the successful issue of your arduous duties. I am aware that our best counsellor was your own unremitting attention to the conducting of the business. Allow me therefore to congratulate you on the triumph gained by your skill and foresight.

On the seventh he intimated the result to his brother James in these words:

> We have got a decision in our favour after a four days' trial. Combe has to pay all costs and damages, which consist of patent

rights or license for every machine he has made or altered. Failing him we have recourse against the parties to whom he sent them.

In the letter from which this is an extract he refers with characteristic humour to a visit from his cousin Mr John Drummond of Wambrichies near Lille, who had grown enormously stout:

We had a visit of cousin John from Warmbreeches. What a fellow! Margaret says he is as big as 'Sutherland and Murdoch'![1] He promised, after seeing through the mill in the morning, to come to tea at six o'clock and bring his companion, a Frenchman, with him. He arrived at eight, said he took the road in good time but as he passed Baxters' gate the workers were dismissing and he had such difficulty in getting through that it took him all that time!

The season was one of much going to and fro. From all parts of the United Kingdom and from beyond it people were flocking to London to see the Great Exhibition, the first exhibition of the industries of all nations, and returning home to tell with delight of the vast collection of interesting and wonderful things. After allowing the managers of the departments to get away in rotation Mr Carmichael went up in August.

That the loss of their little one[2] was not their only domestic affliction that winter the following letter to his brother James will show:

Springhill, Dundee. 12 December 1851

I duly received your kind favour of the third current and take the earliest leisure to reply and this I do the sooner as, from the events which have passed so rapidly in France during the last ten days, we have felt considerable anxiety on your account. There seems no possibility of predicting what is to take place next in France. The President seems determined to continue in power at all hazards and has gone to the opposite extreme of poor Louis Philippe in showing fight at the barricades. The great difficulty

[1] Sutherland and Murdoch, a firm of Dundee plumbers, brass-founders and gas fitters, 146 Overgate (*Dundee Directories*).

[2] In 1851 the Carmichaels' infant son died.

will now consist in keeping the soldiers in good humour and out of mischief for they will be petted on account of such good work for their master and will look for a substantial reward; and the danger will be that the President will have to find work for them at the risk of plunging France, if not all European states, into war.

As to your own personal safety in the present crisis, I have much less fear for you now than during the last convulsion, for you have had longer time to establish your good name and to obtain a good report from those that are without. Yet I would advise you to invest a considerable portion of your savings here and so provide against the worst.[1]

As regards our domestic circle we have had trouble on trouble, one after another. About three weeks ago Phemie[2] was taken ill and after a few days it turned out to be small pox.... We are truly thankful that there is no appearance of the disease spreading among us yet, although we have had an uneasy time of it.... James Cox[3] is laid down with typhus fever. He is going on favourably as yet but there are a few days to elapse before the height comes. The above you will think is sufficient to crowd into a short space of time. How short-sighted we are! We changed our habitation for what we thought a more healthful one and lo! we have had more actual ill-health, not to mention our painful bereavement, than we ever had in our auld hame....

But he had too active and healthy a mind to brood long over his troubles and the year 1852 brought him more work than he had ever had before. In the beginning of the year the trade of the town in general was dull and the profits on the making of certain goods were small. Owing to this not a few of the large spinners stopped part of their machinery and solicited Baxter Brothers and Co. to set the example of going on short time. They found, however, that though their stocks of some kinds of yarns were accumulating they were rather pressed to supply the demand for other descriptions and held

[1] It is interesting that savings worth investing should have accumulated for a mill-manager who had gone to Amiens only six years earlier.

[2] His sister, Euphemia.

[3] James Cox married another of James Carmichael's daughters, Clementina. He was the eldest of the family who founded Cox Brothers in 1841.

on their course as usual, the new mill being got ready meanwhile to start as soon as the market took a turn.

In the beginning of May Mr William G. Baxter, who had been in poor health for some time, left with the purpose of spending a few months at Homburg in Germany and in his absence the most of his duties had to be performed by Mr Carmichael. Added to his own they pressed heavily at times and in a letter to his brother he said: 'I feel that a heavier burden than I can conscientiously discharge is upon me, so that I have to say with Cardinal Wolsey, it is too much for a man that hopes for heaven'. . . . During Mr Baxter's absence Mr Carmichael with the view of brightening the 'home thoughts of a pilgrim in a strange land' wrote him a weekly letter making him acquainted with what was being done. . . .

14 May 1852. The Egyptian flax is nearly all sent in for canvas and it has improved the appearance of the yarn without impairing the strength to any visible extent.

21 May 1852. The spinning is going on well and we have rather reduced the stocks of yarn during the week. I have made arrangements with Donald M'Intosh to commence the duties of manager of hackling on the first of June. He is proud of the advancement and confident he will give us satisfaction. We are still busy in the factory and turning off a deal of work. We have now got a third dressing-machine with the large drying-cylinders to work and doing remarkably well. This makes us quite easy in the dressing department. We have begun to fit up a warp-winding machine from the new models, which will enable us to dispense with the two old ricketty upright spindle machines and do their work at one-third less cost. The new warehouse has progressed rapidly this week, the first flat being about ready for the joists all round.

10 June 1852. . . . The most important event since I wrote to you is the arrival of the Baltic fleet with flax, causing no small stir and anxiety to learn whether or not we were to have a good spin for the ensuing season.[1] I am very glad to say that it looks more

[1] The variation in quality of flax harvests from season to season made it very difficult to predict the price of the finished product and the number of employees required to process it.

favourable than for two years past. The first arrival was the 'Heroine' from Riga with as many different marks of flax as would nearly exhaust the alphabet.[1] Our production at the factory increases every week. I attribute a deal of the increase to the beneficial working of the fan ventilator. We can keep the temperature of the weaving room all day at 64% and by suiting the quantity of water in the damping tunnel to the state of the atmosphere we can keep the hygrometer steady 2% above the dew point. The effect this has in keeping the yarns in a pliable state and also upon the spirits and vigour of the workers is truly marvellous. I am dreaming over a plan to apply something similar to the large dry spinning room and the top room in the new mill where it would be equally, if not more, beneficial.

18 June 1852. We are drawing to a close with our new mill erections and beginning to pay off mechanics for want of work for them. . . . Considerable orders have been coming in for tent ducks. We understand they are for the Australian diggings.[2]

2 July 1852. William Robertson nearly met with a serious accident this afternoon. He was on the buttress of the factory pond looking after the joiners fixing spouts and going on an insecure plank fell along with the plank into the pond below, partly into the water and partly among the stones. The plank must have broken the fall, otherwise from the great height (20 feet) he must have been seriously injured. As it is he was able to go home on his feet and I have seen the doctor since who says there is no serious injury.

Dens works, Dundee. 22 July 1852

Mrs Carmichael, my sister and I spent a day last Friday by appointment at Balgavies with your father and sisters and a most delightful day we had. Miss Baxter met us at the station and we walked up through the Den. At the top we met your father, who had come forth to meet us, looking the very *beau ideal* of a fine old

[1] Each different grade carried its own mark, referring to the area in which it was grown and the port from which it was shipped and supposedly providing, but not reliably, some guide to the quality of flax in a bundle.

[2] The second Australian gold rush began in 1851 and had a very healthy effect on Dundee's trade in sackings and tentings.

country gentleman.[1] It is quite a pattern and example to see the holy calm in which he possesses his soul in patience. We walked round some of the bonny wooded knolls near the house to see the landscape round and had a sail on the loch, pulling water lilies to our content. We returned home late in the evening highly gratified with our day's excursion.

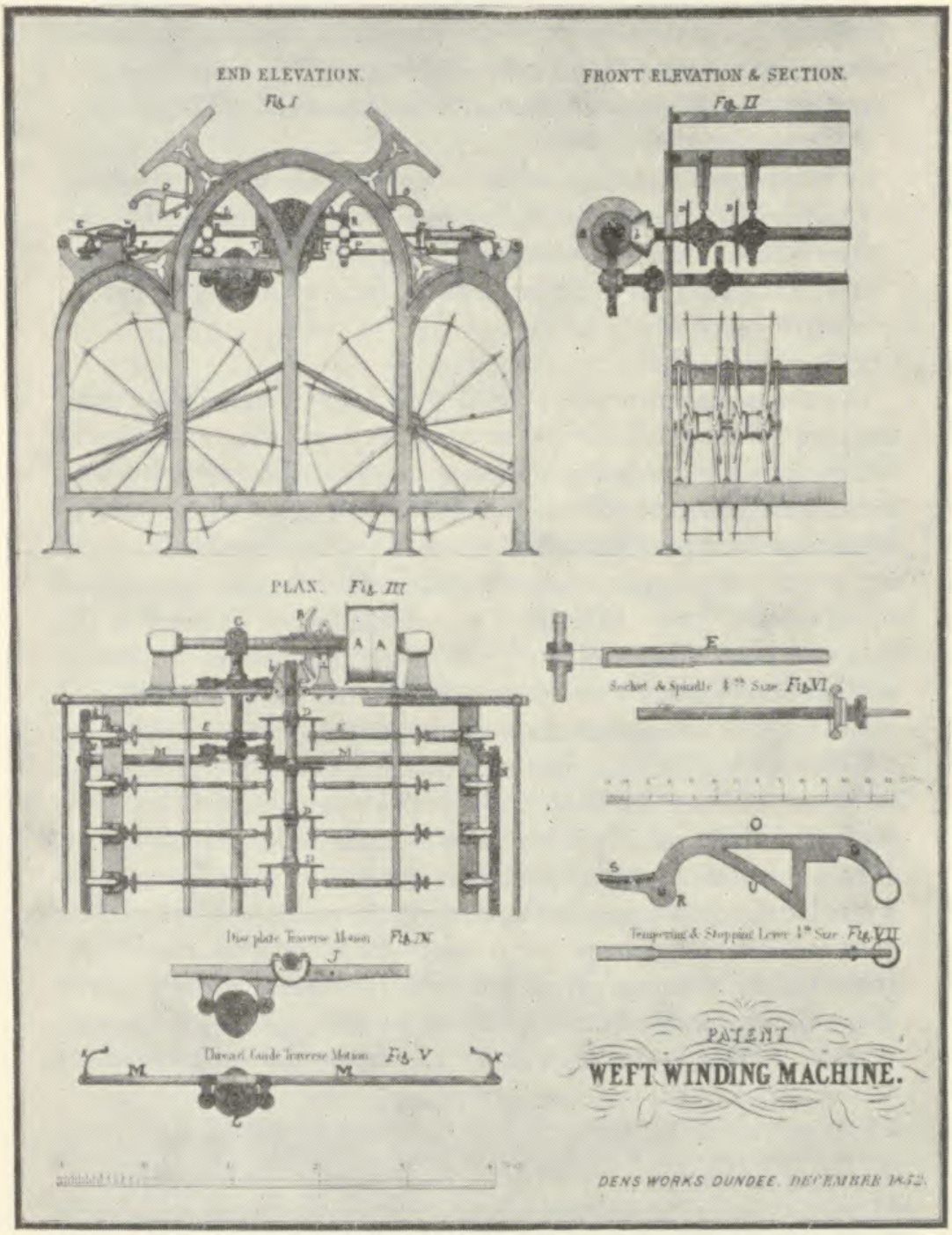
We stopped the works today at a quarter before twelve making a half-holiday on account of the procession for laying the foundation stone of the new infirmary. While I write the shops are shut and hardly a person is to be seen on the street at this end of the town!

It is the busiest man who is readiest to help others and notwithstanding his manifold labours in connection with the extension of the works, the better fitting-up of improved machinery, the organisation of the various departments and the ever-increasing economy of labour, we find Mr Carmichael active in seeking suitable situations for several rising young men or calmly deliberating on the schemes of his friends. Two of the latter to which he bent his mind at this time were Mr William Nairne's new method of railway propulsion and Mr James Spence's new theory of the steam and vapour engine.[2]

Of his own inventions the most important was a machine for winding weft. With the older weft-winding machines the yarn had to be wound from the hank on large bobbins on to the weft pirns and as in all the other processes the motions had to be very slow. Mr Carmichael's ingenious invention was in three parts. It embraced a variable spindle movement for securing the uniform velocity of the yarn and balancing the power required for driving the machinery. It has also the means of giving a variable movement to the finger or guide for laying the thread evenly on the pirn and its third feature was the application of a lever for regulating the hardness of the

[1] William Baxter of Balgavies, father of William, John, Edward and David Baxter, and sometimes known as William Baxter of Ellengowan (his town house) was at this time eighty-six years old.

[2] James Spence was a Dundonian who settled in Portsmouth as 'leading man afloat' in the Royal Steam Navy dockyard. A number of other Dundonians worked as mechanics at Portsmouth during this period, among them John Carmichael, son of Charles of Messrs J. and C. Carmichael (Maxwell MS., unpaginated, in Dundee University Library).


END ELEVATION.
Fig. I
FRONT ELEVATION & SECTION.
Fig. II
PLAN. Fig. III
Fig. IV
Fig. V
Fig. VI
Fig. VII
PATENT
WEFT WINDING MACHINE.

winding and for stopping the spindle when the pirn was full. As an instance of the adjustments needed to get such a piece of mechanism to work well it may be stated that this machine passed through five stages of development before it was deemed satisfactory.

> The beautiful idea of the traverse of the pirn backwards by the cone, which pushed back the pirn as it filled, was not mine. I saw it first in a cotton factory in Manchester and it was said to be the invention of a German named Koch. I at once adopted it in a machine which was driven by a cylinder driving a wharve, being made of tin, the length of the traverse of the pirn from empty to full. When full a pin soldered on the end of the wharve caught on a steel spring which stopped the rotation of the wharve. It was a clumsy contrivance and gave a jerky motion, there being no compensation for the varying speed of the large and small diameter of the pirn. The patented machine gave the variable motion and allowed the speed to be increased. In it the motion given to the swifts was nearly uniform.

In a letter to his brother on thirtieth October 1852, about the time he completed the improvements on this machine, he makes a remark well worth quoting:

> Trying to invent (he said) is a great mistake. Our vocation as captains of industry is to work our business so as to produce the best article at the cheapest rate with all due regard for the rights of those in our employment. If, in the prosecution of this object, we fall upon anything new which we can turn to account it is fair gain. But to lay yourself out for inventing something new is a 'mockery, a delusion and a snare' into which many wise men have fallen. . . .

By this time the works at the Dens had grown much both in magnitude and in efficiency from what they were in 1846. The enlargements, as we have seen, were the result of pressing needs, and the striving after an ideal of perfection in the management, the machinery, the ventilation of the rooms and the habits of the workers was the persistent aim of their chief director. The works were visited

in 1852 by M. Eugene Burel of Rouen who came to Dundee in his tour through the manufacturing towns of Great Britain and wrote a description of what he saw.[1] He was much impressed with the excellence of the works and reported that there were then 2,500 workers, of whom 200 were mechanics, that there were seven steam-engines with a collective force of 272 h.p., that the number of spindles was about 25,000 and the number of power-looms 550, and that the quantity of flax used was about 100 tons a week.

The close of the year 1852 was clouded by the death of Mr William G. Baxter.[2] The state of his health had been precarious for some time past, but he was at the office on the Tuesday preceding his death. On the Thursday he was able to be at the dinner-table and retired between ten and eleven in good spirits. When his man-servant went next morning to give him a cup of coffee as usual, it was found that the spirit had fled. The event affected Mr Carmichael deeply. After informing his brother James of the sad loss he added:

> Thus has been riven asunder a bond of connection that has existed for almost twenty years and there is much difficulty in realising the feeling. Apart from our business connection I feel that I have lost a dear friend. For the last few years our intercourse was of the most agreeable kind. 'Very pleasant was he unto me'!

He complained that he could not go about his customary duties with his wonted vigour but his correspondence at the time bears evidence of much work done in the last days of the year. . . . On the last two days of the year he indulged in the congenial occupation of sending out little presents and good wishes. To several friends he sent 'a dozen towels of a new kind come into extensive use lately, said to be used by Her Majesty and recommended by the Faculty[3] for their sanitary properties. If briskly applied they will cause your countenance to shine in the bonny days to come. We are making large quantities of them.'

[In this year] there was joy in his home and a sense of calm thankfulness in his heart over the birth of another son on twenty-seventh

[1] Eugène Burel, *Excursion en Angleterre et en Écosse* (Rouen, 1853).

[2] William Gorell Baxter, son of William Baxter of Balgavies, died of heart disease, unmarried, aged 54.

[3] Faculty of Surgeons?

January. His family now numbered three, his daughter Grace Margaret having been born in December 1851. As a baby she had been delicate but she was now growing in strength. The notice of his infant son's baptism is thus put on record:

> 17 May 1853. We had a worthy minister Mr Masson living with us last Sabbath week and took advantage of the circumstance to have our little boy baptised. We have named him William Baxter after our departed friend. Our Scotch pride and stubborn independence would not have permitted this had he been alive, but in the circumstances we felt that it would be a graceful act.[1] He is a fine little fellow and will, we trust, make the name worthy if he is spared and hand down after we are in the dust the reputation of an honest God-fearing man, the best legacy we hope to leave him.

The education of mechanics was a subject that interested him much and by way of arousing the interest of others in the subject he sent to the *Dundee Advertiser* a review of the *Book of Industrial Design* in which he strongly advocated the necessity for a school of design in Dundee. A few days later he was asked to give his opinion on the proposal for a new Literary and Scientific Institution in Dundee and he did so in a letter to Mr William Miller the banker, a gentleman who, though less distinguished than his brothers James and Samuel, was a geologist of some fame and an earnest promoter of scientific study in the town.

Dens Works, Dundee. 31 March 1853

William Miller, Esq., Dundee
Dear Sir,
I duly received your communication on the subject of the Watt Institution requesting information as to the cause of the failure of the late Institution. Since the receipt of your letter the subject has occupied my thoughts from time to time and I have also talked over the matter with those whom I thought likely to be able to form an opinion to see how far we agreed; and now, in as plain a

[1] It was common until recent times for employees to give sons an employer's surname for a middle name as a kind of flattery which might attract the employer's attention and possibly patronage.

way as is in my power, I will endeavour to lay before you what I think the causes of the failure and the plan that should be adopted to avoid failure in the future. I was a director of the late Institution for several years and gave a good deal of time to the furtherance of its objects; and, in my opinion, everything that could be done to popularise and induce mechanics to attend, in accordance with the rules as then existing, was attempted. I may mention that during those years the lectures were looked upon as a principal feature and excellent courses by first-rate lecturers were given on the Wednesday evenings. An exhibition was also got up at great trouble on the part of the directors, which was very popular.

During those years we had great difficulty in making the two ends meet, but the most disheartening part of the business was the backwardness of those for whom the Institution was principally intended in taking advantage of its benefits. I mean the working mechanics. The audience at the lectures and the readers from the library were chiefly of a higher grade than mechanics and the members generally were not those intended by the promoters of the Institution. Being interested in the subject we were in the habit of receiving the reports of the various Mechanics Institutions throughout the country and we found it to be the general complaint that the members were not mechanics but a higher grade. And this continues to be the complaint up to the present day and I think points out the cause of the failure, which in my opinion is that these institutions have commenced with expending their means in getting up a fine building, with lecture rooms, library, museum, etc., to attract and interest a class whose education is such that they cannot appreciate their benefits.

My decided opinion is that the failure of the Mechanics Institutions generally has arisen from a mistaken idea that mechanics were better educated than they really are. Taking the young men in Dundee engaged in the mechanical trades, say from fourteen to twenty-four years of age, it will be found that most of them have not received an education beyond reading, writing and the simpler rules of arithmetic; or, if in the course of their school training some may have advanced further, it has been acquired, as too much school learning is by boys, with such a dim perception of its uses to them in after-life that it is allowed to rust out for

want of cultivation. Now the benevolent promoters of Mechanics Institutions, forming their opinions from the higher standpoint of their own education, think what a fine thing it would be for mechanics to attend a course of lectures on the philosophy of mechanics, and be able to read from the library choice works on such subjects, not seeing that their previous education unfits them for appreciating or apprehending such higher culture.

If I am correct in the foregoing statement as to the amount of education among mechanics, and I fear it is too true, it is evident that in establishing a new institution it must be, to commence with, simply a cluster of schools for teaching, at such hours as are convenient for working men, classes for reading, writing, arithmetic, mathematics, drawing and design, etc., the money collected for the new institution to be expended in such a way as to get first-rate teachers for these classes, at the same time reducing the fees payable by the students to such a rate as will come within the means of apprentices and young mechanics.

I do not think, however, that even were proper schools in operation, and a fund provided for making the education cheap enough, that all would be done that is necessary, for even after all this there would be required, on the part of the promoters of the institution, much careful thought and personal attention to induce young men to devote their leisure time to study. When a boy commences his apprenticeship he generally thinks that he has done with schooling and requires only to learn the work; and the modern system of apprenticeship too much removes the boy from the eye of the master, so that the tie between them is only that of work done and wages paid. Now, in most of the trades, the day's work is done by six o'clock in the evening, leaving a couple of hours at least that may be devoted to useful purposes. These hours, to boys serving their apprenticeship, are either their fortune or their fate.

To induce their apprentices to give a portion of their time to study, masters would require, either personally or through their agents, to talk to them from time to time as to how they spend their evenings and generally to hold forth the advantages of education and the disgrace of ignorance, and it might not be out of place for clergymen occasionally to say a good word to apprentices

of their peculiar perils and duties. Besides all this the schools should be so organised as to draw out by emulation the talents of the scholars, by public examinations, by prizes for merit, perhaps by free scholarships to higher classes and we know not but that even diplomas should be given to the leading scholars who have passed with distinction through all the classes. To give the necessary attention to all this would require a deal of time and labour from the promoters of the institution, for the examination of the schools would require to be public and well attended to show that an interest was taken in them.

A most important end would be gained by these schools and a want supplied that most employers must have experienced, that is, the knowing in cases of vacancies where to get a qualified person to act as foreman or overseer. Now a distinguished scholar from the Mechanics' Institution, provided his working abilities were good (and we mostly find the two things go hand in hand) would be seen by every employer to offer a fair chance of a really good man; and the putting the fitting man into the fitting place is perhaps as important a matter of thought as can engage the attention of an employer, for in general as is the foreman so are the people under him, either as regards their work, or, what is more important, their morals. And if it were apparent to young men that a clear way of advancement to a higher position was open to them from having a good recommendation from the Institution it would be a powerful motive to draw the best and most talented to study there, and it would even come to be thought a disgrace to those who wasted their time and did not attend the classes during the currency of their apprenticeship.

I will not attempt to go into any detail as to the conducting of such schools, fees to be charged, etc., as all this can be more ably discussed by many who know more of schools than I do; but I think I have stated what is the only foundation upon which a Mechanics Institution can be laid, with any hope of success. I fear my ideas will not be very intelligible in the preceding, at least they hardly explain what I would have liked to have said on a subject of such great importance. If they be of any service in forwarding the object you have in view it will give great satisfaction to, sir, your most obedient servant, Peter Carmichael.

Not only Dundee but the whole country has come alive to the importance of our having well-skilled and intelligent mechanics if we are to hold our own in competition with the continental nations and it would be well if the principle laid down in this letter were generally carried out. Lads beginning their apprenticeship should be encouraged in every possible way to continue their education in the evening and this education should begin where their school education ends and be carried on step by step throughout the years they are learning their trade. By the end of that time the most talented will have learned enough to make them wish for more.

About the same time as he was considering this subject Mr Carmichael was making a series of interesting experiments in the work on the generation of steam, the economy of fuel and the prevention of smoke. . . . Similar investigations in engineering economics occupied his attention from time to time, but his ordinary routine duties had become more manifold since the death of Mr William G. Baxter and left him less time for experiments. The burden that fell to him was further increased by the serious illness of Mr John G. Baxter who was seldom in the works after his brother William's death and followed him to the grave in four months.[1] Writing to Mr James Spence on seventeenth May 1853 Mr Carmichael said:

> I must apologise for being so remiss in my correspondence of late. You will understand the reason when I tell you that the dull, cold, leaden feeling arising from the death of Mr John Baxter following so close upon his brother made me very listless for a time and then I had to value all the property here, which has occupied every moment of time available from my routine duties for the last two weeks.

The weight of the business now rested on Mr David Baxter and Mr Carmichael. While the two brothers William and John were still alive and active, the proposal had been made to admit Mr Carmichael into the partnership. But he did not jump at the proposal.

[1] John Baxter died of rapid consumption, aged 37. Five of William Baxter's eight children died unmarried. Only Edward and Eliza had offspring. Eliza bore only one daughter. Edward had three wives and ten children.

Serious considerations rather made him hesitate. There was no love of money in his disposition. His patents had proved very successful. For the last two years the proceeds from them had exceeded £1,000 a year and he had already gathered what he then considered a competency. The double loss caused by the death of the two brothers added to the gravity of the situation. There was now not only a share in the responsibility of the heavy concern but there was a nearer prospect of its falling on himself alone. He knew Mr David Baxter, however, to be an excellent man of business, thoroughly upright, with much decision of character yet pleasant to get on with. Recent events, too, had drawn out affection to him as a good man and his standing alone now made it difficult to traverse his wish. When the formal proposal was made by him therefore Mr Carmichael recognised the fairness of its conditions and accepted it.[1] On the first of June 1853 he became a partner of the firm of Baxter Brothers and Co. . . .

On sixteenth June, to a business correspondent, he wrote:

> As you suppose, the double loss sustained by our firm in so short a time has thrown us upon our resources, but a large concern, like the wheels of time, must roll on. Otherwise even a short stoppage pushes you aside in the race course.

Two months later a shadow was again cast over his thoughts. On the thirteenth of August his father-in-law died. Writing ten days after the event to Mr James Spence he said:

> Our dear friend did his work well. The world had nought more of him to ask and we can with confidence think of him as having entered into that 'rest that remaineth for the people of God'. . . .

[1] The original conditions of partnership have not yet been discovered among Baxters' records, but in 1861 Carmichael had six thirty-seconds of the profits, William Dalgleish four and David Baxter twenty-two thirty-seconds. In 1871 Carmichael and Dalgleish had eight thirty-seconds each, Baxter fourteen and Francis T. Maitland (husband of Sir David's niece) two thirty-seconds. Thus Sir David had given some of his original shares to each of his two partners and to one new junior partner. After Sir David's death, Maitland's son, Carmichael's nephew, James, and Edward Baxter's grandson, George Washington Baxter, were taken into the firm. (Baxter's Scroll Balance, 1879-1918.)

In a sketch of the great engineer's life which he wrote at this time he closed with these words:

> James Carmichael's health was never robust but his abstemiousness and placidity of mind probably had a great effect in lengthening his life. He had for several years retired from active duty, but still continued to take an interest in scientific subjects and to spend a few hours occasionally in the work-shop he had fitted up in his house. The law of his mind was *concentrativeness*. He could not take a part in mixed company where various topics were discussed but generally sat silent. With one or two he discoursed eloquently, keeping to the same subject and discussing it thoroughly. In all he said there was a high-toned integrity and rigid regard to truth without exaggeration, such as is seldom to be met with. It seemed to be almost a mathematical precision. By those who were in his employment, scattered as they now are over many lands,[1] there will be but one feeling entertained – affection and love to the upright man from whose lips proceeded only kind words.

Towards the end of the year Dundee was again visited by cholera but happily its ravages at this time were light compared with those of 1832 and 1849.

> Trade is getting worse and it is nearly agreed to go forty-five hours per week in Dundee for two months from the twelfth of December. This is a bad prospect for the workers with the present prices of food.
>
> You will see by the papers that we have another visitation of cholera, God's judgment against filth I call it. We have now had a survey of the town for sewerage for two years but as usual refuse to tax ourselves to proceed with it. The Free Church have had a fast today, which would be very well after all the means in our power had been used, but no one will allow his pocket to be touched. . . . I feel so strongly on this subject that I would be content to live under a despotism for a few years until the purification

[1] C. Hamilton Ellis, *Twenty Locomotive Men* (London, 1958), gives some account of the spread of Dundee-trained engineers throughout the world.

of the towns and the education of the people were carried out. Our present liberty is licentiousness.

Your invitation for May is a bright spot on the horizon which will be looked forward to with pleasure although I have many misgivings as to the accomplishment.

The misgivings no doubt arose from the cloud in the east and the shadow it was casting on the trade of Dundee. In October 1853, about a difference of opinion so small as to be hardly appreciable, the Turks had declared war against the Czar, and before the end of March 1854 England and France as well as Turkey were at war with Russia.

1854–1866

THE EFFECT OF WARS ON THE TRADE OF DUNDEE

'The full tide of prosperity'

THE RUSSIAN WAR excited considerably anxiety and intense interest in Dundee as indeed it did throughout the whole country.

19 April 1854

I again write you after a long pause, more to stir you up by way of remembrance that you are in my debt than from having anything important to communicate. The passing events presently engaging one's attention are apt to cause the duty of letter-writing and many others to be neglected.

We have fallen upon times that I never expected to live to see when the civilised nations of the world are again set in battle array through the blind ambition of one wicked man whose lust of power knows neither limit nor check. Yet however hateful war is one cannot help imbibing some of its spirit, so that even in our sitting-room we have a map of the seat of war hung up for reference and Drummond can talk about Kalafat and Cronstadt and is frequently caught punching the heads of imaginary Russians.

The population of a town such as ours, wholly given up to commerce, have caught the spirit and the boys' play on the streets is mixed up with it. The latest new song is 'Give it to him Charlie'.[1] All this is very much to be regretted, the more so as our

[1] Sir Charles Napier was sent in charge of the Baltic fleet as a demonstration of the strength with which Britain could defend her trading interests. When the war opened

dependence on Russia for our raw material makes us so deeply interested in the result. Owing to the scarcity and high prices some of the mills are already stopped and if the war continues long the effect on the town will be most disastrous. We have had fifty-four wet-spinning frames standing for some time past and last week we stopped another sixteen, making seventy in all. This is very unpleasant and it vexes me sadly to have to part with people who have been trained at the place and are much attached to it. We still keep up nearly the same staff of mechanics remodelling and improving our machinery. This I begin seriously to think must be put a stop to unless we can see more clearly where the raw material is to come from.

Our only erection at present is a new chimney for the mills and this is a work of necessity, for the old one is so cracked and strained with the late gales that it is a great responsibility to let it stand till a new one is built.

The drain of skilled hands emigrating to Canada and Australia and the drawing away of mechanics consequent upon the great prosperity of the iron ship-building trade on the Clyde is telling very seriously upon the population of the town, so that although our trade is bad wages are rising.[1]

The chimney referred to is the largest of the obelisk-shaped stacks that distinguish the works and has been ever since a conspicuous object in a view of the town from the east.[2] It was erected on an elevated site and flues were carried to it from various parts of the work. It is 162 feet high, but as the lowest range of furnaces exhausted by it

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many Dundee merchants had money tied up in flax awaiting dispatch at Archangel, a situation naturally causing them some anxiety. Sir James Graham, although forced to oppose trade with the enemy, advised the Dundee traders unofficially to take the risk of sending for their cargoes with a reasonable expectation of receiving them': 'Get them away as fast as you can' (answer by Graham to questions in House of Commons, reported in *Advertiser*, 30 Jan. 1855).

[1] As the population of the town in fact increased from 45,355 in 1831 to 78,931 in 1851, the absolute number of hands available increased rather than declined. Emigration, however, drained away skilled people from the town and wages for mechanics therefore rose. Their place in the town's population was filled by Irish immigrants and Angus country people, a much lower grade of labour, prepared to accept very low wages. The rates for unskilled work did not rise at all during this period; see, e.g., *Advertiser*, 12 Jan. 1856.

[2] See illustration above, p. 2.

are 86 feet below the base of the stack the chimney has a height of 248 feet in all. The products of combustion in twenty-six furnaces had to pass through it, each furnace on an average consuming over a ton of coals per day. Seven firemen attended to the furnaces, each having his group. It was regarded as a model of elegance and utility and as the smoke from it was carried away at a much higher altitude it was less of a nuisance than the smaller one had been.

The immediate effect of the war on the linen trade was different from what was anticipated in the letter. Within a week of its date orders from the British Government for tent ducks and for German dowlahs[1] had come in and they kept the extended mills and the enlarged factory busy for months. Mr Carmichael did not get to France as he had hoped, for though the production was well organised and would have been kept up in his absence, he had now to give his attention to business more than heretofore and there was at the time much speculation in the market from the difficulty of getting flax owing to the war. It continued the great subject of excitement in the country. Writing to Ailly on twenty sixth April he said:

26 April 1854

> This day is appointed as a day of humiliation and prayer on account of the war. In our church we had a prayer meeting in the forenoon and we are to have a sermon in the evening. I cordially agree with it but I think it no offence to write a friendly letter. It is pitiful to see in the present emergency the want of *one good manager* to carry on the affairs of this country with energy and decision. We have plenty of managers but the uniting link is awanting. . . .

Arrangements made about this time for the renewal of the Harestane lease and for the work of bleaching being carried on by Mr John Carmichael, the youngest son of the family, reveal [him] solicitous for his father's comfort and well-being and show how fairly and delicately the clear-headed man of business held the balance when weighing the interests of his father and brother. But this year, like

[1] Dowlas: a coarse kind of linen, first named after Doulas, south-east of Brest in Brittany, but extensively made in Germany. Scots weavers copied the texture and the name in an attempt to capture markets abroad filled until mid-eighteenth century by German linens.

the one preceding, was to be marked as one of bereavement. In February Mr William Baxter, the founder of the firm and father of the leading family of Dundee Baxters, had passed away, and before the year closed the Carmichael family had to mourn the loss of their father too. There was no merry family gathering on the next New Year's day, for the head of the family was in his grave and it made a great difference to them all. There was the same brotherly sympathy however and on that day he wrote to his sister Jane:

> Allow me to commence the year with wishing you and all the other members of the household at Harestane a good new year. I cannot say a 'Happy' under your present circumstances but trust that the balm of consolation will be given in time.

The steadily large production of the works was interfered with for a time by the accidental break-down of one of the engines.

> On seventh December 1854 the cross head of the piston of the eighty h.p. engine in the Upper Dens mill broke off and the engine was stopped without further damage being done. The metal, on examination, was found to be a solid casting but appeared a piece of coarse grained, hot-blast iron and it seemed from the fracture that the break had been going on for some time. . . . We replaced the cross head with one made from Welch cold-blast iron, not without misgivings, however, especially as we found that the opposite end of the broken cross head came away with a few blows of a hammer and showed a fracture commencing exactly in the same place as on the broken end.
>
> On the morning of Monday fifth February 1855, a few minutes after starting, the crank shaft of the same engine broke on the inside of the crank journal or neck. The broken end twisted itself out of the bearing or pedestal, broke the connecting rod into many pieces, carried away part of the sway beam at about the middle distance between the main centres and the connecting rod ends, and the whole went down to the pit in one horrible smash carrying floor and beams along with it in shapeless ruin. The recoil carried away the cross head at about the same place as before and broke off the top of the piston rod. Our old chief engineer,

John Robertson, was standing at the steam valves at the time. He describes it as one fearful crash and before you could say *his name* all was hushed and the place was filled with a cloud of dust.

An examination of the cause of this breakdown led to a close study of breakages in general and calculations on the strength of materials.[1] The sketches of the fracture and calculations based on the best tables will be found in the *Engineering Journal* and the *Artisan* for April 1856. The conclusion at which he arrived was that in so far as practice is superior to theory it was evident from the breakages that in the working of this engine they had gone far beyond a safe pressure of steam.

These investigations were made early in the year 1856 when rumours of peace were having a lulling influence upon the trade of Dundee and creating a panic among holders of flax,[2] but it was not till September that Sebastopol was taken and the Crimean war at an end. The demand for coarse linens during the war had been very great; large profits had been realised on Dundee goods, the manufacture of jute fabrics had greatly increased and both spinning mills and weaving factories had again been extended. Hardly were the fears of spinners as to a regular supply of flax at rest than anxieties arose as to the supply of jute. In the year 1857 all eyes were turned towards our Indian Empire where British dominion was being threatened and British blood was fired with indignation against the perpetrators of the awful horrors of Delhi and Cawnpore. But the country was prosperous and trade was flourishing till the autumn, when a monetary panic in America produced a mercantile crisis in London and throughout the kingdom that ended in disaster to many rich and good men. On the ninth of November the Western Bank failed and it was followed by others. The liabilities of the houses that became bankrupt were of a magnitude hitherto unheard of. Those of five banks and 146 firms amounted to over forty millions and showed a deficiency of nearly eight millions. In Dundee the prices of goods fell seriously, some of them to about half of what they were

[1] Baxters still possess a nineteenth-century record, not complete, of stoppages of machinery, with dates, the reasons for breakdown and the number of minutes lost.

[2] It was at this stage, because of uncertainty and high prices of flax supplies, that many Dundee manufacturers switched to jute production. While the flax merchants felt anxiety for the town as a whole, as the *Advertiser's* trade report showed, the future was hopeful (*Advertiser*, 1 Jan. 1856).

before, and the distress of the working classes throughout the town was very great.

Mr Carmichael's familiar correspondence seems to have been less during these years than formerly. He was in all probability too busy to write to his friends with the same regularity and ease. At any rate very few letters of this period are extant. A paper written by him in 1857, however, shows that he had by that time effected further improvements in several of the operations that had to be performed in the manufacture. Chief among these were improvements in the process of reeling the thread on the bobbins from the spinning frames into heers, hanks or spyndles and in the process of mangling the cloth. The reeling machine first introduced into the Dens mills was, as we have seen, the invention of Mr William Nairne and while the patent was in force Messrs Baxter Brothers and Co. paid him a royalty on every reel they had in use. But again and again improvements had been made on it by Mr Carmichael till he had pleasure in its working. Here is his description of the machines as they were in 1857:

> The improved machines are in two reels of eight bobbins each for one girl attending to, so that the one may be running while she is knotting or shifting the other. These machines stop when a thread breaks or when a bobbin is empty and will not run until the thread is tied or the bobbin replaced. They also stop when the proper tale is completed and in addition spread the reeled yarn in uniform thickness on the reel.
>
> The reels are driven by the engine so that the girl has her hands at liberty and she thus attains a wonderful facility in knotting and tying, for in linen every knot must be tied a good weaver's knot. This the girl does so deftly that the machine stops, the knot is tied, perhaps an empty bobbin is also removed and the full one knotted and the machine is at work again as if touched by the wand of a fairy, while an onlooker can hardly see what has been done or believe that such operations have been performed.
>
> To give an idea of the facility that can be attained: a smart reeler can reel 520 spyndles of flax yarn in a week of sixty hours. Each spyndle contains four hanks, each hank being tied up into six heers of 240 threads each, the thread being one round of the

reel two and a half yards in circumference, the 520 spyndles amount to 7,488,000 yards. Each hour she has 328 empty bobbins to take off and as many full ones to put on, from 400 to 500 knots to tie, 208 hanks to knot with twine and four and a third times to strip the full reel and take off and twist up the hanks.[1]

What a contrast to the old method! At the beginning of the century the hand-spinner when she had filled her bobbin had to take it off and reel it on a hand *swift*, one bobbin at a time, counting the revolutions for the tale. Then, when her *rocks* were completed, she had to carry the yarns, perhaps for miles, to market. A story is told of a parish minister near Cupar in Fife meeting an old woman who was returning from the market, where she had been to sell her yarn and where she had partaken of a wee drop more than she was able to carry steadily. 'Janet,' says he, 'you are *reeling* tonight?' 'Deed ay, sir,' replied Janet, 'ye ken we canna be aye spinnin'.'

In regard to the processes of finishing the cloth as practised at this time he writes:

The finish given to fine linens is done very often by what is called beetling. In this operation the cloth to be operated on is wound on a beam which is then driven slowly round for hours while a continuous stamping of wooden hammers or beetles is kept up on it, until the outer part of the web is done, when the ends are reversed and the process repeated until the web is finished. This is a very slow operation.[2] Mangling is for the same purpose as the operation performed by the domestic mangle, but it is done with powerful machinery between two huge flat stones which lie horizontally, the upper one being movable and made to travel by a steam-

[1] The yarn, although spun onto tight bobbins and woven off spools, had to be put into loose hanks for the intermediate process of bleaching. Only in very recent years has it become possible for bleaching agents to penetrate through tightly-wound yarn. In the nineteenth century it had to be moved through baths of chlorine bleach in loose bundles so that each length of yarn was exposed to the action of the bleach.

[2] The process of beetling was often carried on in separate beetling mills, manned by groups of eight to ten men and women who worked very long hours because of the slowness of the operation. The River Almond, near Perth, had more than 100 of these water-powered beetling mills. The remains of some of them can be seen at Pitcairnfield.

engine or by water-power. Some of these upper stones are loaded to from forty to eighty tons weight and the machines cost from £1,000 to £1,200.

A new machine for mangling has just been introduced. It is much more compact in form and performs the operation with very much less power. It consists of three rollers, the middle one made of paper and the lower and upper ones of cast iron. The cloth is rolled on the middle roller and the pressure required is put on and off at pleasure by hydraulic power. When the pressure is put on, which is done by simply turning a cock, the machine is driven a few times backwards and forwards; the pressure is then removed and the cloth wound off finished.

Several other machines are used for doubling, measuring, folding, making up and packing in suitable forms ready for sending to the markets of the world which have their different fashions in these respects. Some are made up in round rolls of a specific length for home use, some in compact round webs for the sails of ships, some assorted and packed in waterproof cloth and of such a weight as can be carried on the backs of mules over the mountains to the fairs of Mexico and South America and in many other forms to suit our extended commerce, which, now that China and Japan are opened up, reaches, if we may use the words 'from the river even unto the ends of the earth'.

The new machine for mangling here referred to was of his own invention and was patented in the beginning of 1858. The specification of the machines, with a lithograph showing their construction and mode of working will be found among the publications of the Great Seal Patent Office for March of that year, and we shall not do more than point out its distinctive merits. The introduction of the cylinders was the first great improvement on the old calenders. The first used were made of wood, but cylinders of cast iron were found to be better than those of wood as the wood was apt to warp and crack.[1] Cylinders of paper wonderfully constructed in conjunction

[1] The first calenders were made of lignum vitae and were introduced at Perth in 1758. The use of calenders to finish linen was encouraged by the Board of Trustees for Manufactures whose officers instructed in their use (SRO, NG1/3, vol. 6-7, p. 264, 12 Dec. 1758). See also *Advertiser*, 23 Mar. 1858, for reference to Carmichael's improvement.

with the cast iron ones formed another important advance. The rollers were mounted above one another in a strong frame-work of cast iron and the pressure was applied by weighted levers etc.

Mr Carmichael's important invention lay in the use of water for applying the pressure and in doing away with all weights, levers, wheels and racks. This was accomplished by placing on the top of each side of the framing an inverted cylinder or hydraulic ram, the pistons or rams of which were connected with the bushes of the upper roller and had pipes connected with the inverted cylinder or hydraulic ram, supplied by a pump or head of water to give the pressure required. This hydraulic power, as told above, was applied in a very simple manner and the water cistern which supplied the pumps required a very small quantity of water as what was used for the pressure afterwards returned the pistons. When the machine was used as a calender the cloth was wound on the top roller under pressure. When the end of the piece was put in, the necessary pressure was put on and then shut off. As the cloth went on the roller increased in diameter and rose, pushing the ram upwards. The water in the supply pipes was thus pressed through the valves keeping the pressure uniform throughout the operation. When the piece of cloth was all run on, the valve was lifted to take off the pressure, the top roller was raised clear away from the under one and the cloth stripped off in the usual way. When the roller was lowered to begin the next piece of cloth, the ram, descending, sucked in the water through the supply pipes and filled the cylinders ready for a repetition of the process. When used as a mangle the piece of cloth to be mangled was first rolled on the middle roller with a light pressure. The needed pressure was then put on by the pump or head of water and kept up while the cloth was rolled between the cylinders, the motion being reversed at every one or more revolutions of the roller with the cloth on it until the operation was completed, when the rollers were lifted clear and the finished piece stripped off. This application of hydraulic power in calendering and mangling was found to be a great improvement.

The subject of most general interest to owners of factories at this time was the Smoke Act. . . .This act related to London and in 1857 an act affecting Scotland was passed, fixing the dates after which penalties for non-observance would be enforced.

The act was a popular one but it was hard to subject large manufacturers to a prosecution under the act when they had been at considerable trouble and expense to get rid of, or lessen, the nuisance. The economy of fuel and the consequent consumption of smoke was, as we have seen, one to which Mr Carmichael had given much study. But owing to the extent of the Dens works and the large number of furnaces all communicating with one chimney, it was possible that the quantity of smoke issuing from it might at times seem larger in volume than from the neighbouring chimneys. To anticipate being put in the position of a defender of smoke in a court he addressed a letter to Mr David Small, solicitor, giving a clear and full statement of all that had been done to lessen the nuisance. The letter is dated fifth August 1858, after the act had come into operation in Dundee.

> It will be manifest from the preceding details that we have been carrying on a system of experiments with more or less success for the last twenty years, sometimes gaining a point and sometimes spending a deal of money just to return to the old plan. We purpose continuing to do so, still hoping that sooner or later it will be found possible to get rid of smoke under all circumstances and we are strengthened in this hope by the great improvements made during the last twenty years.

He was also investigating at this time the economic use of steam in steam engines. The experiments were made on an engine of forty nominal horse power, driving flax-spinning machinery and therefore working with a uniform load. They were made with great care and afterwards published in the *Transactions of Engineers*.

But the most conspicuous event of the year 1858 was the opening of the school in Crescent Street, the old one in the Dens Brae being now too small. The new school was far in advance of the school buildings of that time and is still a monument of the generous and enlightened policy of the firm. Standing in an open, airy place, with a large playground, it has all that could be desired to promote the health and happiness of the young people. No expense was spared in rendering its equipment as complete as possible. It was provided with a verandah and lavatories supplied with hot and cold water

where the boys and girls might make themselves tidy before entering the school-room. The ventilation too had special care bestowed on it and could be regulated with ease. The school was free to those employed in the works, teaching, books, slates and everything necessary being provided.[1]

Mr Carmichael had given careful study to all the details in the buildings and furnishing of the school but his loving care did not cease when the school was opened. The education and moral training of the young had always been a subject of great importance with him and he continued to superintend the working of the school in all its parts. With almost parental solicitude he watched the progress of the scholars and encouraged the teachers and monitors in their efforts to secure good conduct and good manners. With this view he paid a stated visit to the evening school once a week to learn from Mr Smyth the teacher if all were doing well and if anything more could be done to make the arrangements more complete. On these occasions his appearance was hailed with delight by the pupils, each of whom seemed eager to gain his smile. By a kind word fitly spoken or a short narrative telling of the good conduct or success of a former scholar, they were urged to make the most of their opportunities. The kindly feeling emanating from his genial presence fell like gentle rain upon their young and tender hearts and not a few now in positions of trust and influence both at home and in the colonies look on these visits with gratitude as having been a powerful means of stimulating them to trust in God and to do what was right. A roll was also kept on which those desirous of promotion were placed. Many were keen to have their names enrolled on the list and to make them conspicuous there by marks obtained for doing well.[2]

In the beginning of 1859 we again find him making experiments and investigations. They had relation to a new plan of condenser and air pumps, but, though interesting, they led to no permanent practical result and need not be detailed.

[1] Mill schools were not always free. In many cases a few pennies a week were deducted from children's wages.

[2] This idyllic picture of a half-time school contrasts rather markedly with accounts of those more closely involved. See, for instance, 'Sketches of life in a jute mill', *People's Journal*, 14 May 1881.

In the summer of that year he took his family to Moffat for a short rest . . . [and] it was during a sojourn [there] that he made the acquaintance of Mr D. Bruce Peebles[1] who became an intimate friend and regular correspondent.

Dundee. 4 November 1859

Your favour of yesterday has just come to hand and in spite of the gloomy November day and many disagreeables connected with business matters just now it has given me a good laugh, not a guffaw to alarm the clerks in the next room, but one of those hearty movements of the diaphragm which does good like a medicine. . . . I don't think you are so happy on the monotony of your life. You expect too much. For years my life has had much of that sameness you complain of and the daily task has latterly gone beyond that and approaches the 'pump or drown' state.

[The following account of a holiday from the mill is written by Peter Carmichael himself. It was undertaken partly in the hope of tracing his family history. As a contribution to the social history of the period, it is here given in its entirety.]

Springhill, Dundee. 31 October 1859

For many years I have cherished a wish to pay a visit to the parish of Knockando in Strathspey and see if I could learn any particulars of our forefathers, and in the last week of September, feeling sorely harassed and wearied, I made up my mind to run away for a week, leave the cares of the Mill behind me, and not tell where I was to be found, so that I might escape letters of all kinds calling me back. Margaret agreed to accompany me and we communicated our secret to sister Susan who has a rare memory for genealogies and she joyfully agreed to go with us.

Well then, on the 30th September at 12.15 p.m. imagine us taking our seats with very little luggage for Aberdeen. There was

[1] David Bruce Peebles was a gas engineer who apparently first set up in business in Edinburgh as a gas-meter manufacturer about 1866: he first appears as such in the *Edinburgh and Leith Post Office Directory* for 1866–7. He died on 6 December 1899. From his firm, latterly in business at Bonnington, in Edinburgh, grew a major Edinburgh company, still in existence: Bruce Peebles Ltd (Electrical Engineers), first registered in 1906.

very little speaking the first part of the journey until we had left Arbroath with its dirty red stone buildings behind us, when the sun came out cheerily and by the time we reached Montrose we were chirruping like crickets and, as we broke ground new to the ladies, the remainder of the journey was very pleasant.

Arriving at Aberdeen at four o'clock we took up our quarters at Douglas's and proceeded to view the granite city. After tea, we went to see an exhibition of photographs and also one of historical portraits of characters connected with the north of Scotland which would be very interesting to you, but I must pass on.

Next morning at seven, we took our seats for Banchory by the Deeside Railway and then by stage-coach twenty-five miles to Ballater. Our companion inside the coach was a clerical-looking gentleman, who was very good company. Arriving at Ballater in the afternoon, damped a little by a Scotch mist, we took our ease in our inn for the night.

Next morning which was the Sabbath, the landlord informed us that the celebrated Mr Caird[1] was to preach before Her Majesty at Balmoral, and we were tempted to drive the nine miles to church. We set off early and drove up the valley a mile beyond the church, so as to get a walk and see the surroundings of the Castle before church time. On our way back, we entered into conversation with a *native* or what uncle George would call an *Araby Jean*, who showed us the right seat to go to.

Shortly after we had taken our seats, who should appear in his clericals but our coach-companion of the previous day, who turned out to be Dr Robert Lees[2] of Edinburgh. A little bustle on the gallery stair and enter Her Majesty in her Victoria tartan shawl, plainly dressed with blue ribbons in her bonnet, the same as my own queen sitting beside me. She was accompanied by Prince Albert, her eldest son and Princess Alice. A few notables – Lord John Russell etc. – took their seats behind Her Majesty.

Behold us then face to face with the Queen, the width of an ordinary room between us, the church pretty well filled, especi-

[1] Rev. John Caird, 1820-98, who became principal of Glasgow University in 1873.
[2] Rev. Robert Lee, 1804-68, minister of Old Greyfriars Church, Edinburgh, 1843-68, who in 1857 initiated reforms in church services which provoked opposition (*Fasti Ecclesiae Scoticanae*, i, 43).

ally in the gallery where we sat, but not crowded. You may suppose our clerical friend was a little fluttered when he stood up and said 'Let us begin the public worship of God by singing to His praise etc.' He gave us an admirable discourse from Galatians VI, 5 – 'For every man shall bear his own burden', and as for our party, we soon forgot the Queen and her suite in the telling words as he reasoned of our higher responsibilities to the Majesty on High. The message could not have been more faithfully delivered, even by John Knox, and at the close the Queen was evidently strongly affected.

This little episode in our journey was the more pleasing that it was not in the programme but fell out by chance like. Next morning we intended to post across the country to Grantown in Strathspey, but our Host refused to give us a carriage, as the road was not good enough to take a carriage over. We had therefore to drive over to Alford in Strathdon by way of Tarland, changing horses there – a route very much out of the ordinary track of travellers, but pleasant enough, the day being fine. About half-way on the journey, a strange-looking mountain loomed up in the distance, its top having the fanciful shape of a huge couch with a pillow at the top of it. We at once queried our driver for its name. He looked at us with an eye of pity and said, 'Benachie', which came on our ears like a gush of a half-forgotten song –

I wish I were where Gadie rins
'Mang fragrant heath and yellow whins
Or brawlin' doun the boskie linns
  At the back o' Ben na chie
Ance mair to hear the wild birds' sang;
To wander birks and braes among
Wi' frien's and fav'rites left sae lang
  At the back o' Ben na chie

Arriving at Alford, we found that we could get no further that night and remained at a newly opened inn, the whole place having the aspect of a new settlement in the back-woods. Next morning early, we set out via Monymusk to the Aberdeen and Inverness Railway. The first thirty miles of our journey lay down Strathdon,

and then we went by Inverurie through Strathbogie to Huntly and Keith. At Keith we renewed our railway ticket to Orton junction where we arrived about mid-day. Here we waited an hour in a wooden shed – the only building! – for a train on the Morayshire railway which is carried a few miles up the Spey to Craigellachie.

Proceeding by this to Rothes, we there got the only conveyance – a dog-cart – to drive us the ten miles over the highland road to the school-house at Knockando. In good spirits at having got so far on our way prosperously, we ordered our dinner to be ready by the time of our return, and a gill of the right Glenlivet[1] having been dispatched in no time to satisfy immediate wants, off we go in our dog-cart. The road is uphill all the way, and as we ascend, the glorious valley opens up rich with the autumnal tints on the woods, while the huge Ben Rinnes closed up the westward view. Up we climb till the rock of Craigellachie is far below us, ever stemming the rapid Spey, from which the Grants – and they are all Grants here – take their motto or device, 'Stand fast, Craigellachie!' Still ascending the hilly road, the northern uplands stretched away on the right towards the distant hills, and on the left lay the valley of the Spey.

Arriving at our destination, a lonely place, situated on a platform which on the north and west declined into the valley with an abrupt descent of about two hundred feet, we tried the garden gate but found it locked, peeped through a broken pane into the school-room and saw the carving of the desks and forms by the knives of young Knockando for generations, but heard no sound of life. We began to grow *eerie*, I went to the garden wall and fortunately descried a native passing, whom I saluted with 'Hi, min!' With a face of terror, the native answered, 'Fat are ye deein' there?' 'I want the school-master, if there is such a being.' 'Jump the dyke' says he 'and hine awa'[2] yonder to the Manse.'

Acting on this, we *hined awa'*, and tried the Manse, which, with the old Church and churchyard, stands on the west front of the cliff. Here we were informed that the schoolmaster had just left

[1] A fine single malt whisky of Speyside.

[2] hine awa': hence away, far off: usually an adverbial phrase, not a verb as here.

for his vacation and the minister had gone to convoy him a bit on the way. We coaxed the Highland lass to run after them, and fortunately in the nick of time she overtook them and brought them back. The schoolmaster went with us to the school and gave up the old parish records to the minister. Well, the book was opened, and strange to say the first entry was the baptism of a daughter of Duncan Carmichael and Betty Chalmers in Bruntlands. We then searched the records and copied the entries relating to the baptisms of our grandfather's children. By the time we had done this, the day was beginning to decline, and we were obliged to tear ourselves away.

On enquiring if there was a farm still called Bruntlands, we were told that we had to pass very near it on our way back and that the house was very old, and probably the same that was once inhabited by our forefathers. About a mile and a half on the way we stopped to enquire and the house was pointed out to us. After looking till it was well imprinted on our memories, we considered what we could carry away as a memorial. It was no genial soil – chiefly stones and peat moss. We brought away two large white stones very beautiful and sharp.

We arrived at our inn at Rothes about dark and got a dinner that the best of your French cookery could not match – chicken soup; fresh haddocks from Spey mouth with the curd on them, and the flavour of the deep, blue sea; a leg of mutton, black-faced, fed on the granite hills and kept until it melted in the mouth; chicken, mealy potatoes, broccoli, and to finish with, an omelette; the whole capped by a gill of mountain dew. This dispatched, off we went to the station and on to Elgin to sleep – after a good day's work, we thought. Before retiring for the night, we chose for our reading the 28th chapter of Genesis, which accorded with our feelings, and we lay down in peace feeling that surely God had been with us. The extracts, barren though they appear, have afforded us no small amount of pleasant exercise for the imagination.

The remainder of our journey will not interest you very much, although it continued to be very pleasant to us. We spent half a day in Elgin, a cathedral town famous for its ruins, and what struck us very much was its French appearance. For instance the

buildings in the High Street have all their porte-cochère,[1] and the style of building is very like that of the old streets in Amiens. Another thing struck us – that the style and manners of the people were superior to what we expected to find so far north.

After noon, we set out again through Nairn, Forres, Culloden to Inverness, which was our next sleeping-place and the extent of our pilgrimage to the north. Next morning we turned our faces homeward, to make a journey of a hundred and twenty miles by a four-horse coach. I secured places in the inside of the vehicle for the ladies, and travelled outside among a mountain of luggage. The first stage out of Inverness was accomplished in the grey of the morning without accident. After changing horses, we had to ascend a long steep hill, which the team took at a gallop, but before they got half way up, they stuck fast and we found it was 'no go'. After various attempts by force of whip and stick, all the male passengers had to get down and put-to their strength by pushing behind and at the wheels, while two were told off to carry big stones to put in behind the wheels when we stopped to blow.

Bit by bit we got to the top of the ascent and resumed our seats, when the coachman, to make up for lost time, started his miserable stud off at full speed. At a turn in the road with a steep descent without fence, one of the wheelers stumbled and the coach was brought up with the wheels within four inches of the declivity. Fortunately the ladies were not aware of the peril until it was past. After we were safe, a sting of pain went through my backbone causing faintness.

With the next change of horses, we had another jolly push uphill and then we began to descend into the vale of Aviemore. We breakfasted at Kingussie forty-five miles from Inverness, and such a hungry lot we were that the provisions disappeared with a rapidity that caused our Highland host great anxiety. He had boiled his eggs to the hardness of granite boulders, but in vain: they shared the fate of all the other eatables. We then had a long drive through a lone valley, sacred to game, which is what the proprietors grow now – not men, as they used to. Pray God we may not miss the men

[1] Carriage gateway, main entrance.

some day in our hour of peril as a nation. An encumbered estates bill to get rid of the effete race of Highland lairds and introduce a new set of proprietors with some capital would be a great blessing and would gladden these solitary places and make the wilderness rejoice and blossom as the rose. At Dalnacardoch, we took on more luggage and even 'twa dogs' and the vessel pitched and rolled down Glengarry in an *aw'some* manner. We lunched at Blair Athole and arrived at Dunkeld in the evening all safe after our perils. Next day we returned home, arriving at the Perth Station in Dundee within five minutes of the time we left on that day week.

After this visit to the parish of Knockando, on the north bank of the Spey between Cromdale and Lower Craigellachie, its scenery and especially the Kirk, with its generations of the dead slumbering around it, remained vividly impressed on Mr Carmichael's mind and were often recalled. Information regarding the Carmichael families that belonged to it and the adjoining parishes was carefully collected and correspondence was opened with Miss Carmichael in Forres. It was his purpose to visit her and revisit Knockando in the autumn of the year following, and a letter to his brother-in-law Mr David Cruickshank reveals the circumstances in which he did so. It forms a natural sequel to the letter just quoted.

Springhill, 20 August 1860

Last Tuesday evening I received a letter from Miss Grant, Forres, stating that Miss Jane Carmichael had died on the Sabbath evening and was to be buried in the family burying-place on Thursday. As I had contemplated visiting Miss Carmichael before winter I thought it would be showing proper respect to attend the funeral. With this view I took the train for Aberdeen at 12.45 on Wednesday, accompanied by Drummond.[1] The day was fine, until we made near Aberdeen about four o'clock. At five we joined the Inverness train. The clouds then began to close in, and by the time we got to Inverury, it was very gloomy and the sky was of a dull brassy colour that I have rarely seen. As we followed up the stream of the Gadie, I was anxious to show Drummond the mountain

[1] His son, James Drummond Carmichael; see below, p. 194, n. 2.

Ben-na-chie, but it was shrouded in gloom and the curious shaped top invisible. The old song often comes over me like a sight of the mountains, and when wearied and harassed grinding in the Mill, a lilt passes through my mind – 'Oh! I wish I were where Gadie rins'.

But we have left the banks of the Don, skirted the Ugie, darted up Strathbogie, made a screech and a snort at Huntly and are away through Keith crossing the rapid Spey at Orton Bridge. We make a short halt at Elgin, where the lamps are lit, and as we enter the plain of Forres, darkness falls down like a curtain and the rain descends in sheets ere we arrive at our destination in Forres.

As it was ten when we arrived, it was too late to call on our friends that night, but to make sure of a conveyance I engaged a carriage to join the funeral next day. And so to bed we went, but not to sleep for there had been a public dinner in the Hall of the Inn and faintly at times came the sound of some loud chorus, or three times three. As this died away towards the witching time of night, it was succeeded by the hubbub of some of the 'jolly good fellows' being carried past our bed-room door unwillingly to bed. I thought of the Poet's account of the night at Forres, when 'Macbeth *had* murdered sleep'.

Next morning, as early as we could with decency, we called at Caroline Street, and found to our chagrin that the funeral had left at half past six in the morning, having thirty miles to go over the hills. We expected the burial to have been at Knockando, but found that the last of their family laid there was the grandfather of the ladies. We were received by a stately lady of the olden time – Miss Grace Carmichael, cousin to our ladies and sister to the late Colonel Lewis Carmichael of the 59th Foot. She told us that the eldest sister, our correspondent, had gone to lie down and that the other was confined to bed very ill. We agreed to call again and pay our respects after twelve o'clock. In the room where we were received, there was a portrait of the ladies' brother Major Lewis Carmichael of the Royal Artillery, who died at thirty-nine. It was a strange feeling to trace the likeness, especially in the lower part of the face. It is a fine picture, and below it hangs his military sword.

Having a carriage engaged, we employed the interval, although the day was still wet, in taking a drive and shaped our course to the romantic banks of the Findhorn and had a glorious view through the woods of Altyre. The purple heather, the green ferns and moss, the underwood of juniper and fir with the windings of the Findhorn deep down in the chasm – now sleeping darkly and quietly and again dashed into foam, as it tumbled over some opposing rock, was a sight not to be forgotten.

At one place Drummond descried far down below us some birds sitting on nests in the trees and we afterwards learned that it was the far-famed heronry – the only one in Scotland. We drove as far as the entrance to Relugas, rendered classic by Sir Thomas Dick Lauder's account of it.[1] The view both up and down from the front of the Change House, where we baited our horses, was, in spite of the bad day, truly 'a thing of beauty and a joy for ever' – one of those rare sights that always suggest to my mind the text, 'Eye hath not seen, ear hath not heard, neither hath it entered into the heart of man to conceive the glory that shall be revealed hereafter'.

Frequent allusions to summer holidays are to be found in his letters and we proceed to give a few extracts from those written at this time, selecting them chiefly from the series to D. Bruce Peebles. . . .

Springhill, Dundee. 11 January 1860

. . . Do you not think marine engineering fully as good an opening as the Railways? The latter has been much run on by young men of good education, leaving more room in the former. If you think so perhaps I could be of service to you.

Allow me the liberty of a friend to say that your school notion seems rather incongruous. If you feel your right path is to return to engineering do so at once with full purpose to go on doggedly in the way of duty, turning your thoughts in spite of vagrant fancies upon the best method of performing what lies straight before you in the best possible manner. Perseverance in this course will appear to come far short of your ideal but *it has the blessing* and

[1] Sir Thomas Dick Lauder, *The Great Floods of August, 1829, in the province of Moray* (third edn., Elgin, 1873), pp. 47-56.

by and by the rough places become smooth and a few successes make what was at first a duty become a real pleasure and you go forth to the daily task 'rejoicing like a strong man to run a race'.

I have let my pen run on lecturing you, leaving no room for criticism on the picture which I would have liked to have my say on, as it is one which touched me deeply when I saw it in the exhibition last year. Come over and spend a week with us to talk it over. We will make you most heartily welcome and it may at the same time forward your business views.

Writing of this letter Mr Peebles said:

To that letter I ascribe the turning point of my career, the firm planting of my foot on the road leading upwards, for it set me thinking and modified the poor opinion I had of myself. I reasoned that surely there must be something in me to draw forth such a communication and although I have done no great things I can honestly say that since then I have not wasted my time but have done my best and the letter has, in that respect, borne fruit. To use one of the expressions in it, it has *had the blessing*.

About this time he began to take a holiday in early spring, spending it on a visit to the Royal Scottish Academy in Edinburgh.

23 March 1860

I spent a few hours of intense occupation with great delight in the Exhibition. A friend from Preston and I had trysted to meet there for two years. His company was of great value, he being a lover of pictures and well acquainted with some of the most eminent painters. We called at Sam Bough's studio[1] and got him to accompany us to the Exhibition and walk round with us. I did not care however to be lionised in this way and was glad to have a quiet hour with my friend or to wander at my own sweet will. We did not think of purchasing any, more especially as I have been rather extravagant in that way lately. Mr Cairns[2] has a commission from me to paint a little view on the coast with fishing boats near

[1] Samuel Bough, 1822–78, landscape painter, ARSA 1856, RSA 1875.
[2] Not identified.

Carnoustie and Harwood[1] has just finished a portrait of Queen Mary for me which I think you will like.

4 May 1860

I bear with equanimity the sale of the picture as I think it was covetous of me to wish to possess it. I have been switherin [*sic*] about making Crawford[2] an offer for another of his pictures but have almost overcome the desire. It is a queer hobby, the desire to possess pictures, and requires a tight bridle hand to enable one, once mounted, to keep at a moderate pace.

In the month of July his family found a Highland home at Corriemuckloch in the Sma' Glen, and though the rain sometimes poured in torrents while he was there, he enjoyed the solitude till he was taken ill and had to return in haste to Dundee. In the end of the month he described himself as 'tiding slowly back to convalescence'.

7 August 1860

I am again in full harness but the bowstring of my spirit is still slack and the work more a duty than giving the usual pleasure. My leading men are getting their usual holiday by turns and I am going about fanting[3] everything at the work.

On the eve of setting out with Mrs Carmichael to spend a few days at Kilmaron Castle[4] he wrote:

4 October 1860

. . . I have a study of a head painted by Harwood which I intend getting framed and sending to the next exhibition to try if it will bring the poor fellow into fame. He is painting for Lord Kinnaird

[1] Henry Harwood, son of an itinerant actress, died in 1868 aged about 65. He was highly thought of in Dundee but neither his talent nor his ambition impelled him to leave it. His best known work is 'The Executive', a portrait of a group of Dundee town councillors, painted when he was eighteen.

[2] Edmund Thornton Crawford, 1806–85, landscape and seascape painter, pupil of Trustees' Academy, one of the original members of the Royal Scottish Academy and a member of the early nineteenth century school of Scottish landscapists. He enjoyed a high reputation during his lifetime.

[3] fanting: fainting (Jamieson, *Dictionary*); but the sense here is obscure.

[4] Kilmaron Castle in Fife was the home of Sir David Baxter.

'Whistle ower the lave o't', a homely interior, for the same purpose, but I do not think it is his fate.

12 November 1860

I hope you are enjoying the hard work and long hours and are daily adding to your stock of knowledge. Overtime is not profitable in my experience. You may get the men to give you work equivalent to the time for a week or two. Afterwards they only give a week's work and the overtime is pure loss.... We are very busy at the works doing a great deal for little money. I have had a very hard year's work and ought to get some relaxation.

You once proposed to have copies of all your stereoscopic views printed in London. When you get them done do not forget to send me a set. I am putting my views into more permanent form on thin cloth and making some further improvements on the machine and would like, as this is the season, to add a few more pictures....

The machine referred to was an ingenious contrivance in which the stereoscopic pictures, instead of being used as slides, were so mounted and arranged that a slight movement of the thumb and finger sufficed to bring them one after another into the field of view. The same end was attained in a way quite different later on and in it the views were easily preserved as they were bound in volumes.

23 November 1860

What a strange move this visit of the Empress is! She is a person of spirit and seems to have both a will and a way. Have you seen a recent photo of the Emperor? It is not pretty and certainly shows nothing of what Solomon calls 'the wisdom that maketh a man's face to shine'. 'Inscrutable', it says to me, 'dark, and not to be trusted'. No favourable character in writing would induce me to put such a face in a place of trust.[1]

[1] Carmichael obviously shared the generally held belief that Louis Napoleon was a Machiavelli threatening European security, a picture which Richard Cobden, the radical politician, against a background of menacing speeches by Palmerston, was attempting to dispel, so that his negotiations for the lowering of French tariffs might have a chance of success.

7 January 1861

> We have been thinking of you and some one said that your ink was surely frozen in this inclement weather. . . . We have some contracts for which we are under a penalty to deliver to time and the bleachfield is unable to work for the frost. This, with the difficulty of getting work done in such inclement weather and the numerous absentees, has made a very disagreeable period out of the *daft days*, as we used to call them lang syne.

This period was one of close application to work in the mill and not without good results. In 1860 and the beginning of 1861 important improvements on the hackling were again achieved. They consisted in the introduction of an apparatus for separating the tow from the dust and shives.

> When the flax is of a fair quality, even though full of shives, the process is beautiful. The fibres of the tow slide down over the grid or are carried down by the force given them in coming off the hackles, while the shives and dirt, being heavier, are projected up at a higher point and fall through the grid into a separate box and thus the pure tow and the dirt are deposited in different receptacles. The tows off the first hackles of the machine by the new plan, contrary to all former precedent, are better than fine tows, being longer in the staple and, being clean also, they add strength to the yarn. The best results are obtained with good flax. Where it is foggy and stuffed with codilla, the tow comes off in patches, entangling the shives and carrying part of them along with the fibre into the tow box. It is not easy to describe the difficulty there has been for some years past owing to the gradual deterioration of the flax for want of cleaning. I spent some months last autumn trying various plans of shaking out the shives but had to give it up. After they are mixed among the tow they will not separate. It made me despair of having any pleasure in spinning such dirty fibre. The hope of overcoming the difficulty kept me at work. Otherwise I would have abandoned it ere now for it was wearing the life out of me.

Before the close of 1861 improvements on the spinning machinery were also effected with very satisfactory results and in 1862 there was

a comfortable feeling of success in each of the departments throughout the work. Of special contrivances invented at this time one may be noted. It was an apparatus for preventing accidents to the hands of the men who fed the calender with cloth. While entering the piece at the chesting rollers the fingers were apt to get nipped and such accidents, though generally slight, were sometimes very severe. Fingers were torn off at the joint as neatly as if they had been taken off by a skilful surgeon, and with such suddenness that the first indication the man got that something was wrong was the sight of part of his finger lying before him. This was just the kind of thing towards which Mr Carmichael liked to bend his mind and exercise his ingenuity in trying to find a remedy. But it was difficult to find a protection from danger in this special work without increasing the risk in some other direction. The apparatus he contrived was extremely simple, being as ready for use and quite as easily applied as the fingers, considerations of great importance, and it had the additional advantage of being easily swung out of the way when not in use.[1]

The constant strain of steady work was relieved at times by holidays. These were few and far between but greatly prized and enjoyed.

4 July 1861[2]

... We have lodgings in Elie for the month of July and all the young ones were in the German Ocean by seven o'clock on the Tuesday morning. They seem to take to it kindly....

10 June 1862

Yesterday afternoon was the only half-holiday I have had this year. It was on the invitation of Mr Neish of the Laws to try his preserve at Omachie.[3] It rained nearly all the time but, for all that, was very enjoyable. I was quite as successful as any of the party, bringing home a few pounds of nice trout. We were Caunter the Painter, Captain Kirk and Dr Spence[4] and there was muckle fun

[1] See *People's Journal*, 11 Jan. 1862, for description of this invention.
[2] This, and the following letter, were written to David Bruce Peebles.
[3] James Neish of Heathfield Works and Law Mill, merchant and manufacturer, president of Dundee Chamber of Commerce in 1853; one of a small group who introduced jute carpeting to Dundee in the 1830s. Omachie was his estate near Dundee.
[4] Spence was a Dundee doctor. Caunter and Kirk have not been identified.

and laughin ye need na doubt. Kirk is an Englishman. He caught an eel and called to a country boy to come and help him as it was entangling his line. 'Na, faigs I', quoth the boy, 'fat kind o' a beast is't?'

11 July 1862[1]

I am so busy that there is no time for wearying. Tell Drummond to be on the *watch* for my arrival on Saturday as it is his birthday. I suppose you would need to *chain* him and turn the *key* to keep him in the house or at any useful employment.

His son was thirteen on the thirteenth and the allusion is to a birthday present.

Dens Works, 17 July 1862, 2.30 p.m.

I received your parcel at eleven o'clock but have not had time to look at your letter until this moment, having been engaged going over the works with my brother James and his friend from France. James, Ellen and Jamie are to come to Elie in time for dinner on Saturday. I purpose hiring from Andrew Gray all the way from Newport, crossing with the twelve boat and arriving in Elie at half past three or four. I was unwell yesterday and last night but feel better this morning, though 'sair dung' like Sandy Baxter. I think sitting alone I had bolted my food and so brought on uneasiness. I miss a gentle face sitting opposite me at dinner and checking my ravenous speed.

We have seen that Mr Carmichael's energies during the past years were spent in trying to produce the greatest possible quantity of the best possible linen with the greatest economy of fuel and labour and the least possible smoke. When trade was dull improvements went on in the hope of a good time coming and difficulties led to inventions. Looking back over the last twenty or five-and-twenty years we find that these improvements, some great and some small, had been constant and that they had been wrought out in every department of the work from the making of the machines down to the dressing of the finished fabrics. A great saving had also been effected by arrangements that led to economy in the combustion of fuel, by a

[1] To Mrs Carmichael.

profitable organisation of labour, and appliances for lightening the toil of the workers so that the business of the firm had already become very prosperous and its revenue exceeding large.

This result was likewise in great measure due to the business capacity, the personal influence and the wise arrangements of Mr David Baxter the senior partner and Mr William Ogilvy Dalgleish[1] who had for some years been associated with him on the conduct of the commercial department of the large concern. Mr Baxter was now the foremost man in the trade and one of the most prominent men in the town. He took great interest in the work of the Chamber of Commerce of which he had frequently been president and in 1858 he had done good service to commerce by boldly and strongly denouncing the system of excessive credit as affording temptations to overtrading, speculation and extravagance. The failures in Dundee consequent on the monetary panic of 1857 had revealed methods of trading that were not honest. There was the manufacture of spurious paper money under the name of accommodation bills, there was the conspiracy of the banks against the general creditors in taking over mills and machinery as security against loans, and there was also the pernicious facility with which men of straw could get large credit from several banks at the same time. While advocating the shortening of credit from six months to four months usance he exposed these evils with crushing power and helped to place business relations on a sounder footing.

More recently Mr Baxter had stood forth as a wise benefactor of the town. In May 1861 he announced that he and his sisters intended to present the town with a large pleasure-ground and that in affectionate remembrance of their father they wished his name to be associated with the gift. A field on the estate of Craigie was bought and laid out under the direction of Sir Joseph Paxton.[2] While this was being done, on the first day of 1863, it was intimated to Mr Baxter that Her Majesty had been pleased to raise him to the baronetage of the United Kingdom in consideration of his eminent commercial position and his generous conduct to the community.

[1] Later Sir William Ogilvy Dalgleish. His wife, Elizabeth Molison, was the daughter of Eliza Baxter, who was sister of David, Edward, William and John Baxter, and wife of Francis Molison of Errol Park.

[2] English architect and ornamental gardener, died 1865.

A few days later the Chamber of Commerce presented him with an address acknowledging that the honour to him was an honour to them and referring to his position at the head of the linen trade. In replying with his usual high-toned courtesy and good taste Sir David said that he could not forget that the position he occupied in the trade of the town had been handed down to him by those who had gone before and that if his firm had been enabled to extend and consolidate its business very much of the credit was due to his partners Mr Carmichael and Mr Dalgleish. The Baxter Park was formally opened with great demonstration on the ninth of September and Sir David was presented with a marble statue of himself which had been subscribed for by nearly eighteen thousand persons.[1]

Meanwhile the tide of trade in Dundee had risen to a height unprecedented. The Dens Works, as we have seen, were in a state of preparedness so that they could take the tide at the flood and go on to fortune. The great wave of prosperity that reached Dundee in 1863 had its origin in America. For some time past political opinion in the United States had been tending towards two distinct poles, one in the north and one in the south. The prevailing opinion in the north was that the union of the states was indissoluble, while in the south it was maintained that each individual state had the right to withdraw from the Union when she saw fit to do so. In the end of 1860 South Carolina seceded and was followed within a few months by ten of the southern states who combined together and declared their determination to maintain their position by force of arms. A frightful Civil War was the result. To cut off the resources on which the southern states had to depend for money to carry on the war, all her ports were blockaded and thus the export of her cotton and tobacco was prevented. In consequence of this the American war affected the linen trade of Dundee in two ways. The short supply of cotton, amounting to a famine, led largely to the use of linen as a substitute for it, while the demand for coarse linens both by the north and the south became enormous. The effect on the value of Dundee goods, as seen by comparing the prices current in October 1862 with those ruling in the same month of 1863 was extra-ordinary. While the

[1] See illustration above, p. 96. Baxter Park was handed over to the Town Council in 1898 'due to diminution of rate of interest on Trust securities' (Dundee Town Council Minute Books, vol. 35, p. 252).

price of flax was virtually the same in both years, yarns were a third and linens nearly half as much again in 1863 as they were in 1862. It was at this time also that the manufacture of jute goods was most vigorously carried on. They were not only used in place of the coarsest kinds of linen goods but the jute fibre entered largely into the composition of many other textile fabrics. And so it was that at the close of 1863 Dundee was enjoying great prosperity and the Dens works were showing the vast production of which they were now capable.[1]

13 November 1863

> It is a dull season here and there is much sickness especially among children. My brother-in-law, James Cox, buried a fine boy just four weeks ago and his youngest child, a dear pet of a girl, died this morning, so that we are constantly reminded even amidst the bustle of business and in the full tide of prosperity that we should stand prepared even as a servant waiting for his master. . . .

He gave much thought at this time to the problem of elementary education then before the country.[2] He had decided views about what every boy and girl should know before being left by the country to educate themselves and what were the best means of bringing out of their homes and haunts every boy and girl to be taught. But he looked upon education merely as a lever and did not see how it could elevate the people without religion as a fulcrum on which to rest it. He did not see much in what was called the 'religious difficulty', however. In his mind the religious difficulty was the difficulty of getting good, God-fearing men as teachers. Nor did he think that a comprehensive, sweeping act introducing a uniform

[1] Baxters reached their highest production figure for goods other than canvas in October 1863, making 18,626 yards in that month. The highest figure for Royal Navy canvas was reached in May 1861. Their highest profit was made in 1864 – £159,627. These figures were not surpassed until after the reorganisation of the 1920s. (Baxter Brothers monthly statements: orders on books, 1861-1924.)

[2] The Revised Code of Elementary Education, embodying the results of Lord Newcastle's commission on education, had appeared in 1861 and aroused fierce argument between those who wished increased parliamentary grants for education and those who would have maintained the status quo, leaving education, in England at least, largely the concern of the churches. The 'religious difficulty' had much less significance in a town like Dundee where the middle classes had an independent grammar school and those workers' children who received an education found it at the mills.

system of education throughout the whole country was either necessary or would be found to work well. He was jealous of any interference with the praiseworthy voluntary efforts that had been made by churches, employers of the young or philanthropists and considered it to be the duty of Government merely to supplement these in districts where they were defective or altogether awanting.

We have seen the deep, personal interest he took in the school connected with the works and that he steadily kept it up. It was a great treat to accompany him and look upon the galaxy of bright and happy faces gathered in the school-room, to hear the children sing, to note their cleanliness, attention, obedience and respect, to observe the quietness and order with which they went out or to watch their drill in the playground. Following the example set by the master, each manager took a hearty interest in the education of the young people under his charge. Still it had to be lamented that though the half-timers at the day school were regular in their attendance there were many at the works who, especially in times of good trade, were slow to take advantage of the evening school and were at ease while growing up to be men and women without being able to write or even to read.

At the end of each annual session there was an assembly or festival at which the prizes for the year were distributed and a quotation from Mr Carmichael's address on one of these occasions will best show his views on education and the aims and efforts of the teacher and the promoters of the school.

> Mr Smyth's aim is not only to make good scholars but that the moral tone of the school should be of the highest, and that quietness, order and attention should be maintained not by force but by the law of kindness. These are things that cannot be made a show of on an occasion like the present, but any one visiting the school, either in its ordinary working state or during the times allotted for the playground, will see that these points are well attended to.
>
> Our steady, attentive young people growing up amongst us as scholars or who have attended the school are a pleasure to us. Their very faces are brightened with intelligence, but alas! there are so many who care for none of these things, who, neglected by their

parents, choose rather to spend their time in the diversions of the hour than in gaining knowledge for future use and advantage. We know, however, that the teaching in our school has not been altogether in vain, for many scholars of former years are now parents of children attending the school. Having felt the advantage themselves they take care that their children shall also have the same advantage; and this is our hope for the future, that it shall be in some degree, like God's precious gift of the full corn in the ear, giving bread to the eater and seed to the sower.

I would ask the assistance of overseers of departments, many of whom are now present, in trying to induce the young people under them to attend the school. Many of them who are untaught are shame-faced and do not like to show their ignorance by going to school, but a kind word spoken to such in a fitting time might show them that it was perhaps their last chance for getting the necessary instruction to fit them for taking their proper place in the world.

Believing that the Bible is the best of all books we shall continue the reading of it in our school as heretofore, holding by the belief that the fear of God is the beginning of wisdom. . . .

It is a pleasant thing in times like these for members of the firm to meet with managers, overseers and scholars on the common ground of promoting the cause of education amongst the children of our neighbourhood and we hope that these meetings from year to year will show continued progress in the good work.

The good trade of 1863 continued into 1864. High prices were ruling, large, well-appointed mills were being built, new machinery was being fitted up, merchants and manufacturers were building handsome houses for themselves in the suburbs or at Broughty Ferry[1] and the question was 'How long will the good trade last?' Some built as if it were to last for ever, the more experienced, who had had to pilot their businesses through shoals and miseries after a flood-tide more than once, kept their sails trimmed ready for a change, and were unwilling to launch out into further ventures. Such was the attitude of the Dens Works. Still they could not remain stationary. The energy of life in them forced growth. To reduce the

[1] See above, p. xl.

pressure of steam an additional auxiliary engine was fitted up and a small light chimney, a little over 100 feet high, was built in connection with it. To restore the balance between spinning and weaving also, more looms had to be put in. To accomplish this the space occupied by the smithy and foundry with other ground had to be used for a factory and a wood-yard to the north converted into the mechanics' establishment. These changes, as may be supposed, needed much planning and occupied many months.

The following letter to Mr Robert Saunders, who had gone to Russia,[1] gives a peep into what was going on and also points to what was becoming a very serious matter in the flax trade.

Dens Works, Dundee. 25 March 1864

I received your letter of the sixteenth February last with much pleasure and am truly glad that you find yourself so comfortably situated and that the climate at the severest season of the year agrees so well with you.

Your acquaintance with Mr Hoskins will be very much in your favour and I hope you will also be the better of knowing Mr Stewart at Cronstadt.[2] Please convey to him my regards when you next meet.

I am glad we are to have a trial of some of your selection of flax and hope we will find the transaction for our mutual advantage and so induce further business. The St Petersburg flax trade has been a striking example of the striving after present gain by the deterioration of the goods. I don't know if the parties engaged in it have grown rich but it seldom does pay. And the St Petersburg dealers do not stand alone in the gradual deterioration of their goods. The same may be said of those in Pernau and Riga[3] although certainly the former have attained to the lower depth. At the same time it must be admitted that the fault has not been all on one side, for the vicious system of buying the goods unseen upon the vague terms of the average of the season and the higgling

[1] Robert Saunders' descendants maintained their flax-trading interests in Russia until 1917. The representative of the family who then left St Petersburg returned to Dundee with a Russian wife and died in 1966. (Private information; obituary of Robert Saunders, *Dundee Courier and Advertiser*, 4 June 1966.)

[2] Not identified.

[3] The chief flax ports on the Gulf of Riga in the Baltic.

about price rather than quality is greatly to blame in producing the state of matters we now smart under. We sell to the Police Commissioners for a trifle twelve tons a week of dust and shives fit for the dunghill.[1] Each ton has cost us £50 at least and half of it, speaking within the mark, should never have been put on board ship. I mention this to you privately to show the enormous extent of the evil, but how it is to be remedied I will not presume to say. The interests of buyer and seller seem so opposed that on the present footing of the trade it seems hardly possible to reconcile them or to see that there is a more excellent way. An eminent steel converter in Sheffield who had attained wealth and fame for the excellence of his manufacture, on being asked how he did it, said he had the courage to be honest. He bought the best raw material and spared no expense in manufacturing it in the best manner and I suspect this is the secret of any durable success in other trades besides steel.

I can understand your difficult position from the tenor of your letters and if I may presume to offer you advice I would say you should not try to do everything at once. 'Gang warily', biding your time, and be not too rash in giving your opinion. With your honesty of purpose you may in a few years work wonders, whereas, if you try to make a present show, you may lose all. Suffer this from one who has a real kindly feeling for you and desires your future success.

With regard to home news that might interest you I have little to tell. We are removing our workshop up the hill to the wood-yard level and we have already cleared out a part and are busy fitting new power-looms into their place which will occupy us for some weeks to come. Your friends at the works are well and jogging on in the usual quiet, monotonous routine. The winter has been more severe than usual here but again we have the appearance of returning spring. . . .

[1] This waste material was not only fit for the dunghill but also destined for it. The Police Commissioners had the right, but not at this date the duty, to remove all manure produced in the town. They bought mill dust for mixing with the night-soil removed from the streets and thereafter for sale to farmers as fertiliser. See the Report of Dundee's chief sanitary inspector. Thomas Kinnear, 1906, published in *British Association Handbook for 1912*, as 'Sanitation and pure air in Dundee fifty years ago'; and also Lord Kinnaird's pamphlet *Workers' Housing* (Dundee, 1874).

The falling off in the quality of flax referred to in this letter was partly owing to its being under-retted, as this left a deal of the wood adhering to the fibre. In general too it was coarse and round-fibred, what those handling it would call *frush*. The Pernau flax imported in 1863 was so bad that much of it was kept over in the hope that the 1864 importation would be mellower, when the former might have been used up without much loss by mixing it with the later crop. But the importation from Pernau in 1864 was even worse than that of 1863 and the flax from Riga did not assist much as some shipment of it had the same faults as the flax from Pernau. This was vexing as it prevented the keeping up of the excellent quality of the yarn and had a dislocating effect in several directions, not the least being that it made the work people who had to handle the fibre indifferent and careless.

This serious drawback on the extension of the linen trade continued for many years, but arrangements were made by which the effects of the evil were lessened. Larger warehouses were built so that in a year of good flax, which was generally a year of plenty, a quantity beyond what was required for the year might be laid in. Parcels were got from the various ports each year so that the relative values and suitableness of each might be ascertained. A greater variety was also kept in store, so that if one particular kind fell off there was a remedy at hand.

The next letter is to his brother in France.

8 April 1864

Time has passed on swifter than a weaver's shuttle and Saturday comes round before one has time to count the days. We are in the period when we should have spring weather but winter still remains. The Sidlaws are tipped with snow and the wind has all the feeling of coming off snow.

John has taken Baldovan mill from Sir John[1]. It is in better order than Harestane and more suitable for doing work. He has now got a good start at it. The bleaching process which he confines himself to is called *improving*, as it is, if well managed, a very safe process for the yarn, and unlike his old trade of milling is likely to come

[1] Sir John Ogilvy of Inverquharity, 1803-90, MP for Dundee 1857-73, was laird of Baldovan, two miles north of Dundee.

more and more into use, as it has been gradually supplanting the milling process for the last ten or twelve years.[1] I have gone out every Saturday afternoon that the weather would permit for the last two months and have tried to organise a proper mode of book-keeping to check each week's cost and production.

Trade in Dundee keeps steady in linens but is not so brisk as it was in jute fabrics. However you will see that there has been a considerable rise in the price of yarns. The price of cloth is not so high in proportion and this is said to arise from the fact that there has been a greater increase in weaving than in spinning so that the most of the profit is made by the spinner at present. There is certainly a great increase in the power-looms and the first check to business will be a serious one.

James was with us last Sunday. He is strong and hearty and looking forward to come to me in July, though Mr Low[2] may not like it as he is so busy with work. Excuse scrawling. The boys have broke in on me to assist them with their fishing tackle as they are going to fish tomorrow. . . .

It was in the month of May 1864 that Mr Alex. J. Warden drew up his valuable 'Statement of the spinning and power-loom works in Dundee and Lochee with the proprietors' names, horse-power, spindles, power-looms and numbers employed, May 1864, compiled from information derived, excepting in a very few instances, from the proprietors'. It shows that there were at that time in Dundee and Lochee sixty-one firms engaged in spinning and weaving by power, having together 160 steam engines of 4,621 nominal h.p., driving 170,552 spindles and 6,709 looms and employing 36,020 persons. On examining the tabulated statistics it will be found that more than one half of the whole number of workers was employed and more than one half of the work done by eight of the sixty-one firms and that the works of Messrs Baxter Brothers and Co. at the Dens still held the foremost place. Nearly all the others were devoted to the spinning

[1] The process of milling involved the application of friction and pressure to fabric whilst in a soapy and moist condition; the modern equivalent is 'boiling'. 'Improving' was boiling followed by raising the colour to a limited extent by the use of chlorine or hydrogen peroxide; it is a term now rarely used, the modern equivalent being 'boil and raise' or 'cream'.

[2] James F. Low of Monifieth Engineering Works.

of jute and the manufacture of jute goods. The Dens works were still kept on the old materials of flax, tow and a little hemp and the owners were now the largest manufacturers of linen goods not only in Dundee but in the world. They had kept the town the great seat of the linen trade while others were rapidly extending its reputation for jute fabrics, for the quantity of jute consumed in the town was now far in excess of the quantity of flax, the number of tons imported in 1863 being 28,898 of the latter and 46,983 of the former.

The Dens Works differed from the others in another respect. Most of the others had been built to order on level ground. Plans were made and the huge fabrics built according to them were in splendid symmetry. But the towering and massy pile of buildings at the Dens had grown, as we have seen, bit by bit and the ordinary difficulties of making extensions were greatly increased by the ground having a very steep slope, being cut up by a rocky ravine and having two public streets passing through it.

The bustle of business during this period of prosperous trade made a retreat to the country more than usually soothing and refreshing and the summers of 1864 and the years following were perhaps the happiest Mr Carmichael had known. During them his household was removed to the House of Bonhard near Scone and not far from Perth. It was near enough Dundee to allow of his going there in the morning to work and returning in the afternoon to rest.

The family were very happy here. They liked to go early and they left in the autumn with regret. Many friends visited them and were delighted. Not a few weary brain workers enjoyed the hospitable retreat for a few days and went back to their toil refreshed. Mr Carmichael himself enjoyed his Sabbaths with the keen relish of one wearied with the labour of the week and when he stayed for a few days' rest or change he entered into the joy of it with the enthusiasm of a boy . . . .

Bonhard by Scone, 12 August 1864

> This is the first day I have taken since you were here and perhaps it will be the best day I have had, for business is so pressing that one is apt to get immersed and unable to survey all round. . . . We too often in the haste of business . . . travail in our narrow circle seeing only in one particular line and are unable to take a broad view of our surroundings. Yet there never was a time when I was

so tempted to forget everything else in the race for riches. Our demand for goods is quite unprecedented and we could employ twice the quantity of machinery if we had it.

I have got to work a portable locomotive 3 h.p. engine which goes about wherever a lift is wanted and does wonders in the way of hoisting and stowing. We had a staff of strong men as porters in our warehouses who earned on an average £2 a week. Some two months ago, when we had a number of ships discharging, they claimed a right to engage what men they pleased to assist them. I declined to allow that they had any such right and they all left on an evening without further warning, so I at once ordered an engine from Chaplin[1] who fortunately had one ready. It will save a deal of wages and not strike. A lad at five shillings a week works it. Wherever there is a lift needed it can be brought or rather goes itself to the place and does it.

We are purposing a visit to Stobhall this forenoon, an old mansion of the Dukes of Perth near Campsie Linn. We continue to like this place and will regret when our time is up. The half of it has passed away very quickly.

Dens works, Dundee. 28 November 1864

We have had awful weather. The night of Thursday when the 'Dalhousie' was wrecked, was fearful from the darkness and the roll of the mighty billows on the banks, plainly heard from our bedroom window. We heard the muffled sound of two shots before retiring but, while we were sleeping on our pillows, we little thought of these poor fellows struggling with the mighty waters. It is nonsense about the absence of lights in the Tay having anything to do with the disaster. The Captain (Rattray) of the London steamer, a neighbour of Mr Behrens,[2] came up the river the moment the 'Dalhousie' must have gone down and he told him that his stout vessel was struck by a terrific sea and said that if the 'Dalhousie' was struck in the same way she must have been completely disabled. It is a touching episode, the Ferry women

[1] Not a Dundee firm.

[2] John G. Behrens, accountant in Baxter Brothers, and manager from 1844 to 1884, was one of the German flax men who in the last quarter of the century added much to the cultural and business life of the town.

wiping the sand from the poor dead mouths of the drowned men and reverently closing their eyes. Drummond's old pony, Donald, was the first to find the bodies, his master having rode into the surf on him on Friday morning.

In the beginning of 1865 the tide of prosperity ceased to flow.

24 January 1865

Trade with us is very calm and orders are coming in very slowly. Still the rage for extension is very great. The engineers and machine-makers have orders for twelve months to come. The only extension of consequence we have in view this year is merely pulling down of an old building put up in 1823 and making it fire-proof. The house is very shaky and if it were to take fire it would stop or derange a great part of our works for a time.

In the beginning of this year, consequent upon the burning of the Theatre Royal in Edinburgh, there was a good deal of discussion as to the best means of preventing the spreading of fire and many curious suggestions were made. It was a subject to which Mr Carmichael had devoted a good deal of attention and he resumed his researches at this time.

It was generally supposed that there was great risk of fire in a spinning mill and the premiums of insurance on them were therefore high. In point of fact however it was in the warehouses that the most serious fires in Dundee had occurred. In the early years of spinning by machinery these were very slight erections,[1] but there was not then the same danger of fire. It was only about the year 1833 that the lucifer match came into use as a ready substitute for the steel and flint that had so long been used in striking a light. Fires before matches became common were generally the result of carelessness or want of watchfulness and these faults of course were not awanting. . . .

There had been several very serious fires in warehouses and the insurance companies had raised their tariffs. This led to the Dens

[1] James Cox in his MS. Diary describes the stacking of flax in barn-like, open-sided structures with thatched roofs.

Works and other mills being made what was called 'fire-proof'. There was also a fire engine in connection with the works and a brigade trained to work it. With characteristic care to be always ready, Mr Carmichael took other precautions and one of these is described by him in a paper communicated to the Royal Scottish Society of Arts and read by the secretary on thirteenth March 1865....

The paper was cordially received and gratefully acknowledged and, as it reveals Mr Carmichael's ways of thinking and doing, the points on which it does so may just be touched before passing on. In effecting an insurance against loss by fire most proprietors rest satisfied with having the buildings covered so as to recoup them for the damage done and lapse into a state of carelessness arising from fancied security. He was not content with this but set himself to find out how fire in any particular place could be prevented, or, if it did break out, how it could best be retarded or extinguished.

Another characteristic and one most prominently brought out by the paper was that while others were contented with putting on record a theory in mechanics or chemistry he translated it into fact by putting it into extensive practice. It was 130 years since alum had been proposed as a substance suitable for preventing the spread of fire, but no one had thought of applying it. As late as 1859, in the days of crinoline, the Master of the Mint at the command of Her Majesty had taken the opinion of eminent chemists as to what were the best substances to use for rendering ladies' dresses non-inflammable and they had reported in favour of sulphate of ammonia and tungstate of soda, but in practice the matter was as seldom attended to as if no investigation had been made. It is one thing to know what to do, it is quite another thing to do it.

We may also note as characteristic the admission of the human element as a factor in the calculation of possibilities. This is one that is often overlooked. To put a stop as far as possible to the carrying of lucifer matches, however, was evidently dealing with a frequent cause of fire, while the use of means calculated to inspire confidence and prevent panic in the event of a fire would tend to its more speedy suppression....

A few weeks after, another paper was read to the Society of Engineers in Scotland, an institution of which Mr Carmichael was

one of the oldest members. Its subject was factory chimneys and it was afterwards published with illustrative drawings in the *Transactions* of the Society. Several of the leading newspapers and scientific journals of the day also quoted or referred to it. In directing attention to its publication the *Dundee Advertiser* in a leading article gave the following amusing description of the chimneys in the town at that date.

> Anyone looking at the numerous specimens of factory chimney in Dundee will agree with us in thinking that they have not been built with much respect for the laws of symmetry. Of course this is particularly the case with some of the older structures, those of more modern date being lofty, handsome and well proportioned for the most part. But standing on an elevated part of the town where a good view of the 120 chimneys or thereby can be had, it is almost comical to note what one would call the individualities of these erections. There is the short dumpy stalk, black with the smoke and service of many years; another leaning rakishly over as if inclined to try the horizontal attitude after so long having kept a perpendicular position; there is the old solid square stone structure which looks as if it would last as long as the town itself; then there are the square, circular or octagonal brick chimneys with plain, pointed or ornamental summits, tall and beautifully proportioned, the whole forming an array of dusky sentinels which if not very correctly sized or very prepossessing in appearance are yet one of the most picturesque features of our town, whether seen in storm or sunshine, in the early dawn or when the moonlight sleeps upon our noble river.

The chimneys on which the experiments recorded in the paper were made were the three chimneys of the Dens works built in the years 1844, 1854 and 1864 respectively. They were easily distinguished from the other stacks by their taper tops from which the smoke ascended very freely, especially when there was a breeze of wind. The chimney of 1854 was the largest of the three and the amount of work it did was very great. It now served nineteen boilers each with two furnaces, the average consumption of coal in these being 210 tons for the sixty hours' work from getting up steam on

Monday till Saturday afternoon about three. The chimney of 1864 on the other hand did very little work as it served only one boiler and the consumption of coal was not more than ten tons a week. The oldest of the three received the flues from the furnaces of seven boilers and the consumption of coal was about seventy five tons a week. . . .

It was generally recognised that observations and experiments like those given in the paper would lead to important results and others began to take up the subject. It was about this time that the magnificent chimney at the Camperdown Linen Works was built at a cost of about £6,000.[1] Constructed of variegated bricks in the style of an Italian Campanile and rising to the height of 282 feet above the ground with a balcony round it about fifty feet below the summit, it has since been reckoned one of the wonders in the neighbourhood of Dundee and is a conspicuous landmark for miles around. The external tower is square, as high as the balcony and octagonal above it, but the chimney proper inside is circular in form narrowing slightly towards the top. This shaft carries the smoke of the furnaces far over the village of Lochee.

One of the subjects Mr Carmichael was considering in the autumn was the propriety of erecting houses for the workpeople. On thirty first October (1865) he wrote to Mr Peebles:

> We are very ill off for workpeople's houses in Dundee. They are so crowded that disease has broken out and although it is against our principle as employers to build houses yet necessity and humanity compel us to do something. I am told they are building such houses of *brick* in Glasgow and suppose from the urgency of the case that we will be driven to use the same material.

And again on sixth November:

> I find that the price of brick has advanced so much in this district owing to the great demand[2] at a season when they cannot be made

[1] 'Cox's stalk' is perhaps the only factory chimney in Britain which is officially listed as worthy of preservation. James Cox gave Carmichael the credit for having materially assisted in the design of Camperdown Works.

[2] The large amount of warehouse building at this period created the demand. Although exteriors of buildings in Dundee were almost invariably of stone, interior walls, engine housing and door and window arches were often of brick.

> that they are out of the question. . . . We greatly want decent house accommodation in Dundee. I have gone and examined some new buildings and find that most of them consist of two small apartments. I measured one, ten feet square each room, and I could on my tiptoes just touch the ceiling. The two rooms let for six guineas per annum[1] and such dwellings are occupied sometimes by a man and wife with almost grown-up sons and daughters whose united incomes at this moment exceed in many cases the average stipend of ministers.[2] Not to mention ordinary decency or morality I asked a man where they said their prayers.

As an experiment about eighty houses of two and three rooms each were built and fitted with all needful conveniences including grates with boilers. But it was found that the tenants did not take sufficient care of these and that the plates were soon burned through.[3] The double relationship of master and landlord too was at times awkward and it was not always possible to limit the letting of houses to the workers. The intention of doing so was therefore given up and the houses, though conveniently situated for the workers, were let to any who were likely to prove good tenants; and the workers, while encouraged to choose good houses, were left perfectly free in their choice.[4]

But the subject to which Mr Carmichael was most frequently turning his thoughts in 1865 and the three following years was that of fires in flax mills or warehouses where flax or such like materials were stored. In their origin many of these fires were, or appeared to be, spontaneous. More than twenty-five years previous to 1865 Mr Carmichael's attention was aroused by the fact that a great number of mysterious fires occurred in places where there was neither open

[1] Rents for two-roomed houses in Dundee varied between £2 and £7 a year; 2s. 6d. a week was very typical (Valuation Rolls, 1862–72).

[2] This was possible only if the man was skilled and had at least four working children. If the children were half-timers and the man and his wife unskilled it was quite impossible. (*People's Journal*, 13 Apr. 1874.)

[3] Grates with boilers were far from common in this period and their proper use may well not have been understood. The boiler was at the side of the fire, filled from the top, and emptied by a tap below.

[4] For a discussion of the housing problem, see Bruce Lenman, Charlotte Lythe and Enid Gauldie, *The development of the Dundee textile industry* (Abertay Historical Society, forthcoming), chapter on housing.

fire nor light in use and that many of them took place during the night or on Sundays when the places were locked up and no person was near the premises. This led him to note down the circumstances of such fires as came under his own observation in the hope that a comparison of these might give some clue to the origin of them.

> The first fire that drew my attention to this subject was in 1840. It took place in an old mill under my charge. The alarm was given by the night watchman about one o'clock on a Monday morning. The fire broke out in a receptacle for holding mill-dust and sweepings and did considerable damage before it was put out. It seemed a mystery as no one but the night watchman, George Trail, a most trustworthy man, had been about the premises since the previous Saturday afternoon. Either from over-exertion or from anxiety at the result he took ill and died ten days after the occurrence of the fire.
>
> A few years later, again on a Monday morning, another fire took place. It broke out in an engine-house where it could do no great harm. It was about the time when the covering of steam cylinders to prevent radiation of heat began to be practised and this cylinder had been cased in wood, a space of about two inches being left between the cylinder and the wood. This was filled with dry moss as a non-conductor. There was not much to burn, but the fire pointed to some mysterious cause that had to be guarded against.

After this no fires considered worthy of note occurred till July 1850, when several broke out about the same time. From an examination of these it became evident that there was much danger in keeping greasy waste or threads in close rooms or covered with dust and to obviate this safes for holding the greasy waste were made in the open courts and orders given that all such waste should be carried to them every evening, with the result that there were no fires except in these courts for some years.

It was the occurrence of four instances of spontaneous cumbustion in the month of April 1865 that led Mr Carmichael to resume and extend his investigations into the subject. From numerous experiments made with various kinds of oil and greasy waste put into

baskets covered with mill dust and placed in an engine room where the temperature stood at about 72°, he had noted great differences in the lengths of time the baskets hung before taking fire. Sometimes there would be no combustion for days or even weeks, while at other times the same articles placed in the same conditions took fire in a few hours. This he attributed to the state of the atmosphere at the time and in his future experiments the indications of the thermometer and barometer and the general character of the weather were carefully noted every day.

The experiments made throughout 1865 were to ascertain the susceptibility to flame of the different kinds of oil placed in various circumstances. Sperm, Price's spindle and cod or fish oils were the first experimented upon. Of these cod oil was found to be the most inflammable.[1] A bunch of waste saturated with it and placed in a barrel between layers of mill-dust readily took fire on the barrel being exposed to the sun's rays, but the irregularity in the times of taking fire even of it did not seem to point to any law regulating the combustion. He did not therefore give his experiments publicity, but contented himself with continuing his observations and keeping notes of the fires that were recorded in the newspapers. Following a practice common with him he put the extracts descriptive of the fires that occurred during each month into an envelope and laid it up for future observation.[2] Many of these fires served to show the circumstances favourable to spontaneous combustion and they were always such as to make one think they might have been avoided. . . .

We now turn for a little from noting Mr Carmichael's work to learn something more of himself and his family during 1866. His position was now one of great influence but he used it for the good of others. Mr Charles Mackie[3] who had watched him from his boyhood, writing in the beginning of this year about the early days of flax spinning and referring to the building of the mill in the Upper Dens in 1833 said:

[1] Mineral oils did not come into general use in textiles until the twentieth century. Their adoption helped to defeat the Dundee whaling industry which had supplied the trade with sperm oil. See S. G. E. Lythe, 'Dundee whale fishery', *Scottish Journal of Political Economy*, xi (1964), pp. 158–69.

[2] This envelope of news cuttings still exists and is in the possession of Major Peter Carmichael of Arthurstone.

[3] See above, p. 19.

Mr Carmichael arrived just in time to start this beautiful new mill and there he is to this day in good health, beloved by every one who knows him, and respected for his moral worth. He feeds the hungry, clothes the naked and gives a helping hand to every good work. He has helped and aided the oldest mill manager now alive for a dozen years bygone. He has sent money to him in Edinburgh over and over again and now he sends it to Glasgow to clothe him from the cold of winter and keep him comfortable in his old age.

A few weeks after these words were written the writer died and his daughter in announcing the fact wrote:

He spoke frequently of you the fortnight he lay and wished me to write and tell you how ill he was, but I was like Madame de Stael when her father died, 'She would not and could not believe it'.

This is only one instance of his benevolence, but it shows the quiet stealthy way in which he did good and filled hearts with gratitude and love.

He took special interest in the training of his nephew James, the son of his brother in France.

23 January 1866

I had a long, very interesting and I may say very satisfactory interview with James on Sunday evening and we discussed various subjects bearing on his position in a manner that was very agreeable to me, being in the usual friendly way that I have always had pleasure in talking to James. . . . I told him that if he wished any change of work I would be glad to favour him in any way that would help him to get a thorough knowledge of the business and further said that if he wished to get a knowledge of the looms he might be transferred to Peter Shepherd's department and there learn not only the machinery of the looms but how to fettle them or put in a web and set the loom to work and with all this that he ought to study and with all his gettings to get understanding.

I have just finished reading the lives of Boulton and Watt, a new book by Samuel Smiles,[1] in which there are some excellent letters

[1] Samuel Smiles, *Lives of the Engineers, with an account of their principal works* (3 vols., London, 1861-2).

and advices of Boulton to his son and young Watt. I thought them very appropriate to our thoughts on the same subject at the present time, for it is a subject of anxious thought to me, the succession and the time coming when the right hand will lose its cunning and those that look out at the window become dim and the wheel be broken at the cistern.

As the night wears on I will close and have only further to say that I am sorry it is not in my power to advise you better, but you may count on my willingness to be of service to you in any way that will advance James's interest as I do earnestly wish that he may turn out 'a workman that need not be ashamed' in the highest sense of the expression.

Bonhard. 24 April 1866[1]

I had a short tour in the manufacturing districts of Lancashire and Yorkshire, doing a good deal of business in a short time and got home this day week past. I took my nephew James and Drummond[2] with me to introduce them to some of my old friends and give them a lesson how to gang warily amongst the network of railways. We visited Horrocks and Miller's, the crack cotton works at Preston, Whitworth's at Manchester, Platt's at Oldham, where they employ 7,000 hands machine-making, Titus Salt's at Saltaire, Fairbairn and Greenwood's at Leeds, and finished on the Saturday after the works were closed by running down to Windermere and spending the Sunday there. We got to Edinburgh at 5.40 on Monday and went to see the Exhibition, were seized on by John Cairns[3] and kept prisoners. We set off to Dundee on Tuesday, came here on Thursday and are gradually settling down. The troubles with saucy industry seem daily increasing. A waggish friend told me yesterday that he expected his hands would soon intimate that they intended only to come for their wages on Saturdays.

[1] To David Bruce Peebles.

[2] Peter Carmichael's son, James Drummond Carmichael, 1850–81. He entered Dens Works in 1867, intended for a managerial role, but as his health was delicate he left the firm in 1871 and spent his remaining years in the country. He was author of *Memorials of James Drummond Carmichael, Arthurstone*, ed. Alexander Monfries (printed for private circulation, Dundee, 1885). He mentions this trip in his book and records that he took 'a rest at Windermere after the confusion of seeing so much machinery'.

[3] Not identified.

Bonhard, Scone. 26 June 1866

I have taken a lease of Bonhard for four years and am laying out a little to make it more comfortable and only wish we had you here to spend a few days with us before the bloom is off the thorn trees and laburnums. They are very beautiful.

How has the money panic affected you? I suppose it is always a dull time in your business at this season. I never liked the limited principle and now I like it less than ever although it presents many temptations especially to such firms as ours in a good time to withdraw.[1]

We have managed to go on comfortably with our workpeople on the whole, conceding an advance of wages when the times were showing it necessary, even before it was asked, and we hoped to tide over without any jar; but a few weeks ago our masons set us at defiance by commencing to work nine hours a day, or rather to leave off work at five o'clock in the afternoon without giving any notice or the usual warning required by the rules of our works. We could not put up with this and warned twenty of them, choosing rather to let the work in progress stand over until next spring. I am not sure how the question of nine hours or fifty hours' work a week will be settled,[2] but rather think, if the present prosperity continues, it will come to be the rule in all trades and in that case our continental neighbours would be likely to have such an advantage over us as to jeopardise the boasted supremacy of our country. Perhaps the best check would be the importation of workpeople from the northern countries of Europe, but this would be so unpopular that few would care to incur the odium.

[1] The Limited Liabilities Acts of 1861-2 had brought a rush to form companies, sometimes unsoundly based, causing many, like Carmichael, to doubt the wisdom of the limited principle. The crash in 1866 of Overend, Gurney and Company, a large discount firm, affecting many sections of trade, seemed to confirm their worst fears. Baxters did not become a limited company until 1892, the year after Carmichael's death.

[2] Anthony J. Mundella's Nine Hours' Bill, to establish a nine-hour day in factories, was not presented to parliament until 1873 and was passed in 1874. Agitation in Dundee was very active during the years 1871-4. On the nine hours movement in Scotland generally and in Dundee in particular, see *Minutes of Edinburgh Trades Council, 1859-73*, ed. Ian MacDougall (Scottish History Society, 1968), pp. xxxvii-viii, 89, 98, 344.

Bonhard. 21 September 1866

I have hardly fallen into the routine of regular correspondence yet, but between the gloamin and the mirk do nothing, it being soon dark after dinner and yet not a regular long evening. I miss sadly our beautiful evening walks at Bonhard and mourn over the shortening days which will soon drive us home to our winter nest. What you say about the Limited Company near Manchester is just a repetition of what we hear about such companies in every branch they meddle with. They are like *Boards* devoid of a conscience and they will continue to be an incubus for some time.

I work like a cart horse and have only been turned out in the park on Sundays all this season. Drummond has begun to try the shooting and sent you by rail this morning a sample of his work. Willy is back to school but going and coming daily all September.

Springhill, Dundee. 14 November 1866

I am satisfied of having committed a grave error in not taking any holiday this year. The change going up and down by rail was pleasant but became very much of a daily routine and the work was very hard and engrossing all the time. I have commenced to build the street which we proposed to do when the masons made the stir about the nine hours last June. I waited until the shortening days made the nine hours imperative. The Union are displeased and are trying to prevent their members working to us but we are getting men from the country round. I dislike very much being at variance with any tradesmen but the masons are tyranical. There are many of them idle. Excuse this twaddling, especially so much about self.

The feeling of weariness that finds expression in the first sentence of this letter was the result of affliction as much as of continuous and manifold labour. God's finger had touched more than one member of his family. His wife had had an illness that had aroused anxious fears for her health, his daughter Grace was slowly growing weaker, the hearing of his son Drummond had become dull, and in his own person he had been afflicted with tic or face-ache, the paroxysms of pain being at times very violent. In the hope that the change to a warmer clime would be good for Mrs Carmichael, Drummond and himself, a winter sojourn in the South of France and Italy was resolved on. . . .

1867–1885

COUNTRY RETREAT AND THE DECLINE OF LINEN

'Dull markets and careless workers'

THE AUTUMN of 1867 was rendered memorable in Dundee by the visit of the British Association to the town. It had been spoken of a year or two before, but had been delayed till the Albert Institute that was being erected in memory of the Prince Consort and that was to contain rooms for a Free Library, Museum and Picture Gallery, should be completed. Even with its buildings however the accommodation was too scant and a larger hall than anything then existing was needed for receptions. The Volunteers were in need of a drill hall at the time and it was arranged that one should be erected that would meet both purposes. The expedition with which this was done shows how hearty was the spirit of enterprise in Dundee at the time. Ground was bought in the beginning of June and early in August the Hall was complete.

Mr Carmichael's disposition was too retiring to allow of his taking an active part on any of the committees, but in his own way he quietly helped to make the visit a success by giving a handsome subscription to the funds, by sending specimens of the varieties of flax and tow and of the different kinds of yarn and cloth made from them, by conducting some of the more distinguished members through the Dens Works and by encouraging the workers to visit the collections of industrial objects and fine art that had been brought together.

The expansion which the staple trade of the town had undergone since the midsummer of 1864, when the statistics of it last given were

made up, had been extraordinary. During the three years the sixty-one firms engaged in spinning and weaving by power had become 72; the nominal h.p. employed had been increased from 4,621 to 5,822; the number of spindles going had grown from 170,552 to 202,466; the number of power-looms from 6,709 to 7,992; and whereas there were 36,020 persons employed in these works in 1864 there were now as many as 41,550.

To keep closer again to Mr Carmichael himself, the following brief extracts from letters written by him to Mr Peebles in 1868 and 1869 will indicate the events of most interest in his life and work during these years.

Springhill. 23 January 1868

We have a bale of china grass on which we are making experiments just now but without much success as yet. I wish we had a good chemist on the staff. My hands are so full of many things that nothing is done right. I came crawling home this afternoon fairly tired out and yet nothing accomplished to give satisfaction.

Springhill. 25 February 1868

I had sad news from Halifax last week. My old and valued friend Frederick Smith[1] had a shock on the thirteenth and died in twenty minutes, age 44. He spent a few days with us at Bonhard last July and was building a fine new house. Alas and alas! . . . Our friend Mr Blyth[2] spent an evening here lately. He has made an improvement in cutting up cloth for sacks and has resolved on proceeding with a patent for it.

Springhill. 10 March 1868

I thank you for the sketch of the coal barrow. We are just making a cart to weigh and measure coals to furnaces. The cart in iron swivelling on the axle makes a low lift and we expect it will be easily emptied as well as filled.

[1] Frederick Smith may have been a brother of Thomas Smith, 1813-85, manufacturer, who began his business career in the office of John Baxter of Idvies and in 1836 established with his father the firm of Henry Smith and Company, Dundee. He later bought Polepark Works, Dundee.

[2] See below, p. 200, n. 1.

Springhill. 19 March 1868

We (Mrs and I) went on Friday afternoon to visit Mrs Cox in Edinburgh and also by invitation to visit our young married friend Mrs Tod at Glenesk.[1] We paid a short visit to the exhibition on Saturday morning and then drove out in a tempest of wind and rain to Lasswade, calling on our friends the Umpherstones by the way.

Bonhard. 6 May 1868

My experiment with the lime light was more a bit of policy than for further information as to its cost. There is an unfortunate dispute in Dundee between the Town Council who wish to buy up the Gas Works and assess the town for gas and the large consumers who say that the power of assessment will take away all motives for economy and that the Council are not likely to manage better than a Company.[2] The Council are supposed to be resolved to buy up the Gas Works at any price. My experiment was in a quiet way to show that the Gas Works might possibly be superseded and the Town Council make a bad bargain. A photographer in Perth who had a small apparatus came down and gave us an exhibition of the light. It was quite a success, paling and rendering unnecessary all lights in the street up and down. The photographer is not a believer in the economical application of the light in its present stage of development, and I, having served my purpose with it, did not go into the subject.

There is no life in our trade and a general feeling is abroad that we shall have to go on short time again. An eminent author in a recent article says: 'When food is scarce and dear in a community they can do for a time without weavers'. We are feeling this.

We had very sad news yesterday from France announcing the sudden death of the pleasant companion in our journey to France and Italy last year – Isabella Stewart. It has thrown a gloom over us all. We parted with her at the station at Paris last March and have never met again to talk over the incidents of our pleasant

[1] Mrs Tod was James Cox's daughter, and wife of William Tod.

[2] It was suggested in the local papers that the large consumers, notably George Malcolm and Sir David Baxter, were concerned with their position as shareholders in the private gas companies. The affair developed into a very undignified fight between the 'Trades' and the Chamber of Commerce. (*Advertiser*, 3 Jan. 1868; Dundee Chamber of Commerce minutes, 29 Dec. 1893.)

journey together. Let us cherish the hope that the time is coming when we shall be done with all this haste and bustle and that beyond the dark river 'there is a rest that remaineth for the people of God' where death-divided friends shall meet again, a land of which even the fairest of this world's scenes are only a foretaste, a shadow of the glory that shall be revealed.

Bonhard. 24 June 1868

Our friend Mr Blyth[1] is making a sensation with his cloth-cutting machine. It is really a very nice machine and will give him considerable eclat.

Springhill. 30 October 1868

Your humorous account of the revolutionary waterwheel of Sholto Douglas[2] is very amusing but it is easy to laugh at poor inventors. On the other hand are the weary days and wakeful nights and 'the hope deferred that maketh the heart sick' and all to be flung aside as a warning and a caution.

We all arrived here safe although by devious ways on Wednesday. We are getting to be too heavy a body to be easily moved now. Think of three males and seven females, equals ten persons, one cow, two horses, one dog, six turkeys, five hens, thirteen young do. and one canary besides goods and chattels.

Springhill. 18 December 1868

A good and cheap out-door light is much wanted. If the streets of populous towns were well lighted it would greatly tend to lessen the amount of crime and drunkenness which are at present so favoured by darkness. I hope your friend Mr Reid will prosecute his enquiries and bring out something that will meet all the requirements. I wish him success. But these things will not be taken by violence; somehow they come into the mind with a start *after long pondering*.

[1] Henry Blyth erected Bank Mill, Dundee, about 1839, at a time when trade was so bad that it was called 'the last mill that ever would be built in Dundee' (*Dundee Year Book*, 1887).

[2] Not identified.

Bonhard. 25 April 1869

I had the pleasure of meeting and being introduced to your friend at the well at Bridge of Allan and we had a pleasant chat, only too brief, as Mr R. had just finished his *sixth* tumbler. It seems curious but his face and manner were those of one that I had known for half a life-time. Perhaps, the odious comparison of the 'auld horse and the fail dyke' nevertheless, there is some sympathetic feeling that draws you to a kindred mind. . . .

We came here on Thursday afternoon and the weather is glorious.

Bonhard. 30 June 1869

You must not let down your spirits now that you are getting your head above water. It is just the trying time with you, having perhaps by too close an attention to business weakened the system, for you must have had hard work to mature and perfect the beautiful mechanism of the dry meter, and a reaction was sure to follow. You should flit to the country for a week or two and obtain a perfect rest for mind and body.

Bonhard. 4 August 1869

You have had many sore trials of late, ills touching not only yourself but those most dear to you. . . .

I am happy to say we are all in usual health again, but we are reduced in number to 'the old folks at home'. The two boys and their cousin Maggie,[1] who has been here some time, left with the London steamer on Saturday evening. The boys purpose a month's tour up the Rhine to Switzerland. Drummond took with him a young pointer as a present to his cousin at Ailly-sur-Somme. Poor thing! It never was in public life before and the change from bonny Bonhard to the bustle of going on board was too much for its feelings. Its tail disappeared, it trembled and even lifted up its voice and wept.

Mr Cox's son-in-law Charles Aitchison[2] has been telegraphed

[1] Maggie was the daughter of James Carmichael, the brother who settled in Amiens.
[2] Charles Aitchison, 1832-96, later Sir Charles, son of Hugh Aitchison of Edinburgh, married James Cox's daughter Beatrice. In 1868 he became foreign secretary in the secretariat of the government of India. In 1878 he became chief commissioner of British Burma, but returned to India and in 1882 became lieutenant governor of the Punjab. (Letter-book of James Cox, 25 Mar. 1885, 19 Feb. 1885; *DNB*.)

for from India to take the office of Foreign Secretary. We were in Dundee last night bidding him 'Good-bye'. He leaves today via Marseilles.

The sweets of country life enjoyed at Bonhard led Mr Carmichael to look out for a place of his own, as his lease of that place was drawing to a close, and after looking at several residences he secured the property of Arthurstone in the valley of Strathmore. . . .

Arthurstone was an old property. It was one of the five estates in the neighbourhood of Coupar Angus gifted to his five sons out of the Abbey lands by its last and famous Abbot, Donald Campbell, a son of the second Earl of Argyll. It got its name from a large monolith which up to the end of last century stood at a point not far distant from the western march. . . . In the legends of the district the stone, that no longer exists, was associated with King Arthur. . . . Besides the stone which gave its name to the estate, there is quite near a place called Arthurbank and a field known as Arthur's fold.

The new laird of Arthurstone was interested in traditionary legend and found out all he could on the subject. The question of who Arthur the British hero was, used to be discussed on the spot. According to some, he was an ideal leader, and according to others he was a Cymric King of the sixth century – the great Pendragon or Imperator of the Celts, whose life was one great struggle against the Saxons, who kept landing on the east coast in larger and larger bands. The latter was the view held by Mr Carmichael, who also believed that the region of the hero's exploits was not Cornwall, Wales or Brittany, as is generally supposed, but the Scottish lowlands from Strathmore on the north to the border on the south. Most Arthurian names are to be found in the latter region, though it is in the other districts that the legends of Arthur and his knights still linger, the stories having been carried thither by the vanquished Celts.

The estate was richer in soil from having formed part of the Abbey lands, for the monks were the great improvers of land during the middle ages. . . . Arthurstone proper was a residential estate, the lands being pleasure grounds and parks around the house. Two of the parks were to the north and in a large one to the south was a pond with two pretty little wooded islands in it. The grounds around the

House enclosed by the Ha-ha fences of the parks were all made up and contained many elegant and rare trees, the *pinus nobilis* and the golden oak being remarkably handsome specimens. But the special feature of the grounds was the number of grand old beeches that formed the avenues and lined the paths. One magnificent tree stood at the south-west corner of the house and another still more umbrageous, with seats around it, stood by the side of a path a little further to the west. The facade of the house looked out in that direction towards the Gask hill and the south side, which best showed the extent of the house, looked out on Kinpirnie and Keiller hills. Rose plants and shrubs with scarlet berries were trained up the walls and around the windows making them sweet in summer and bright in winter. Immediately in front of the west door was a fountain surrounded by a pleasing bit of garden ground. To the east of the house, but screened from it, were the stables and other outhouses. There also were the bleaching green, the bowling green and a large garden enclosed by a lofty wall and famed for its rich fruits.

Shortly after the estate of Arthurstone was acquired, the adjoining farms of East and West Ardler, Mains of Arthurstone and Colbeggie were purchased from Lord Wharncliffe. . . . The estate of Arthurstone as thus enlarged was a goodly one, and the new laird took possession of it with full purpose of heart to leave it better and fruitfuller and the people on it wiser and happier than when it came into his hands.

One of the first improvements he thought out was how the house could be lighted with gas. There was a gas-work in the village of Meigle and he thought at first of laying pipes between it and the house. But the gas was dear there and the level was not favourable for carrying it such a distance, so he resolved to build a gas-work on his own ground. It was soon put up; the inside fittings went on at the same time and all was in readiness by the end of the first summer, as will be seen from the following characteristic note:

Arthurstone, 6 September 1870

Everything is going on well at the Gas-work. David made the gas without help or instruction last time. The leak is quite closed and I think it is a model Gas-work. The only mistake that has occurred is with David, who, being a widower, has set his affections on the

cook and is to marry her at the Term and take her away to our great annoyance, as she is a good cook, and a pleasant, agreeable, obliging woman.

The greatest alteration on the House was the removal of a kitchen and larder on the north and erecting in their place a Library and Billiard-room. They were substantially built of stone from the quarry on the estate and as they are only of one storey a good deal of designing was needed. The wood used in the fittings of this part of the house was solid oak and much of it was carved by the hands of cunning workmen under Mr Carmichael's direction. He was fond of good wood carvings, and for some years back had employed an ingenious carpenter in making little ornamental cupboards and brackets for special corners and recesses in his home at Springhill. There too he had a large handsome book-case of light polished oak, in which, instead of doors, the frames moved up and down like the sashes of a window. This beautiful piece of furniture was set up in the new Library, which was made worthy to receive it by having its mantel-piece, shelves, window recess and dado carved in appropriate designs. At this time, the man who was quickest at working out what was wanted in wood was Andrew Reekie. Much of his handiwork gave evidence of great genius. . . . The greatest achievement of his skill was the sideboard in the Dining-room at Arthurstone and in the making of it he was assisted by Mr Law, a clever ship carver. Mr Carmichael gave rough tracings of what he wished made, with exact measurements and instructions, usually adding a word of delicate praise as a stimulus, and they did their best to produce it. It was thus in the details rather than in the general plan that one got the result of the workings of the master's mind. Many things that met the eye were known to be his, because they were seen to be the outcome of original, or at least unfamiliar, thoughts. It was the same with the ornaments and articles of virtue in his cabinets, and the clocks, armour and instruments throughout the house. They were valuable in his eyes because of the stories attached to them. His friends in France, India and other parts of the world knew this and when they fell in with anything unique, that they thought he would like, they advised him of it or sent it to him. In making his collection of pictures also, he was guided by the same personal liking. There

were portraits of men and women whose lives had a special interest for him, pictures of landscapes he admired, of scenes that recalled incidents in his travels or reproduced and vivified impressions made in the course of his reading. They had been gathered as his books had been gathered, gradually, and they were emphatically his and no other man's in the sense that they revealed his interests, tastes and likings. Not that he did not consult the opinions of others on a matter of taste and sometimes give way to them. He liked an opposing opinion from an expert and encouraged the expression of it, but if he gave way, it was only tentatively, making the man who differed from him aware of his attitude. Here is a characteristic note as an example:

> I received your letter, written in rather a scolding style, regarding the renovation of the antique chair. I must bow to your experience, but
>
> > He that's convinced against his will
> > Is of the same opinion still.
>
> Make as good a job of it as you can and we shall see about the others afterwards.

The improvements outside on walks and slopes, in setting up vases, beautifying corners or laying out flower-beds, were made with the same thoughtful care. In carrying out agricultural improvements on the Estate, he consulted and was guided by Mr John Collier, a gentleman of large experience and much practical sagacity in the valuation and management of farms. A good deal was laid out on fencing, draining and planting and special pains were taken in providing better cottages in the hope of inducing the ploughmen and other farm servants to become fonder of their homes and to stay longer in one place. In answer to a compliment on the changes for the better he had made on the district surrounding the house and particularly on his cottages being the best in Strathmore, he admitted that he had not spared the outlay necessary to make the place better, but said that much more had to be done. The rule was to patch: what he did was thorough. His arrangements with the farmers were characterised by the same fairness inclining to liberality and the same

precision that marked his other business relations. He gave a hearty encouragement to every effort calculated to improve any portion of his land.

Before going out to reside at Arthurstone, a farewell visit was paid to Bonhard and it will be seen that the letter describing it shows a lingering fondness for the place where he and his family had been so happy:

> Springhill, Dundee. 21 March 1870
>
> Drummond and I went to bonny Bonhard on Saturday, having to settle finally for removing some things that we had left there. It was a fine day and renewed our sadness in bidding the scene and the friends farewell. The larks were all singing in full chorus as we walked out and everything told of the breath of spring being abroad. We returned through the Den and heard the voice of the Burn saying –
>
> Men may come and men may go
> But I go on for ever.
>
> A neighbour of ours here is shooting the crows as they attempt to build on the trees where they have long time held a prescriptive right. I am *eerie* about it, for when the crows go, it is said the Laird soon follows. I had to take down some trees three years ago at the Dens in order to erect our new calender, but allowed the trees to stand at considerable inconvenience to give the young crows time to *breek*.[1] I don't know if they fully appreciated my motives, but somehow I think we have not done so well since. Such is the creeping superstition I have that crows have a good deal in their power.

The family went to reside at Arthurstone in the end of March 1870 and returned to Springhill in the beginning of December, as winter, which was late that year, set in. When they went in the spring, they saw the trees putting forth their leaves and bursting into fresh and beautiful verdure. . . . They felt that their lot had been cast in a pleasant place and above the side gate that led by a shady path to the House the new possessor placed a stone on which was inscribed the

[1] To breek: to grow; as with young boys to grow old enough to wear breeches.

pot of lilies that forms part of the armorial bearings of the town of Dundee and the motto 'Dei Donum'.

While his home was at Arthurstone Mr Carmichael usually travelled into Dundee four days in the week and his estate improvements did not interrupt his experiments in the works. On twenty-second March 1870 he sent to the Institution of Engineers in Scotland a paper on the bursting of two steam boilers by hydraulic pressure, the experiments having been made towards the end of the previous year. The paper was awarded the gold medal of the association. Considering that there are about 150,000 boilers in this country and that on an average there are about forty-five explosions, causing the loss of about thirty lives each year, the subject is one of vital and lasting interest and we refer those specially interested in the subject to the *Transactions* of the Society for the interesting and instructive description of the actual bursting of the boilers.[1] Accidental burstings are usually owing to defective design, the want of proper inspection, defective fittings, too high working pressure, or the ignorance and neglect of attendants. The value of the paper lay in its emphasizing the fact that the bursting pressure usually tabulated was too low and in showing which were in reality the weakest points of a boiler. . . .

Business required more than ordinary attention during the summer and autumn of 1870 owing to the war between France and Prussia. From the declaration of war in the middle of July to the surrender of Sedan in the beginning of September events were startling in their greatness and their rapidity. During the siege of Paris and the occupation of the country by the Prussians, several members of his brother's family came over from France and stayed at Springhill. They revealed pictures behind the scenes in the country of their adoption that were interesting but sad, some of them even horrible. The fact of the Parisians keeping up postal communication with the world outside by means of carrier pigeons and balloons is well known. Though not so uncommon it is equally impressive to see how his brother, whose home at Ailly was for some months occupied by officers of the German army, had to communicate with the members of his family at Springhill. On paper marked with the

[1] Dundee Police Commission Reports, of which a very incomplete set is kept in the Dundee Public Library, show 'death caused by bursting boiler' as an ordinary occurrence in their printed column of accidental deaths.

red cross of the Société Nationale Anglaise de Secours aux Malades et Blessés, the following letter is written.

In train from Noyelle to Boulogne-sur-mer. Dec. 2nd, 1870

Dear Sir,
I saw your brother Mr James Carmichael this morning in passing through Ailly-sur-Somme on my way to Abbeville and Boulogne. The Prussians having occupied part of this country, postal communication is cut off. Your brother handed me a letter for you which I shall post on arrival at Boulogne. I promised your brother to write you to address letters for him in future under cover to me and I will forward by first opportunity. Yours truly, H. M. Merridew, 60 rue de l'ecu, Boulogne-sur-mer.

30 November 1870
Dear Brother, We are all well here. Acquaint all the Friends of the same. With kind compliments, I am, Dear Brother, yours affectionately, James Carmichael.
sent away the 2nd December. All well.

The superior quality of the gas made at Arthurstone and the arrangements introduced for the regulation of its pressure there set Mr Carmichael a-thinking of how the pressure of the gas in the various floors of the works could be regulated and repeated experiments with the photometer were made throughout the winter months.

9 December 1870
We are continuing to prosecute our enquiries with the photometer, and so far as gone, we find that a pressure of three tenths with a large burner gives most light with most-economy.

I am reading Carlyle's Friedrich[1] and could see to read quite well at Arthurstone, but on trying it at Springhill without thinking of the change, I could not make it out and have been compelled to resort to the reading lamp. The gas is quite a different colour.

[1] Thomas Carlyle, *History of Friedrich II of Prussia, called Frederick the Great* (6 vols., London, 1858-65).

. . . The state of his dear wife's health, which had long been delicate, now caused much anxiety and distress. In the hope that the change to Arthurstone would do her good the family removed to it about the middle of March in 1871. But neither the peacefulness of the place nor the most tender nursing could restore her to health. . . .

The spring and summer of 1872 was also a time of grave anxiety caused by the illness of Sir David Baxter. For some years past Sir David had spent the winter chiefly in Edinburgh and, while there, in March of this year, he was seized with paralysis. He recovered so far from the serious attack that he could be removed to his house on the estate of Kilmaron in Fife. There his condition continued to improve till he had a relapse which ended fatally on the thirteenth of October.

Springhill, 15 October 1872

You will have seen the account of our sad loss by death of our dear friend Sir David Baxter. It was not unexpected for some weeks past. What further events may arise from it I know not, but wait their unfolding in a quiet, resigned way.

The property of which Sir David died possessed was very large, amounting to over £1,200,000. Mr Carmichael was one of the five trustees appointed under his will and the carrying out of the provisions entailed much labour and care. Some of the bequests to public institutions were large and of lasting benefit. Though small in comparison with some of the others, one of the most thoughtful of the bequests was £3,000 to the managers of departments and old servants in the employment of Baxter Brothers and Co. and £1,000 to clerks in the office in King Street. These were to be apportioned by the trustees as they thought proper, their decision being final and not subject to challenge. The legacy to the clerks was distributed among nineteen of them. The legacy of £3,000 yielded £2,700 free of legacy duty and this sum was distributed with much consideration among 241 legatees. . . .

Of the 241 men who got a share of the bequest 204 had been more than ten years at the works, sixty-eight had been more than twenty years and not a few of these had been from thirty to forty years there. This record says more for the excellent management of the large works than words could do. How many heads of families must the

discipline of their daily duty have trained to good habits. How many homes must have been made comfortable and happy by the steady employment and regular wages of their bread-winners!

The town of Dundee was at this time enjoying great prosperity. Between 1871 and 1873 both the population and the rental of the burgh had greatly increased. The manufacture of jute especially was expanding rapidly. The quantity imported had risen to 102,844 tons in 1871 and in 1873 it was no less than 143,150 tons. Another noteworthy development of the jute trade during these years was the importation of the fibre direct from Calcutta to Dundee. In 1868 less than 6,000 tons was shipped direct, in 1869 the quantity rose to about 28,000 tons and it continued to increase year by year till in 1873 it was over 100,000 tons, which was more than two-thirds of the whole quantity imported. This direct traffic gave employment to a fleet of between seventy and eighty large full-rigged vessels which added greatly to the beauty of the river. . . . After the death of Sir David Baxter the burden and responsibility of upholding this great manufacturing business rested almost entirely on Mr Carmichael and Mr Dalgleish. They had by this time been associated as partners for nearly twenty years and had got on very well together. Their business relations had always been characterised by mutual respect and perfect confidence and each deferred to the judgment of the other. The burden was heavy at times and Mr Carmichael now found that residence in the country was beneficial to his health. . . . It was good for him to have to leave his office in the town at a stated minute and to be whirled far away from the mill into a widely different region of sights and sounds to rest and sleep. On Wednesdays and Saturdays he usually stayed in the country that he might lesiurely superintend the work being done on the place. . . .

Arthurstone. 12 March 1873

The Calender workers in Dundee have been troublesome for some time. Having got up an association[1] they hold meetings

[1] Calenderers were one of the last trades to be protected by the factory acts, having been left out of the Bleachfields Act of 1862 which protected kindred trades. Heavy hand labour was still involved and the hours worked were longer than in other trades. Agitation on their behalf was very active during the years 1870 to 1873. The Calender Employe's (sic) Association was formed in 1872 (*Advertiser*, 15 May 1872). For

every Saturday night and publish weekly the names of employers who advance a man a shilling. We are well in advance, having for some years used the folding machine, but we have still a lot of Lappers, each with a boy, who put the webs into shape and tie them up. We cannot put them on piece and they take it cool. I had the pleasure last week (after many trials and spending many dinner hours at the Lappers' table tying up) of perfecting an apparatus which presses and does the tying up in a manner superior to what was ever done by hand. It will save a number of hands besides linking the men on to the machine and so quickening their motions as well as classifying the work to allow of it being paid by piece. Happily the men do not oppose. On the contrary some of them offered suggestions and pointed out defects. A little thing like this is very cheering in the din and strife.

At a public meeting held in Dundee in the month of July 1872 it was proposed and carried with enthusiasm that a statue to the memory of the late James Carmichael the Engineer should be erected in the town. Several artists sent in designs and the two best were those of John Hutchison and William Brodie.[1] The commission for the monument, which was to be in bronze, was ultimately entrusted to John Hutchison and Mr Carmichael, partly out of a kindly feeling but also because he liked the other design, commissioned William Brodie to work out his in marble. He did so in a very elegant and artistic manner and a pedestal of polished granite was prepared for it. When it was ready Mr Carmichael wrote to the sculptor:

My dear Mr Brodie,
I have the base for the statue ready and expect every day to hear from you. If you can arrange to come on Saturday and spend a quiet Sabbath with us in the country and go to the Kirk like a good boy I will feel it a pleasure and remain, very truly yours.

---

negotiations with Baxters by calenderers, see *Advertiser*, 15 June 1872; see also Dundee Public Library, Lamb Collection 196(3).

[1] William Brodie, 1815-81, sculptor, ARSA 1857, RSA 1859, executed portrait busts of many of the celebrities of his day. John Hutchison was also a well-known sculptor and an RSA.

The most stirring public event after his return from the Continent[1] was the General Election in February 1874. He did not take a prominent part in politics and was never a blind admirer of any party but at this time he exercised his right as an elector. On the eleventh he wrote to a friend: 'I voted for Maxwell today'. On the thirteenth to another: 'We have returned Sir William with nearly 500 of a majority. It is a triumph hardly expected.' And on the sixteenth to a third:

> We have had a great triumph in Perthshire. The majority for Sir William was greater than any one expected, but as a set-off, we are saddled with Jenkins in Dundee.[2] My only fear is that D'Israeli will make another leap in the dark to gain popularity and insure continuance in place. At all events I fear it is only a delay in our progress towards democracy. . . .

[Mr Carmichael had at this stage to take into account] the fact that neither of his sons was likely to succeed him in the management of the Dens works. It was hard to accept this as his future lot in place of the plans he had been cherishing but he did it with fortitude and set himself to arrange accordingly. Two things had to be done. The one was to call in someone to be his assistant and successor at the works and the other was to find an honourable position for each of his sons where they might lead lives of further usefulness in comfort and happiness.

The relative whom Mr Carmichael naturally selected to assist him in his business was his nephew James Carmichael the eldest son of his brother James.

[1] Carmichael had made a trip to Florence during 1873 in the hope of improving his son's health.

[2] Sir William Stirling-Maxwell, 1818–78, of the Stirlings of Keir, adopted the surname of his wife, third daughter of Sir John Maxwell. He was a scholar, whose subject was Spanish art and history. Returned unopposed as MP for Perth, as a moderate Conservative, in 1857, 1859 and 1865, he was unexpectedly defeated in 1868 but restored with a large majority in 1874. John Edward Jenkins, 1838–1910, a strong imperialist and keen radical, was returned for Dundee in 1874 with the support of the local radicals. In 1882 he stood as an Independent Liberal for Edinburgh but was defeated. He stood again for Dundee and was adopted as Conservative candidate in 1885, but was beaten in 1895. (Donald Southgate 'Politics and representation in Dundee, 1832–1963', in *Third Statistical Account: Dundee*, forthcoming.)

Arthurstone, 19 March 1874

My dear Brother,
I am ashamed to find that your last esteemed letter has lain beside me since 28th February unanswered. James being with us here rendered it less necessary and since his departure the daily toil and worry has been sufficient for the day.

I now write to you on the important subject that James will have talked to you about. Recent severe disappointments have turned my attention to the propriety and necessity of having some near friend to assist me and be my representative in the firm of B.B. and Co. and it was impressed upon me in lonely night watches that your son James was the most suitable person. I opened the subject to Mr Dalgleish who jumped at it and he is more anxious than myself for some such arrangement. James seems also to like the idea and it seems to remain with you to decide whether or not you can spare James and if it is possible to arrange with the partners in your firm to allow him to leave. James will explain to you my proposals better than I can do in a preliminary letter. I can only say at present that if you agree with the proposal I have no doubt that we could give James a position of consequence to begin with and a prospect of advancement worthy of the ambition of a young man to aspire to.

Hoping you will take a favourable view of the position and give us your cordial help to bring the business to a favourable conclusion, I remain, affectionately yours Peter Carmichael.

Arthurstone, 18 April 1874

My dear Nephew,
I duly received your letter of 14th current and now reply. About Springhill, I think your remarks are very sensible. It is standing empty and it is sufficiently furnished for a young pair, hence my proposal. At the same time I am aware that it might occasion a good deal of talk which had better be avoided. . . . Your determination to begin in a humble way has quite my hearty approval. The spirit is excellent. . . .

12 August 1874[1]

James is buckling on his armour and is already a help to me, so that

[1] To his brother.

I feel part of my burden at the works shared by him and less heavy for me.

6 May[1]

I was sorry your visit came to such a hurried close. We ought to have a day at the burnside together, but I am so driven as to be 'dung doited'.[2] Do come and tear me away.

6 May[3]

What a collapse the miners have made! I hope it will be a lesson.[4] The Factory Nine Hours' Bill will be settled some way tonight. It is a hazardous experiment and if carried may be the beginning of the end for our textile manufactures and the child unborn may rue the day. I am staying at home today. It is the first day for a long time as I have been hard pressed with business matters – dull markets and careless workers.

(no date)[5]

Our present arrangement with half-timers is that the morning shift work on Saturdays till 9 o'clock and get their wages before they leave, the afternoon shift taking their place after breakfast and working till stopping time, when they get their wages. By the new arrangement one set work all Saturday – six hours. The other set are idle all day but have to come for their wages. When the turn of the afternoon shift comes to work on Saturday, they, not being accustomed to commence work at six o'clock, forget or sleep in and derange the work of others. One set work twenty-five hours one week and thirty one hours the next, deranging and making confusion in the pay list. In all well-ordered works it is introducing confusion for no useful purpose that I can comprehend. . . . I hope you will be successful in the principal object of

[1] To David Bruce Peebles.

[2] Dung: overcome by fatigue; doited: stupid; dung doited: stupefied with work (Jamieson, *Dictionary*).

[3] To Doctor Spence.

[4] A collapse in overseas markets for coal caused a very severe drop in colliers' earnings in 1874 and a resultant failure of miners' organisations (A. Slaven 'Earnings and productivity in the Scottish coal-mining industry', in *Studies in Scottish business history*, ed. P. L. Payne, London, 1967, pp. 219-24).

[5] To D. H. Saunders.

your mission. The blow aimed at mills driven by water power is manifestly unjust and impolitic.[1]

27 June[2]

The Factory Bill restricting the hours of labour is an act of confiscation disguised as philanthropy. If the present collapse in trade continues and our foreign competition so ignored continues we may live to rue the day. I am glad that your interest in mechanics continues. It is a pleasure to me also to have some new combination to ponder over. . . .

28 September 1874[3]

We have been very quiet since you left. . . . We have had Mr and Mrs McDougall[4] and Isabella, the Rev. P. Stevenson and Mr Brebner all together.[5] Father Gavazzi[6] is also with us but he and Mr McDougall have gone to Forfar this evening and go to Arbroath tomorrow, returning here on Wednesday, on which evening they are to address a meeting in Coupar and then go home on Thursday.

Towards the end of 1874 the jute trade of Dundee, after a considerable period of wonderful prosperity, met with a decided check and had to pass through a trying ordeal. From being a paying busi-

[1] The Factory Act of 1874, which came into force on 1 Jan. 1876, took away from water-mills the privilege held until then of making up time lost through floods or drought. This had been used as a loophole to allow the working of excessively long hours, including night and Sunday work. A protest led by D. H. Saunders and David Grimond produced an amendment. (Dundee Chamber of Commerce Report, 29 Mar. 1876.)

[2] To Doctor Spence.

[3] To William Carmichael, his son, then on holiday.

[4] Rev. John Richardson McDougall, 1831-1900, was a Free Church missionary in Italy, whom Peter Carmichael visited when called to his son William's sick-bed in Florence in 1874 (W. Ewing, *Annuals of the Free Church of Scotland, 1843-1900*, 2 vols., Edinburgh, 1914, i, 225; and see below, pp. 223, 235).

[5] Rev. Patrick Stevenson, 1835-1905, minister of Inverarity, Angus, from 1867 to 1905 (*Fasti Ecclesiae Scoticanae*, v, 293). Brebner has not been identified.

[6] Alessandro Gavazzi, 1809-89, an Italian preacher and patriot, was exiled for his political views, joined the Evangelical Church in England and became head of the Italian protestant community in London. He returned to Italy in 1860 as an army chaplain with Garibaldi and in 1870 became head of the Free Church of Italy. (*Encyclopaedia Britannica.*)

ness the making of jute goods became a losing one and a good deal of machinery was stopped. This was caused in great measure by the erection of mills for the spinning of jute in Calcutta. By the spring of 1876, however, the linen trade was as bad or worse than the trade in jute. Large reductions in prices had to be made in order to get rid of stocks and it was difficult to find employment for the work-people, who were not always patient under the reduction of wages that was necessary if the manufacture was to be carried on at all.[1] In the beginning of 1877 Mr Carmichael's anxieties were still further increased by being deprived of the usual communings with his friend and partner Mr Dalgleish, who was laid aside from business for a time and obliged to go to a warmer climate. By the end of April, also, Russia had declared war with Turkey and before the summer was ended she had crossed the Danube and led her armies through the passes of the Balkans. The linen trade being dependent on Russia for the supply of flax, all her movements required close attention so that altogether this was rather a weary time.

In spite of the depression of trade during these years many vast improvements and great works were being carried on in Dundee. Elegant and commodious schools were built in various districts throughout the town by the School Board that had been constituted under the Education Act of 1872.[2] Spacious thoroughfares lined by magnificent blocks of buildings took the place of the decaying slums, narrow lanes, crooked wynds and narrow-necked or obstructed streets that had long disgraced the central part of the town.[3]

An abundant supply of water was brought into the town from the Loch of Lintrathen. The Victoria Dock with a new graving dock to hold vessels of the largest size was opened and the first bridge across the Tay was in course of erection and nearing completion. The events

[1] The usual reaction of Dundee mill-owners to bad trade was to reduce wages, a step which had no effect whatever in reducing the over-production which was at fault: 'Piece workers whose pay is reduced will exert themselves to produce as much more as will bring the sum they earned from the old rates . . . and diminished supply will never result from reduced wages' (*Advertiser*, 6 Dec. 1874).

[2] These schools were not always in the districts where they were most needed. See *Report of the Committee of Council on Education in Scotland, 1875-1906*, p. 402.

[3] This suggests a scale of improvement much greater than the reality. After Dundee's Improvement Act of 1871 a start was made on street improvement and slum clearance, but little could be done until the powers given to local authorities became mandatory rather than adoptive.

of a public kind at this time with which Mr Carmichael had more immediately to do were the opening of the Victoria Road, the erection and unveiling of the statue to James Carmichael which had been decided on in 1872 and the renovating of the Cowgate Port.

The opening up of the Victoria Road was the great improvement on the east side of the town. It took the place of the old Bucklemaker Wynd, Water Wynd, Ladywell Lane and Powrie Lane which had become quite inadequate for the traffic that passed through them. Between nine hundred and a thousand vehicles passed up and down the Bucklemaker Wynd every day, yet it was at several places not more than twenty or twenty-five feet wide. The width of the new street was between fifty and sixty feet and its gradients were made much more easy. Not a little of its importance to the town, however, would have been lost if it had not been continued as far as the Arbroath Road. This involved a passage through the works of Baxter Brothers and the building of a bridge across the Dens. Permission to build Victoria bridge was granted by the firm and the valuable outlet or access by Victoria Street was gained. . . .

The restoration of the Cowgate Port was done by Mr Carmichael himself in his own quiet way without letting it be known who was doing it. In the old town wall of Dundee there were five ports or gates, two on the west, two on the north and one on the east. Only a vestige of the wall remained and all the gateways were gone except one, the East Port in the Cowgate. This gateway had been preserved out of respect to the memory of George Wishart the martyr who, among other works of benificence in the town, had preached from its parapet during the plague of 1544. It is doubtful whether the gateway standing was the veritable one from which Wishart preached or whether it had been erected in place of the older one; but for more than two centuries it had been associated with his name. It was considerably decayed and one of the suggestions in connection with the Improvement scheme was that it should be removed. Mr Carmichael was strongly opposed to its being taken down and in 1877 he, through Mr A. C. Johnston, the architect, asked to be allowed to restore it. . . .

The next letter refers to the invention of the overhead sewing machine by Mr James Laing, a wonderful mechanical genius, though of a somewhat erratic habit of mind. He was well known on the

streets of Dundee by his wild gesticulations when in a state of excitement, but the ingenious contrivances of his fertile brain were also known and kept him respected. Mr Carmichael was a true friend to him, trying to keep him right and scolding him when he went wrong. Laing had worked out improvements on the air pump and the screw propeller but practically they came to nothing. To give him a better chance with the sewing machine a few gentlemen gave him help while he was working out his idea. The Messrs Carmichael of Ward Foundry gave him the run of their shop and other assistance, and a devoted sister made a home for him and gave him loving sympathy. In these circumstances he had been trying to work out the principle of the 'thread barrel' for about twelve years and now he had succeeded. Mr Carmichael had seen so many of Laing's failures that he was slow to believe in his having at last achieved a signal success. Somewhat sceptical, he went along to the inventor's house to see the machine at work and Laing's sister used to tell that after watching it for a while he turned to her and said in a kindly way: 'Well, I'm converted this morning'. The meeting to which this letter refers had been called to consider how the successful inventor might best secure the fruits of his genius.

28 September 1874[1]

The proposal at the meeting in Lamb's that we should all become partners in Laing's invention took me by surprise. It would be too cumbrous an affair and I could not give time to such a business. Besides I do not want to make a profit of it, but only help the poor fellow and bring out an invention that would benefit the trade of the town, for, though it would take the bread from many poor women, if it is not wrought in Dundee it might take the trade elsewhere.

My crude idea is something like the following. We should subscribe the money to take out the patent in Laing's name and pay him £1 per week while the machine is being perfected. Then Laing should by a legal document assign the patent to you as makers (allowing you to licence other parties if you could not meet the demand) and fix a charge as royalty to be paid to him, either so much for each machine or a percentage on the sums

[1] To George Carmichael, his nephew.

received by you. You would then as men of honour and unblemished character do the best you could for Laing and yourselves, the subscribers to be paid their advances with interest at five per cent and get the first machines turned out.

If such an agreement could be made siccar[1] I would order a pair of machines and give such attention to the working of them as to help to make them easily worked. Some of the parts I fancy could be simplified and condensed into less space and the proper tightness of the thread made self-adjusting on the cone or a disc wheel which would be neater and occupy less room. You can think over this before next meeting.

The patent was bought by Mr D. R. Dawson[2] and a limited liability company was formed to carry it out. By means of the sum obtained for it Laing was able to live comfortably for the rest of his days and provision was made for his sister. He lived for twelve years after the patent was taken out and his busy brain kept fermenting theories for the improvement of the machine it had invented till the 'fitful fever' was over and he slept. But Mr Carmichael's personal interest in the sewing machine ceased when the company was formed.

7 December 1874[3]

Business in jute here is now only carried on at a loss. Nearly all the mill and factory workers are out on strike today to resist a reduction of wages. From the temper of the crowds I passed through on my way to the train this afternoon I fear mischief tonight. I was presiding in the J.P. court nearly all day and saw very little, but our people are at their work as usual.

14 July 1875

Business in Dundee continues in a very bad state and one is almost afraid to open a newspaper lest he should read of fresh disaster. A second reduction in wages is being made at most of the mills, making 20%, which will cause a large restriction in the circulation of money in the town and I fear that a hard winter is before us

[1] Sicar: secure. [2] Not identified.
[3] Addressees of next three letters unknown.

with so many workers thrown idle.... Two good men have passed away to the land of shadows – John Shiell and David Martin.[1]... I had a cheerful letter from Mr Martin a few days before his death asking me for a photo to send to our friend Gribanoff[2] in Archangel, which I sent, cheering him with the hope that I would soon have him for a neighbour at Kinloch.

7 August 1875

The strike still goes on in Dundee and I do not know which side will win, if the word can be used where there is nothing but loss on both sides.[3] We have taken no part in the struggle, our business and wages not comparing with the high pressure jute wages. The employers most prominent in urging the reduction of wages are the same who enticed our weavers to leave by giving them four to five shillings per week more than we were paying a year or two ago. We are taking in no new hands and so far acting fair between the opposing parties.

On thirtieth August a message came from Ailly that his brother James had died suddenly that morning. The following is a translation of a tribute to him.

Amiens. 4 September 1875

Mr James Drummond Carmichael of Scottish origin came and settled in France at Ailly-sur-Somme near Amiens about thirty years ago. By the tradition of the family he belonged to the Presbyterian Church of Scotland. On his arrival in this country he attached himself to the little Protestant congregation of the town of Amiens and in it he remained till the end, as we are happy in being able to testify, one of the most faithful and zealous of its members and one of the most generous of its benefactors....

[1] John Shiell of Smithfield, Angus, 1806–75, solicitor, of Shiell and Small, law agents (*Old Dundee Exhibition Catalogue*, 1892–3). David Martin was president of the Chamber of Commerce, Dundee, in 1852, and nephew of David Martin, 1777–1863, of David Martin and Company, flax merchants (Norrie, *Dundee Celebrities*, p. 222).

[2] Gribanoff was presumably a flax merchant or export agent in Archangel whence much flax was shipped to Dundee.

[3] This strike of mill-workers against a reduction of workers resulted in the formation of the East of Scotland Mill and Factory Workers' Protective Association in the following autumn (*Dundee Courier*, 23 Oct. 1875; *People's Journal*, 11 Sept. 1875).

Mr Carmichael was not quite fifty-eight years of age. Full of vigour and health, quite able for the numerous duties of the manufacture, which, under his able and intelligent direction, has become one of the most important industrial establishments of the country. Nothing appeared to indicate the end of a life to which there seemed to be attached so many precious lives, such considerable interests, and to a certain extent, from a human point of view at least, even the future of the church of Amiens. But God, whose ways are not as our ways, has judged otherwise. He suddenly called him away on Monday last after an attack of paralysis with which he had been struck two days before. His funeral took place on Wednesday. The entire population, Catholic as well as Protestant, whom the news of his unlooked for death had plunged into consternation, accompanied him to his last earthly home....

[The following six extracts from letters have been made, by Alexander Monfries, the original compiler, unfortunately without attributing them to their recipients. They seem to have been written between autumn 1875 and spring 1876.]

I rejoice to hear of your success in getting orders, the more so as I was afraid you had got into the backwater which all new things have to go through before they obtain credence or success....

If you can see your way to put up substantial buildings they will certainly keep their value. I have always been rather stingy in buildings, preferring to spend on labour-saving machinery for facilitating the manufacture.

If, as I infer, your partner has made an unfortunate contract, it can only be an error in judgment, which we all need pardon for, often. I entreat you not to be hasty in throwing up your present position. Think over it well and pray over it....

I hope you will get a good young man for a traveller. It would be a great relief to your mind and help to your business. If you have a choice you should aim at a person well educated and of

good family connexion 'where munny is' as the *Northern Farmer*[1] puts it.

I am sorry you have got into trouble about your patent. I can only advise you to try every means to settle with your quondam friend before going to law with him. I tremble at the idea of your doing so. Surely an arbitration would bring him to reason.

I am sorry that the depression in trade has had such a bad effect on your son and that he has so soon lost conceit of factory work. It is certainly hard work and requires constant attention and a degree of success is almost necessary to give encouragement. It has many ups and downs but on the whole it should give a satisfactory result with perseverance. It is impossible to predict how long the present bad trade may continue. The most experienced merchants are quite at a loss to say when a revival will take place. I told your son when he was proposing to change all his machinery to jute that I did not think it was prudent, but jute was passing well at that time and the linen trade dull and if he erred many beside him were in error. . . .

13 April 1876

Dundee trade is very bad, linen now as bad as jute or worse. We know not from day to day if we can keep on and find employment for our people. Matters in Turkey and Egypt seem to be approaching a break-up. For Turkey it seems that the measure of its iniquity is about filled up. Its best plan would be to declare itself bankrupt, give up the plane and machinery[2] and cross over to Asia, but then, who is to participate in the estate? Russia and Austria will quarrel over it and a general fight all round may be the result. We must take a protectorate over Egypt.

11 November 1876

I have cherished the hope of getting away to the sunny south during the worst of the winter and have a letter from Mr

[1] *The Northern Farmer, or select essays on agriculture etc.* (Carlisle, 1778), a duplicate of *The Scots Farmer* (Edinburgh, 1773).

[2] A typical engineer's way of expressing the idea of giving up business, disposing of the essential tools of the trade.

McDougall with a strong invitation to Florence. In these bad times it is my duty to remain at my post and cheer fainting hearts who might make mistakes in my absence. I often come home despondent, feeling that I have not done a day's work, even when every minute of the day has been occupied. Our business is so bound up with Russia for our flax supplies that political events keep us constantly on the alert. Great events are on the gale and each day brings a varying tale. I don't like it but if I had the entrée to Lord Derby I would say: 'Now speak out like a man and say England wants a railway through Turkey, the ancient cities of Aleppo and Bagdad, the valley of the Euphrates, Mesopotamia, the Garden of Eden, on to join our own railways in India, and we must have such a government in Turkey as secure this – not you, Russia, with your prohibitive tariffs.' This road would make India a journey of five days from London and civilise and liberate the peoples long trodden down by the Turk and Derby would be held in everlasting remembrance as the builder-up of the old waste places and the restorer of paths to dwell in.

26 May 1877

I am better when at work than at any other time and I have had plenty of it, rising early and sitting late. The state of war and especially our connection with Russia requires constant watchfulness. We have a ship in from Riga. They could hardly get the ship loaded for want of men and horses. All gone to the war. Three thousand horses were requisitioned from Riga and it is not known how many men. I don't like the Turks but hope the Russ will not find it easy to carry out his double dealings and deceitful covetousness.

1 September 1877

I have heard and read about the lighting of factories in France with the electric light and am rather taken with the success already attained. The verbal description is that the actual combustion of the carbon is not visible to the workers in the rooms. The light is thrown on the walls and ceilings and reflected back thus avoiding all shadows and filling the rooms with light similar to a cloudy summer day.

27 September 1877

James has been to France and returned last week, much to my relief. He got the information about the electric light for factories, but it is, as you say, not ripe by a long way yet. . . . The lavender light burns well but it does not pale the gas and does not find favour. It is fitted in our foundry yard and kept burning all night. I will get the notes of the cost of the oil etc. in a few days and compare it with gas. The trouble and attention it requires will, I fear, put it out of court where gas can be got at a moderate price.

19 October 1877

The state of trade in Dundee is giving us much anxiety – prices at zero, stocks accumulating and wages as high as ever. It takes away all motive to increase production and lessens the fund to spend on improvements. I have never seen such a prolonged depression before. You will have seen the notices of the strike in Forfar. It ended in a victory to the agent for the work-people who is triumphant and ready for another contest.

17 February 1878

I have been awakened from a state of do-nothing-but-wait to a state of excitement in work and have been in town every day all about Government orders for war material. We had offered for the usual annual contracts at extremely low prices and lost a good many of them by being underbid when all at once the Government seemed to waken up with the fear of war[1] and have overwhelmed us with orders on our own terms provided we can give the goods in very limited time. Telegrams were passing all yesterday and we finally agreed to supply an almost impossible quantity of articles, over 200 tons of cloth, in four weeks. They have no other dependence but on our firm in time of need. Our tools are sharp, but I am full of fears that something may arise to prevent us keeping our promise. I have a great dread of our being driven into war and this action of the Government makes one rejoice with trembling.[2]

[1] Britain had opposed the treaty of San Stefano between Russia and Turkey by which Russian influence in the Balkans seemed dangerously strengthened. War was avoided by Disraeli's contrivance of 'Peace with Honour'.

[2] 'This action' was the treaty of Berlin, 1878, by which Austria and Britain pledged

3 August 1878

I have all along hoped that the end of the war would result in the opening up of a way to India by the Euphrates valley and the advance of a new and better civilisation in the old cradle of the human race, so long trodden under the heel of Turkey which has made a desert of Mesopotamia, once the country of the good Haroun al Raschid and now almost forgotten or treated as an ancient fable. I am writing with a deal of talking going on around. Try and arrange for a little holiday and come over and cheer yours ever truly.

9 November 1878

There was a meeting in Dundee to get up subscriptions for the sufferers by the Bank failure. Mr Dalgleish and I promised to give £250 each, which was repudiated as too small a sum and the meeting was adjourned to ask us to reconsider and increase. I declined to give any more and the collection is at a stand-still for the present. The position that I took up was that we were suffering from bad unremunerative trade and weekly reducing the wages of our work-people and of course they would criticise our giving away a large sum. Besides I think it premature to write down a large sum before it is seen what is needed and how the charity is to be expended.[1]

3 February 1879

I am glad to hear that your strike is ended and would that they were all so ended . . . I read with some amusement your cutting about the self-acting mill in Yorkshire. Surely it came originally from America, or is a cutting from the *Danbury News*. It beats Markinch by a long chalk. It is long since we had any great stride in the economy of manufacture by lessening the number of

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support to Turkey against Russian domination. Although Dundonians shared the popular British distrust of the Czar, they were less interested in his Balkan pretensions than in the effect of these upon trade in the Baltic.

[1] This letter refers to the City of Glasgow Bank failure. While not unfelt in Dundee, its repercussions there were not of great importance. James Cox wrote: 'I do not think the stoppage of the Bank will hurt – only a little temporary embarrassment in arrangements' (Letter-book, 3 Mar. 1878).

workers required in the textile manufactures of our country. It has been a marvel to me that the disposition to strike has not been met by new inventions. For my own part I am deeply engaged in petty details of economy. . . .

30 April 1879

I am allowing myself to be immersed in business and with hot hands over doing the thing. I have in hands or rather in head a few improvements that will pay and have begun to increase our working staff of mechanics, but not daring to demand fifty-six hours as yet. I sent a short paper on the durability of steam boilers to the Glasgow meeting of engineers and got a compliment and a vote of thanks for the same last week.

27 June 1879

Our holidays commenced last Saturday and ended yesterday. I mostly moped at home and, having little to do, did nothing except a good deal of groaning with the Tic.[1]. . .

28 August 1879

I am very sceptical about the gas engine superseding steam. It would be a grand thing for Dundee just now as there is a squabble going on about *coolers*, which means that all ponds are to be prohibited and users of steam are to buy water sufficient to condense all the steam used.

New Year's Day 1880

The Tay Bridge disaster is like a nightmare, hardly for speaking about yet.[2] It tells on everyone. The doctors say they have many patients suffering from nervousness.

16 March 1880

There is a great hubbub here about politics from which I stand aloof. The whole system of canvassing is to me an abomination and I think immoral. The elections will disturb the course of trade for the next few weeks and make a dull time.

[1] Common expression for facial neuralgia, often accompanied by muscle spasms or twitches in the face. Carmichael suffered the complaint for many years.
[2] The Tay Railway Bridge fell on 28 Dec. 1879.

31 March 1880

We are in the throes of the Election contest. I am disfranchised in Dundee having my abode beyond the bounds. Being a Burgess, and having a large stake in Dundee, it seems unfair that I should be deprived of a vote. But it has its advantages in keeping me out of the strife and clamour!

21 April 1880

A great calm in business has followed the animation of a few months ago. It has chequered our hopes. We have been too sanguine in our belief that Gladstone and the millennium would come in together. But the green fields are bonny and the hopes of the husbandman reviving. A good season would improve business all round.

About this time he was interested in the proposal of Mrs James Carmichael, his sister-in-law, that she and her family should go to New Zealand.

I rather approve of their going. She has four fine lads and a pretty girl to get settled.

22 May 1880

Aunt Ellen and her family who have been here on a farewell visit are to set out on their long voyage on the first or second June. Mrs David and her daughter, and Mrs George[1] and one of hers are to go to London in the steamer to see them off. 'Weep ye not for the dead, neither bemoan him, but weep sore for him that goeth away, for he shall return no more nor see his native country.'

27 June 1880

James is away for his holiday to France with his wife and children and I am in chief command, acting the part of tyrant at the works, doing it wittingly so as to show that James is pushed on from behind and that my hand is heavier than his. Men with fixed

[1] Mrs David and Mrs George were the daughters-in-law of Peter Carmichael's brother John, bleacher at East Mill, Baldovan, near Dundee.

salaries unless they have a good deal of the *carle hemp*[1] in them get lax and try to feather or make smooth their well-lined nests. I was hard at it all last week up to Saturday night. When trying to get home with the evening train I got into the midst of the excursion trains for Glasgow, Edinburgh, etc. It is long since I was in such a melee. My friend Peter Barron the wheel-greaser fought for a seat for me when a train did get to the station, but by that time the second train was due and there ensued a scene. Peter locked my carriage when the complement was in and kept the crowd at bay. When we were about to start, a despairing voice, holding on, cried in real Dundee 'Oh! can ye no manage a man and a woman'? I replied firmly 'No, we can't manage a man and a woman'. I got home late, but safe and thankful. Surely the railway people could manage a man and a woman better if they tried.

25 December 1880

I wish you a merry Christmas and a happy New Year – the old formula of the season, but none the less true or earnest. . . . You will have seen in the papers an account of the Noble Gift of £125,000 by Miss Baxter of Balgavies for founding a College in Dundee.[2] It has many sides and will cause much discussion before it takes permanent shape. It is only a small portion of her great wealth but it is a wise resolve to spend part of it in her life-time. The Dens Works have been better than a gold mine. One other view is the probable discontent likely to arise amongst the work-people as to their share in such vast wealth, which makes it difficult for those who have to guide the affairs in these bad times.

10 February 1881

An exhibition of Swan's electric light was made last night at a conversazione of the Naturalists' Society in Dundee. Three of our people were there and gave three differing accounts of it, good, bad or indifferent, but on the whole it seems as if one difficulty after another is being conquered. Mr White[3] who purchased the

[1] Carle hemp: the largest stalk of hemp; stubborn. Scots proverb: 'You have a stalk of carle hemp in you', spoken to stubborn boys (Jamieson, *Dictionary*).

[2] See above p. xxxiii.

[3] J. F. White, son of Alexander White, 1778-1847, a Dundee manufacturer who began

Balruddery property lately is extending the mansion house and has arranged to light it with Swan. The motion is to be got from water-power driving a turbine wheel.

24 March 1881

I duly received your letter of seventeenth current. How time flies! I had the same feeling about the Czar. Just about the time we got home from church and were sitting down to luncheon the fatal bomb had done its hateful work and the mighty had fallen in mortal agony. What a life of apprehension he must have led, dying daily. I hope no harm will come to the Prince of Wales or any other great ones at the funeral.

Clunes Lodge. 20 June 1881[1]

We are still living here, at least I am coming and going. The weather has not favoured us and we purpose clearing out on Friday. Our mill holidays commence on Saturday and I must be about.

The electric light seems to be making progress. If Professor Thomson[2] is right about the storing of the wonderful fluid one of the greatest obstacles will be removed. It is quite beyond my ken. I cannot understand it at all. I read Siemen's lecture in the *Times* and the leader on it. It is bold, but your idea was still bolder to make gas of all the coals burned in London and do away with London smoke and fog. I would much like a talk with you about these wonders. . . . This is the week of the Dundee Fair holidays. We have stood four days, but most of the works are standing all the week. I was in town and saw our *Peter Borrie* engine[3] started after extensive alterations. It has rained all day. Unfortunately I had given liberty to the Good Templars of Blairgowrie to spend

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life as a handloom weaver. Balruddery is a large estate in the foothills of the Sidlaws, some six miles from Dundee. The mansion house was recently demolished.

[1] This and the following two letters are to David Bruce Peebles.

[2] David Thomson, 1817-80, professor of natural philosophy, Aberdeen University; or Allen Thomson, 1809-84, professor of anatomy, Aberdeen and Glasgow Universities; or James Thomson, 1823-92, professor of civil engineering, Glasgow University (*DNB*).

[3] Peter Borrie was in business as an engineer at Tay Foundry, Trades Lane, Dundee, in the 1840s (*Dundee Directories*).

the afternoon and they have just departed after singing a few temperance hymns, hurrahing and quite happy!

Arthurstone. 12 September 1881

I read with interest the cuttings from the *Scotsman* and sent them on to Dr Ferguson[1] who is a strong *fair trader*. I am in a swither. No doubt *Free* trade is right in principle and will triumph in the end, but it is something like the question of peace and war as entertained by John Bright[2]. If all men were Quakers, it is right, and it will be right at the Millenium which is not yet. If foreign restrictive tariffs continue to extend as they have been doing of late, something will have to be done in self defence. The popular voice will speak and make itself heard.

I feel tonight as if I would like to crawl into a hole out of sight. I have not done half a day's work, yet am weary and heavy laden. It is want of sleep, and why should I trouble my friends with groaning. . . .

23 September 1881

Just a line to say that Mr Lowdon[3] and others are trying to get up a company for electric lighting of factories. In collecting statistics of the cost per burner per annum in the factories in Dundee for gas light they found that it varies from 4s. 9d. in the cheapest to 9s. 4d. in the dearest. We have 3,482 burners and paid for gas last year £678 5s. 4d. which is equal to 3s. 10¾d. per burner and I believe we illuminate our works as well as or better than most. We do not grudge light but we do hate waste.

Hotel Bristol, Rome. 18 January 1882

Yesterday afternoon we arrived here and have spent today in visiting old Roman remains, churches etc., till wearied out. Any

[1] Not identified.

[2] John Bright, 1811-89, radical politician, of Quaker stock.

[3] George Lowdon of Dundee had been associated with James Bowman Lindsay of Dundee in his early experiments with electricity (A. H. Millar, *James Bowman Lindsay and other pioneers of invention*, Dundee, 1925, pp. 83-94). Lowdon's firm became the first firm of electrical engineering suppliers in Scotland and perhaps the first in the United Kingdom (see *British Association Handbook and Guide to Dundee and district*, Dundee, 1912, p. 308).

attempt to describe the novelties I have seen would be out of the question. One thing jostles with another till it is a confused mass in my mind and I have come to the conclusion that we have attempted to do too much and it would have been far better for me to have spent my holiday quietly at Cannes or Nice.

The old Roman antiquities we have seen today far exceed my imagination of them from what I have previously conceived from writings and pictures. The Coliseum is more vast and imposing and carries one away in a day dream of the number of workers that must have been engaged, not only hand workers, but head workers. They say it was done by Jewish captive slaves. St Peter's is overwhelming at first sight but I soon had enough of it. A great many pilgrims were present from France and there was High Mass going on.

There is a great controversy going on between the Pope and the King and much stir of soldier play. They quote Victor Emmanuel's speech when he first got to Rome: 'Here we are and here we shall stay'; still the Pope has great power. . . . I wish I once again were sitting beside you for I am weary and wish our faces were turned homewards.

Arthurstone. 15 February 1882

. . . We were disappointed in not finding you at San Remo as we made a halt there for the purpose. We went direct from Marseilles to Paris where we got into cold weather and fog. We staid in Paris to see Robert[1] and his wife and then went direct to London leaving Rachel at Ailly with her mother. We found London in thick obscurity, very trying after so many weeks of warm sunshine, and hurried home by night mail. I have had cold and return of Tic but am pleased to be at home again, though kept very busy tying broken threads and unravelling tangled yarns. . . .

(Another letter, a little later.) I have been lying awake a good deal lately, partly with pain and a good deal with thick-coming fancies

[1] Robert Carmichael, son of James Carmichael, resident at Ailly, married Élie Guepratté, whose sister married Paul Cambon. Paul and Jules Cambon were French ambassadors in London and Washington. (See *Memoirs of Captain Liddell Hart*, London, 1965, i, 5.)

and shrinkings from anticipated evils, and it is not unpleasant to feel that I have sudden divine directions on subjects that I have long pondered over without seeing my way. . . .

Arthurstone. 27 June 1882

I am at home today, it being one of the Dundee holidays and 700 to 800 Roman Catholics with a convoy of priests and a band of music are enjoying themselves in the Pond Park and the four acre park. Other requests are coming in for the like privilege and it is not easy to decline others after the Roman Catholics. The chief constable has sent policemen, which I don't like, but hope they will not need to exercise authority.

28 October 1882

Our neighbour Sandeman's[1] tried the electric light in his weaving factory last Friday night. It was quite a failure and the Company admitted it and took away the whole apparatus. They hung the walls with white calico to help the diffusion but the lights and shadows only dazzled the weavers. . . . The Dundee Picture Exhibition is lighted with electricity and the diverse opinions as to its merits show no great success. One night this week when the rooms were crowded with lads and lasses they were suddenly in the position of Moses and it is said that uncommon noises and little shrieks were heard. Candles had to be got and the visitors shown the way to the door.

Arthurstone. 29 September 1883

I have let Mill o Camno, dear Drummond's farm, to a tenant who enters at Martinmas, in fact has entered now. It is a wrench but it was necessary as I could not attend to it. It is in perfect condition and pays an increase of rent. I have also a new tenant for my largest farm, West Ardler, and have promised to put it in first-rate order which I am pleased to do, but it cannot be done without personal attention and more time than I can well spare. . . .

[1] Colonel Frank Sandeman of Manhattan Works, Dundee, was a descendant of William Sandeman of Luncarty, a pioneering entrepreneur in the bleaching industry (Enid Gauldie, unpublished thesis on Scottish Bleachfields, in Dundee University Library). Manhattan Works was opened on 15 July 1874 and named because the firm was 'specially interested in the requirements of U.S. where large quantities of their production was sent' (extracts at Jute Industries Ltd from early records).

Bath Hotel, Bournemouth. 15 December 1883

We arrived here yesterday afternoon, rather wearied with the long journey. We went to Edinburgh on Thursday afternoon, having engaged a Pulman car for the night journey to London. We left at 10.20 and turned in as soon as the conductor had made up the beds. It was case-packing. It was my first experience of this mode of travelling and I would rather travel by day. . . . The Great Northern is said to be the smoothest line but I found it *rather* rough on P.C. It whiles wagged away from side to side like the pendulum shake of a strong hand, then it changed to the pump handle shake – up and down bumps and anon mixed the two together in indescribable confusion. It was fine moonlight and I managed to pass the time but was glad when the day dawned and Kings X was reached. After two hours we took to the train again for Bournemouth. The country, with the exception of a few oases, seemed a desert – scrubby trees, pools of water, brown heath and withered ferns with very few habitations and very few inhabitants. . . . We are in a comfortable house, the master and mistress and several of the servants being kindly Scotch folks. . . .

Arthurstone. 20 January 1884

Speaking of weddings, my niece Rachel Carmichael is to be married on the fourteenth of February to a French Protestant gentleman. I wish he had been English, or more desirable still, Scotch. This is the third Rachel within a year and they make a hole in my purse.

Arthurstone. 24 April 1884

My time is much occupied. Mr Dalgleish is in London and James and his wife are in France having a month's holiday, so I have to be in town every day and I am much pleased to be able to work and resume duties which to a considerable extent have been left to others for a good while past.

The burning of Belmont Castle stirred us up a good deal. We got information very early and I got into the carriage and galloped off, having ordered the fire engine and brigade to follow quick. They put the engine into a small cart and Captain the

white work-horse made a rare run. Mr and Mrs Low and two boys were with us till yesterday. Burnt out of house and home, they had no place to lie down in. It is a lesson and a caution.

Arthurstone. 4 June 1884

I agree with you about American investments and can remember Sydney Smith's compliments to Philadelphia on a similar break-up,[1] but I am very sorry for some of my dear friends who are victims.

Arthurstone. 21 June 1884

I am at one with you about the Oregon affair.[2] I avoid being a *Director*. At least I would only be so on the footing which is thought to be necessary in a prophet. I am asked to be a patron for scores of things – cricket clubs, swimming clubs and yesterday a cycling club. I decline as it would soon be found that I was 'a patering body'.

Arthurstone. 24 August 1884

When writing about the books for the Ardler School library would you ask if the bookseller has an old edition of the life of Benjamin Franklin with 'Poor Richard's Almanac' bound up along with it. It was one of the earliest books that I remember reading and it is lost.

Arthurstone. 6 September 1884

I thank you for the trouble you have taken on my behalf about the Jacob Abbott literature and I hope the books may be useful to some of our youths so that they may leave some footprints on the sands of time. But tastes change and the old order gives place to

[1] One of Sydney Smith's last publications was a petition to the U.S. Congress in 1843, followed by letters in the *Morning Chronicle*, accusing Pennsylvania of faithlessness in suspending payment of interest on its bond (*DNB*).

[2] Thomas Cox was one of a number of Dundee shareholders in the Oregonian Railway Company, the repudiation of whose lease involved many small investors in loss. Money was raised in Dundee to take the case to arbitration. The Supreme Court at Washington did not reach its adverse decision until March 1889. Another company, the Oregon and Washington Investment Company, which later amalgamated with the Dundee Mortgage and Trust Company, prospered. (Thomas Cox's obituary in *Dundee Year Book*, 1892.)

the new. The popular literature of one generation gets to be 'stale, flat and unprofitable' to the next.

Your kind friend Mr Robertson called on me yesterday and prevailed on me to give him a small sum. I am not sure about the policy of multiplying sects in Italy.[1] Mr M'Dougall was with us last week and speaks very favourably of his success. I think he is too hard on the Pope. The time seems to be drawing nigh when all who have the fear of God should band together to resist the incoming tide of unbelief in God and in a future state of reward and punishment. . . . November comes in gloomy enough, though, to many poor people out of employment with little prospect of work or wages and we can hardly help feeling for them. We have foreseen the bad time coming in our trade for a long time, but one does not like to croak.

Arthurstone. 6 December 1884

I am purposing going to town this afternoon to hear Stanley,[2] having joined the Geographical Society in the hope that good will come to commerce, civilisation and religion from the opening up of new countries. I have a pretty considerable investment in Panama canal shares from the same romantic feeling.

[There follows a long section dealing with Peter Carmichael's building of a church at Ardler, near Meigle, in memory of his son, Drummond. The narrative is resumed in 1885 at the time of a movement among Baxters' work-people, particularly those men who had once attended the works school, to mark Carmichael's fifty years at their head.]

He was surrounded by much kindly feeling and regarded with gratitude, admiration and respect. He had long been so, but for some time there had been growing up among his work-people a desire to give expression to their feelings towards him in some tangible form. They knew however that if this were done, it would have to be done delicately. In the summer of 1885, a beginning was made by a few of

[1] Carmichael was rather in advance of his time in condemning the multiplication of sects at a period when Britain's policy was to support any resistance to papal authority.
[2] Sir Henry Morton Stanley, explorer, 1841-1904.

the old scholars forming themselves into a committee to consider how the desired object might be attained. They agreed that the best things to do first was to lay their proposal before Mr Dalgleish. He gave it a cordial approval and advised them to make sure first that they could successfully carry out what they proposed and then to lay their wishes before Mr Carmichael himself. Thus encouraged, the committee was enlarged by representatives from the various departments, and means were taken to ascertain the minds of the workpeople generally. As soon as the proposal was known, it at once met with a hearty response from upwards of three thousand of the workers. A deputation from the committee then waited upon Mr Carmichael and asked him to allow his portrait to be painted in oil. They went with some fear and trembling; but they were kindly received, and after learning the object of their visit, he sat in silence for some time and then said: 'It is beyond my power to refuse your request and I feel keenly the high compliment you are paying me'. The deputation left with gladdened hearts, and the committee made the needful preparations for carrying the proposal into effect.

The painting of the portrait was entrusted to Robert Herdman RSA and in the end of October Mr Carmichael went to Edinburgh and gave the Artist the necessary sittings.[1] Referring to these, he wrote:

> I sat yesterday from half past ten till a quarter past two and was very wearied. The weather is bright and all that could be desired for the sittings. Mr Herdman is very pleasant company. At the rate he is progressing it will be the end of next week before he can finish.
>
> The portrait progresses. I have another sitting today being the fifth this week. I am no judge. On Wednesday it was like Sir David Baxter; yesterday it was like James Watt. A few touches change it entirely. I shall be glad to have it finished and get away home again.

The portrait was presented at a social meeting in the Kinnaird Hall on Christmas evening. The meeting in itself was a hearty com-

[1] Robert Herdman, 1829–88, distinguished water-colourist and portrait painter, ARSA 1858, RSA 1863.

pliment. There was not room for all who wished to be present but more than 1800 were there. On the platform Mr Carmichael was surrounded by his partners and the managers and a few other friends, who shared with him the pleasure of looking down on the happy company whose faces beamed with an expression of contentment, gratitude and good-will. It was a proof of the happy relations that subsisted between masters and servants, and it was moreover a tribute to law and order, for the discipline of the works though not severe was rigid and the people felt that they were under a government firm as well as wise. He had not sought their favour; yet he had won their respect and gratitude, not only by his inventive genius and faculty of organization, but by his urbanity and joyfulness, his wide human sympathy and his forgetfulness of self in seeking the good of others, and it added to the honour done him that the expression of their appreciation should have been given at a time when trade was in a depressed condition. The meeting was presided over by Mr Dalgleish. . . . In course of his address, Mr Dalgleish said:

> In Mr Carmichael's presence I feel I cannot say much that might and otherwise ought to be said. But there is the less need for entering upon details, because I am addressing an audience that is fully conversant with the facts. We all know how warm an interest Mr Carmichael has taken in the health, the comfort and the welfare of the workers in all the departments of the works and how much he has done by many well-considered and efficient methods to promote these objects. But in no department has he shown a deeper interest than in the school. For myself I cannot claim to have been a pupil in Dens Works and I therefore forfeited the pleasure of being a contributor. But I have enjoyed the pleasure of being associated in partnership with Mr Carmichael for more than thirty years and I will only say that this long and close and constant intercourse has only served to deepen and strengthen my feelings of esteem and confidence and reliance. . . .
>
> And now I will conclude by saying that while we are most highly pleased to have got in so very gratifying a way, a likeness of Mr Carmichael, which, I have no doubt you will find does

justice to the subject and credit to the artist, we will all heartily unite in the hope that we may long enjoy the kindly and genial presence of the original.

The hearty applause which followed was as if all the people said Amen.

The presentation was made by Mr Donald McIntosh, a venerable manager who paid Mr Carmichael the highest form of flattery by many years of unconscious imitation till he had grown to look like his *alter ego* or second self. After returning the Committee his sincere thanks for the honour conferred upon him, he said:

Mr Carmichael, I have now the pleasure of presenting to you, in the name of the subscribers, this portrait, and we trust that you will accept it, not merely because of its intrinsic value as a striking likeness and work of art, but because it is the outcome of widely diffused feeling of respect and affection toward you – the natural consequence of the devotion of a long life to the moral and material well-being of others. It is now nearly fifty-four years since I entered Dens Works. We were then young men; now we are among the patriarchs and we have seen many changes in the establishment which during all that long period has been dear to us. Some of these changes have been of the saddest kind inasmuch as we have witnessed the removal by death of many who were closely associated with us in our daily labours. But, sir, those of us who have been any length of time associated with you can testify – and none better than myself – to the steady and earnest manner in which you have devoted your energies to the development of Dens Works and to your increasing interest in the welfare of all those connected in any capacity with them. This meeting and this presentation are an inadequate recognition of your labours and virtues. The picture however will be a treasure to all of us, and recall to many the beloved features of a friend, and we hope that you may yet have many happy days to go out and in amongst us in the assurance of a full continuance of the respect and affection of which this gift is the expression. Sir, I have now the honour to present you with this portrait which bears the following inscription:

Peter Carmichael Esquire of Arthurstone
Senior Partner of the Firm of Messrs Baxter Brothers & Company
Dens Works, Dundee.
Subscribed for
by upwards of 3000 of the workpeople
in appreciation of his inventions in machinery
& his many appliances for the lightening of labour
In grateful acknowledgement also of
his manifold acts of benevolence
& of the interest he has uniformly taken
in the prosperity & welfare of the people
in the advancement of young men
& more especially
in the education & moral training of the young.
Painted by
Robert Herdman RSA.
Presented 25th December 1885.

On the unveiling of the picture, the delighted audience greeted the portrait with enthusiastic applause and general admiration.

As a work of art it is a good example of the latest period of the amiable and cultured artist whose career is marked by his 'Excelsior', 'La Culla' and his 'Charles Edward seeking shelter'. As a likeness it was at once recognised by all, the face, figure, attitude and manner being strikingly characteristic. And it is very like, though not perfectly so. There are shades of expression that belong to the face awanting. There is in it the cast of deep thoughtfulness and the touch of sweet sadness that Herdman was quick to detect and loved to portray, but we miss the slumbering strength that lies there. In the attitude too there is the calm repose of manner that is essentially characteristic, but not the activity that was *toujours prest*. Still it is a portrait full of character.[1]

On rising to accept it, Mr Carmichael was greeted with an enthusiasm surpassing that which the revelation of the likeness had drawn forth. He said:

[1] An engraving of the portrait was made by James Ford, RSA, and a copy of this engraving, from the *Jute and Flax Machinery Advertiser*, 1891, is reproduced as the frontispiece of the present volume.

Mr Chairman and dear friends, I am almost overcome with emotion when I look around me and see so many kind faces. You all know that I am not a man of many words and I hope you will be as quiet as possible, else you will not hear the words I am to address to you. I have listened with varied feelings to the complimentary remarks made by my esteemed friends. The kind words they have used I feel very much and it would be affectation in me to say that they are not highly prized. Not the least part of the pleasure I have in this gift is that you have chosen Mr McIntosh, who is such a loyal and faithful friend of the firm, to present it.

When this matter was first named to me I was taken by surprise and was disposed to decline the honour, but I found that arrangements had progressed so far that they could not be stopped and after reflection I found the compliment to be so great and your kindly feelings towards me so gratifying that I could not do otherwise than agree to your wishes, although rather reluctantly, fearing that the long sittings the painter would require would be irksome. Instead of being so, I found Mr Herdman a most pleasant companion, both wise and witty, making the time pass pleasantly with his lively conversation.

After these few remarks I have now to say that it gives me pleasure to accept your valuable gift, which I trust will perpetuate the good understanding which at present exists and has so long existed between the partners of the firm of Baxter Brothers and Company and their workers. To show that this is no transient feeling of yesterday I will read to you the inscription on the painting in our schoolroom which most of you have seen. It reads thus: 'Portrait of William Baxter Esquire of Ellengowan, painted by desire at the expense of the workpeople at Dens Works, as a testimony of their esteem of his benevolent character and moral worth and presented to him at the opening of the new school erected by Baxter Brothers & Company at Dens, Dundee, 1841'. This school-room of 1841 was found to be too small as the works continued to be extended, and in 1858 the present school in Crescent Street was built and occupied and, being in an airy open place with a large playground, it is conducive to the health and happiness of the young people. We are greatly indebted to Mr Strachan and his staff of teachers for the admirable way they carry

out the teaching and discipline of the school. I must not forget to mention the good work done by Mr James Brown, who has for nearly twenty years superintended the Sabbath evening school assisted by Mr Proudfoot and other excellent teachers, some of whom are amongst our best workers.

I now turn to the managers and overseers, many of whom have grown grey in the service and you may judge of the satisfaction it gives me to-night to be surrounded by such a number of men, who have been like familiar friends for so many years. It has ever been with us a matter of grave consideration to choose the most suitable men to fill responsible positions in the works and it has always given us pleasure to reward by promotion young men who have been trained amongst ourselves. The natural consequence of having good men as managers and overseers has been that they have chosen good and respectable workers; and we have reason to be proud of the girls who have been trained and educated by our firm. They are noted for making good wives when they leave our employment to become the mistress of the house where love and labour go hand in hand.

I now say a few words more personal. It is fifty-two years since, as a boy, I entered on the duty of manager of these works which consisted at that time of two mills at Lower Dens and one in course of erection in Princes Street. From this small beginning they have extended to what you now know.

Then, after giving the idyllic picture of his father's house and gardens and the surrounding district already sketched in his [Autobiography] he continued:

As regards my own work, it has been a labour of love all these years and it has been my rare good fortune to be associated in business with such men as the late Sir David Baxter and my esteemed friend William Dalgleish. I take it upon me to say that our junior partners will maintain and carry out the same kindly spirit towards their workers that has been the policy of Baxter Brothers and Company in past years.

I thought some years ago that it was time for me to retire from active duty, but God has been very good to me, giving me

length of days, kind friends and ability to work, and I determined to continue, especially as trade was bad and it might be in my power to do something to help to keep in employment the workers depending on us. I have in these latter days found that many things which I thought were nearly perfect can be greatly improved and that there are improvements lying before us which will give employment to the inventive genius of younger men for many years to come. I take this opportunity of saying to our young men that the improvements of the future appear to me like climbing one of our lofty mountains. You think the height before you to be the summit, but on arriving there, another height comes into view, to attain which fresh energy and effort are required. It does not do to rest content with the lower height, but the journey upwards, higher and higher, must be continued. It is this continuity of purpose which is generally successful. In conclusion I hope that the youngest among you may see the continuance of the firm of Baxter Brothers and Company and that prosperous times may soon come round again to employers and employed. Again I thank you for the precious Christmas gift you have so kindly presented to me and I wish you all a happy New Year and many of them.

Between the addresses, glees and part songs were sung and one of the most pleasant parts of the programme was a varied selection of songs by a choir of half-timers. A poetical address was also read by Mr David Craig, the Convener of the Committee. In pithy couplets which were heartily applauded, it described the portrait and their joy in having their master himself with them that night. Then it ran into a few reflections and closed with the following lines:

But poet Burns is not our theme,
We're jottin' of Carmichael's fame;
Though here his triumphs to rehearse
Is not the purpose of our verse
Still we must not omit to mention
Our thanks for his kind condescension;
In lettin' 's get his portrait taen
It gratifies us ev'ry ane.

'Twill gratify us a' still mair
Gin Providence long shall him spare
In health and strength to guide the spinnin'
And keep our wheels and shuttles rinnin'.
We ken it's now no easy matter
To keep our heads abune the water;
It taks wise heads and skilfu' plans
To haud aye wark among our han's
Lang may he live to us a blessin'
His skill, our care and labour lessen;
The picture, be to him a pleasure,
By us 'twill be esteemed a treasure,
To hang high on the walls of fame
An honour to Carmichael's name.[1]

[1] Peter Carmichael died on 6 May 1891, aged eighty-three.

GLOSSARY

beaming the winding of a warp prior to weaving on to a warp beam in such a way that even distribution and tension of threads are ensured

breaker card a carding engine specially constructed and openly set in order to prepare the material for the true card q.v., which follows

calendering heavy continuous pressing under heat in machines which are a combination of steel and cotton or paper-covered cylinders

camb the eyelet of the heald, q.v., through which the warp thread is passed

canvas an open, plain weave texture produced from hard twisted yarn

cards wire brushes used in pairs to comb out and set in order the fibres of hemp, etc.

codilla short coarse fibres discarded by the first process of preparation of flax

cone wooden holder for flax

cop conical ball of thread wound upon a spindle

doffer a young person whose duties are the removal of full bobbins from spinning frames and the assembling of empty ones in their place; in Dundee more often called a 'shifter'

doffer cylinder on a carding machine, an important roller, covered with filleting or pinned leather sheets, which moves slower than the swift, q.v., and clears it at each revolution

dresser operator employed in dressing the warps delivered in ball form on to the loom beams

dressing preparation of the warp previous to its being placed in the loom, consisting in evenly distributing the threads over a given space

duck a heavy, plain weave fabric, the best quality of which was used for tropical suitings, the heaviest for tentings

green term used to describe unbleached yarn or cloth

grey term given to yarn as it leaves the spinning frame or to a woven fabric upon leaving the loom

hank a bundle of reeled yarn of a suitable length for handling in bleaching or dyeing

heald, heddle an apparatus consisting of two wooden shafts with cords and mail, q.v., in the centre, a series of

heald, heddle—continued
which control the warp in weaving

hear, hier sixth part of a hesp or hank of yarn, or twenty-fourth part of a spyndle, q.v. (Jamieson, *Dictionary*); 240 threads, or rounds of the reel, each of them 91 inches long (*Old Statistical Account of Scotland*, iv, 19)

heckle to dress flax, to comb the rough mass of fibres into suitable individual lengths ready for spinning; or the toothed comb used in dressing flax

jacquards a combination of engine and harness employed in weaving figured fabrics

lapper folder, person who made the woven cloth into bales for market and was responsible for measuring the yardage in each bale

lea the divisions into which a hank is tied during the operations of reeling

mail an eyelet of brass or steel, suspended midway between the heald shafts by the heald cords, through which warp threads pass

milling a process in bleaching involving the application of friction and pressure to fabric whilst in a soapy and moist condition

osnaburgs coarse linen cloth manufactured in central east Scotland in imitation of that at first made in Osnabrück, Germany

pick a single strand of weft reaching once across one piece of cloth

picker the instrument used to separate the 'picks', made of buffalo hide until the extinction of the American buffalo herds; hence the trade, listed in some Dundee directories, of 'buffalo picker maker'

pin bobbin on which yarn was wound

reed that part of the loom, usually made independently of the loom by means of which the threads are distributed evenly, usually consisting of two baulks with a definite number of reed wires held between them

reel, reeling box, reeling machine machine used in bleachfields on which hanks of yarn are hung and moved through bleaching liquor, and consisting of a series of removable, white enamelled posts, which are slotted horizontally into a frame which can be lowered and moved backwards and forwards by means of levers and gears in the bath of bleach over which the apparatus is hung

retting dissolving or softening of the natural gum in the straw of the stem of flax and kindred plants

rock a distaff; or the flax placed on a distaff for spinning

rove a sliver of flax, etc., drawn out and very slightly twisted

scutch wooden instrument for dressing flax and hemp

sett the number of warp threads per inch

sheetings plain two and one twill or two and two twill cloths

shifter the operative who removes full bobbins from spinning frames and replaces them with empty ones; see *doffer*

shives refuse of flax or hemp

silesias originally a plain weave cloth, now more often twill

sizing impregnating yarn with adhesive compound with the object of laying down the exposed ends of fibres protruding from spun thread, thus strengthening the yarn to withstand the strains to which it is subjected in weaving

spyndle 14,400 yards of jute yarn

swift the largest cylinder in the carding machine, which in connection with others works the material submitted to it and delivers it to the following, more closely set, cylinders; term also used of wheels for winding yarn

enter attendant at loom; in Dundee a sub-foreman, always male, with oversight of a number of power looms

terry towelling in which the action of the reed in weaving forms loops in the warp

thrums term used for waste made when starting a warp during weaving

trap a weaver's term for a smash or breaking down of a number of warp threads caused by some irregularity in the loom during weaving

twill an interlacing effect running in a diagonal direction across the piece, which makes a fabric heavier and more compact

twisting the binding of fibres into a yarn to add to its strength

warp a series of threads placed longitudinally in the loom

warping mill a cylindrical framework round which threads required to form the warp are wound and from which they run directly on to the loom beam

weft the series of threads which pass from selvedge to selvedge of the cloth and are known as picks, put into the

weft—continued
fabric by means of the shuttle, weft yarns being usually on smaller cops, q.v., and being softer spun than warp, q.v.

wharve the whorl or fly-wheel on a spindle

winding frame an apparatus consisting of spindles which drive the bobbins to be filled and which draw forward the material to be wound on to these bobbins

worker the roller on a carding machine which works in conjunction with the swift in opening and combing the fibrous mass of flax presented to it

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SCOTTISH HISTORY SOCIETY

THE EXECUTIVE

1968–1969

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Chairman of Council

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MEMBERSHIP

Membership of the Scottish History Society
is open to all who are interested in the history of Scotland.
For an annual subscription of £2 2s. or $7
members normally receive one volume each year.
Enquiries should be addressed to
the Honorary Secretary or the Honorary Treasurer.

NEW OFFICE-BEARERS
(from December 1969)

Chairman of Council

RT REV. MONSIGNOR DAVID MCROBERTS, STL, FSA

Honorary Secretary

T. I. RAE, PH D
National Library of Scotland,
George IV Bridge, Edinburgh EH1 1EW

REPORT

of the 82nd Annual Meeting

The 82nd Annual Meeting of the Scottish History Society was held in the Rooms of the Royal Society, George Street, Edinburgh, on Saturday, 7 December 1968, at 11.15 a.m. Professor G. W. S. Barrow, Chairman of Council, was in the Chair.

The Report of Council was as follows:

It is with great sorrow that the Council records the death, on 9 October 1968, of the President of the Society, W. Douglas Simpson, C.B.E., D.LITT., LL.D., F.S.A. His services to the Society in this office came at the end of a long and distinguished career. Although his official profession was librarianship and he was Librarian of Aberdeen University for forty-seven years, he was even better known as a historian and archaeologist. To a remarkably wide-ranging fund of knowledge he added the capacity to communicate his enthusiasms to others. Members will recollect with pleasure the two addresses which he delivered to the Society during his regrettably short tenure of the office of President. At the time of his death he was already preparing his next address, on the subject of 'Sir Hugh Campbell of Cawdor and the Lord's Prayer'. That this must remain undelivered is a reminder of the Society's loss. The Council has extended on behalf of the Society sincere condolences to Dr Simpson's widow and daughter.

The Council will propose to the Annual Meeting that Professor Gordon Donaldson, D.LITT., of Edinburgh University, be elected to fill the vacancy in the office of President. Professor Donaldson has already served the Society in several capacities: as editor of *Accounts of the Collectors of Thirds of Benefices* (1949), as a member of Council from 1956 to 1960, as Joint Secretary from 1962 to 1964, and as Chairman of Council from 1962 to 1965. He is widely known throughout Scotland for his many books and his lectures and has brought a notably high standard of scholarship to his studies of church and state in the sixteenth century, the history of Shetland and many other topics.

The fourth volume of the Fourth Series, *Court Books of Orkney and Shetland, 1614-15*, edited by Dr R. S. Barclay, was issued during the year. In the Northern Isles this volume has aroused particular interest and has brought to the Society a number of new members from that area. The next volume, *Minutes of Edinburgh Trades Council, 1859-73*, edited by Mr Ian

MacDougall, is entirely in proof and will be ready for issue about the end of the year.

The volume for publication in 1969 will be *The Dundee Textile Industry, 1790–1885, from the papers of Peter Carmichael of Arthurstone*, edited by Mrs Enid Gauldie, the contents of which were described in the last Annual Report. The Council is confident that this volume will not only reveal the striking character of a significant nineteenth-century industrialist but will also illuminate several neglected aspects of the economic and social history of that era. The Society is much indebted to Major P. O. Carmichael of Arthurstone, one of its own members, for permission to publish this manuscript from his family archives.

The Council is glad to announce that during the year the Society has received two very considerable benefactions. The Leverhulme Trust has made a grant to the Society of £1,500 towards research and publication expenses on *Sutherland Estate Papers, 1780–1820*, which is in course of being edited by Mr R. J. Adam and Mr A. V. Cole. This generous award will permit fuller publication of a group of estate records which the Council conceives to be of first-rate importance. The material will be published in two volumes, which will be issued together in respect of one year's subscription. Their provisional publication date is 1971. As was announced at the last Annual Meeting, the Society has also received a gift of £500 from an anonymous donor. The Council wishes to express its warmest thanks for this large donation, which will greatly benefit the programme of publications. A further gift of 15 guineas, from another anonymous donor, is also recorded with gratitude.

Two new titles have been added to the list of items in preparation, which now includes a total of fifteen volumes. Mr R. W. Munro and Dr Jean Munro are preparing an edition of *The Charters of the Lords of the Isles, 1354–1493*. Approximately eighty charters are known and the work will draw together widely scattered texts, which will provide a documentary check on traditional sources. This collection of the formal deeds of the greatest baron of the western seaboard in the later middle ages will be an important contribution to early Highland history and a continuation from the four volumes of *Highland Papers*, edited for the Society by Sheriff J. R. N. Macphail between 1914 and 1934. The Council has also accepted for publication a volume on *Ninian Winzet at Ratisbon, 1577–89: letters and papers from the archives of the dukes of Bavaria*, to be edited by the Rev. Mark Dilworth, O.S.B. These documents relate to the dealings of the dukes with the abbey of Ratisbon during the period of Winzet's abbacy, when he was engaged in raising the standard of religious life and teaching of the monastery. The

material throws light on the general religious situation among Scots at home and abroad in the generation after the Reformation and touches on the diplomatic activities of Mary, queen of Scots, and the career of Bishop John Leslie. The volume will provide unusual insight into the way of life of a colony of expatriate Scots in a German city.

Kraus Reprint has now publicly announced its programme of reprinting which covers the Society's First, Second and Third Series, and has already received a number of orders for sets. According to present plans, reprints of the First Series will be available by Spring, 1970. Members are again reminded that it is to their advantage to purchase back volumes now, at the present cost of 30s. each (plus cost of postage and packing), as the price of reprints will be greater. An up-to-date list of volumes available will appear at the end of *Minutes of Edinburgh Trades Council*. Enquiries regarding back volumes should be directed to the Honorary Treasurer.

In March, 1968, the Council presented to the Secretary of State for Scotland its views on the Local Authority Records report produced by a Committee under the Chairmanship of Mr James McBoyle. The Council considered that the Committee's recommended system for the care of these records was too fragmented to work effectively and would be dangerously impractical; and that records kept as the Committee envisaged, that is in local libraries, could not be as secure as those kept in repositories designated and staffed for that purpose. The Council therefore adhered to its original recommendations presented to the Committee, namely that regional archive repositories should be established under the joint authority of the Scottish Record Office and the combined local authorities of the region.

Members of Council who retire in rotation at this time are Professor J. D. Hargreaves, Dr William Ferguson and Mr R. W. Munro. The following will be proposed to the Annual Meeting for election to the Council: Professor A. A. M. Duncan, Dr I. M. M. MacPhail and Mr John M. Simpson.

During the past year seven members have died, four have resigned, and two have been removed from the list for non-payment of subscription. New members numbered 118. The membership, including 205 libraries, is now 664, as against 559 in 1967. The Council is gratified to report that this is the largest number of new members ever to join the Society in one year and that the total membership is the highest in the Society's history. These record figures are very welcome at a time when increased postal charges and further rises in printing costs are causing extra pressure on the Society's finances. Members are urged to continue efforts to bring in new recruits. For this purpose membership brochures may be obtained from the Honorary Secretary or the Honorary Treasurer.

At the commencement of the meeting the Chairman spoke of the loss which the Society had sustained by the sudden death of the President, Dr W. Douglas Simpson, whose rare combination of the gifts of enthusiasm and the power to convey technical knowledge had enabled him to render outstanding service to the study of Scottish history and archaeology both as a scholar and as an expositor. He then proposed Professor Gordon Donaldson as the new President of the Society. This motion was seconded by the Honorary Treasurer and enthusiastically concurred in by the meeting.

In presenting the Annual Report the Chairman commented favourably on the steady upward trend in membership, which had passed the total previously reached by the Society, although the number of individual members (as opposed to libraries) was still less than that of the 1920s. He observed, however, that when an English local body such as the Northamptonshire Record Society can produce a membership of about 1,300 it was surely possible for our Society to reach a total of appreciably more than 700 members. In regard to publications he said that it was a welcome development that the difficulty was now not starvation but a tendency to surfeit. Fifteen volumes were already on the list as accepted and a number were well ahead towards completion. But while it was on balance far better to have to soothe eager editors who would like to have their volumes appear without delay than to be short of editors, the situation was not without its anxiety for the Honorary Treasurer. Inflationary costs were always catching up with the Society and the regular income only just covered the cost of the annual publication. He spoke of the interest likely to be aroused by immediately forthcoming volumes such as *Sutherland Estate Papers* as a hopeful source of new members. Scots in Scotland, he said, are more preoccupied now with the future of their country than they had been for a long time in the past. It is important that it should not become established in people's minds that this concern has nothing to do with history. When we take the measure of our ancestors, for good or evil, we always have ourselves in mind; and thus history is directly related to both the present and the future. The historian has no need to be an escapist; indeed, so far as he is one, the less he is of a historian. The Society should be an antidote both to myth-makers and myth-revivers and to those who wish to wipe the slate clean. We cannot abolish history even if we wished to; and we would do better to make ourselves familiar with it than to fear it and attempt to reject it.

The adoption of the Annual Report and Accounts was proposed by Mr John M. Simpson and seconded by Miss Margaret D. Young and they were duly adopted.

Dr T. I. Rae proposed for election to the Council Professor A. A. M. Duncan, Dr I. M. M. MacPhail and Mr John M. Simpson. This was seconded by the Rev. Dr Duncan Shaw and they were duly elected.

Professor A. A. M. Duncan then read a paper on 'A medieval murder' and the proceedings closed with a vote of thanks to the speaker proposed by the Chairman.

ABSTRACT ACCOUNT OF CHARGE AND DISCHARGE OF THE INTROMISSIONS OF THE HONORARY TREASURER for the year 1st November 1967 to 31st October 1968

I. GENERAL ACCOUNT

CHARGE

I. Cash in Bank at 1st November 1967:		
1. Sum at credit of Savings Account with Bank of Scotland		£20 2 2
2. Sum at credit of Current Account with Bank of Scotland		137 3 9
3. Sum at credit of Savings Account with Edinburgh Savings Bank		52 11 9
4. Sum at credit of Special Investment Account with Edinburgh Savings Bank		284 7 10
		£494 5 6
II. Subscriptions received		1,444 11 6
III. Donations		523 2 0
IV. Past publications sold (including postages recovered from purchasers)		506 3 3
V. Interest on Savings Accounts with Bank of Scotland and Edinburgh Savings Bank		35 0 5
VI. Grant from Carnegie Trust		250 0 0
VII. Grant from Leverhulme Trust		750 0 0
VIII. Income Tax Refunds (1966-67, 1967-68)		198 2 5
IX. Sums drawn from Bank Current Account	£3,951 0 0	
X. Sums drawn from Bank Savings Account	£200 0 0	
		£4,201 5 1

DISCHARGE

I.	Cost of publications during year (*Court Books of Orkney and Shetland*)		£1,098 2 8
	Postage of Volumes		38 18 10
	Cost of printing Annual Report, Notices and Printers' postages, etc.		84 14 10
			£1,221 16 4
II.	Payments in furtherance of forthcoming publications		5 5 0
III.	Miscellaneous Payments and refunds of subscriptions		138 1 2
IV.	Brochures and stationery		85 17 9
V.	Sums lodged in Bank Current Account	£4,009 2 11	
VI.	Sums lodged in Bank Savings Account	£2,592 1 11	
VII.	Funds at close of this account:		
	1. Balance at credit of Savings Account with Bank of Scotland	1,888 4 2	
	2. Balance at credit of Current Account with Bank of Scotland	58 2 11	
	3. Balance at credit of Savings Account with Edinburgh Savings Bank	53 17 9	
	4. Balance at credit of Special Investment Account with Edinburgh Savings Bank (Leverhulme Trust Fund)	750 0 0	
			2,750 4 10
			£4,201 5 1

II. DR ANNIE I. DUNLOP SPECIAL FUND ACCOUNT

CHARGE

I. Cash in Bank at 1st November 1967:		
1. Sum at credit of Savings Accounts with Bank of Scotland		£777 17 11
2. Sum at credit of Current Account with Bank of Scotland		19 6 0
		£797 3 11
II. Interest on Savings Account with Bank of Scotland		29 15 10
		£826 19 9

DISCHARGE

I. Sums lodged in Bank Savings Account	£29 15 10	
II. Funds at close of this Account:		
1. Balance at credit of Savings Account with Bank of Scotland	£807 13 9	
2. Balance at credit of Current Account with Bank of Scotland	19 6 0	
		£826 19 9

EDINBURGH, *15th November 1968*. I have examined the General Account and Dr Annie I. Dunlop Special Fund Account of the Honorary Treasurer of the Scottish History Society for the year from 1st November 1967 to 31st October 1968 and I find the same to be correctly stated and sufficiently vouched.

C. T. MCINNES
Auditor