The Railway Navvy—a reassessment

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In the ninety years preceding the outbreak of the First World War, the construction of over 23,000 'route' miles [1] of line provided work for the navvy in railway building somewhere in the United Kingdom. Certain periods, such as the late 1840s when the 'Railway Mania' collapsed, saw a catastrophic decline in the demand for labour and, by the final decades of the nineteenth century, the navvy was compelled to find an increasing proportion of his employment in the fields of dock and reservoir construction. Nevertheless, no time in that century proved as bleak as was the depression of the early 1930s when seasoned navvies in London competed for the job of excavating the pedestrian underpass from Paddington main line station to the underground system in 1932 [2].

Evidence in the Records of Parliament

In the course of the nineteenth century, the navvy and his masters changed the face of rural Britain to an extent unequalled by any other group except, perhaps, for the diverse interests behind the Enclosure Movement. In view of their importance to the Victorian economy, it is incongruous that so little information on this body of men appears in contemporary official records.

Their existence is, for example, virtually ignored in that voluminous enquiry the Royal Commission on Labour of the 1890s. Earlier, in 1839 and 1840, Parliament had requested railway companies to provide information on the deaths and injuries suffered by labourers at work in building. A few companies, amongst which was the Great Western, responded with detailed reports but others, notably, two major projects of the time, the London & Brighton and Edinburgh & Glasgow, ignored the order. Thereafter, Parliament was interested only in deaths and injuries amongst passengers and company servants [3]. Similarly, in 1847 the Railway Department of the Board of Trade began a potentially valuable line of enquiry by ordering companies to supply statistics on the different types of men engaged in constructing their lines. It specified that they should be listed under several different headings, but the reply from many companies allocated them between only two: 'Labourers' and 'Artificers'. In this case, the latter group often included not only tradesmen but also clerks, inspectors, accountants, timekeepers, etc. [4].

With the exception of some passing references in the 'Criminal Returns' and an enquiry which is mentioned below, this is the sum total of the Parliamentary evidence on this very important labour group. It is random and incomplete and it stands in striking contrast to the several major enquiries into the life style of an equally notorious group, the canal boatmen [5]. Therefore, it is not surprising that most

accounts of the origins, working conditions and customs of the navvy rely heavily on the literature produced by middle-class ladies (who usually deplored the fact that navvies did not conform to their standards of morality) [6], on the lurid accounts of their misdeeds which appeared in the press and, above all, on the evidence given to the Select Committee on Railway Labourers of 1846 [7].

The Enquiry of 1846

This committee had its origins in the discovery by John Roberton, a very active member of the Manchester Statistical Society, that the men driving the long Pennine tunnel at Woodhead between Manchester and Sheffield were living in conditions nearly as squalid as those suffered by many of the inhabitants of Manchester. The matter became almost an obsession for Roberton and he harnessed the astonishing energy of Edwin Chadwick to the cause of reform [8].

Pressure from Chadwick led to the appointment of a Select Committee chaired by Edward Pleydell Bouverie which heard evidence from engineers, including Brunel, contractors, policemen, railway missionaries, etc. Men from the group in question played a minor role in the enquiry—only three navvies were invited to speak and they received a mere 171 questions out of more than 3000 put to all witnesses. This situation is in obvious contrast to the structure of other enquiries into working life in the same period. The Royal Commission into Children in Mines of 1842, for example, collected statements from 34 miners in the South Staffordshire and Shropshire coalfields alone [9]. Apparently factory operatives and coal miners had something useful to say on these occasions, but not railway navvies. The most balanced and authentic account of life at Woodhead Tunnel probably appears not in the 1846 enquiry but in a booklet entitled *Strictures* which Thomas Nicholson, the contractor at its eastern end, produced in answer to the charges of the Manchester society [10].

Chadwick was correct in believing that Government inspection and employers' liability in relation to accidents should become features of railway building, but this ran counter to that 'spirit of independence' in the management of railway affairs which Brunel and others wishes to see preserved. The whole matter ended in disappointment for the supporters of the enquiry when Parliament failed to even discuss its proposals mainly because of the intense and prolonged debate over the repeal of the Corn Laws. With the end of the 'Mania' and the decline in the number of men employed in this type of work, the committee's report was quietly forgotten.

The picture of the navvy which emerges from nineteenth-century literature, from the episodes of violence which shaped the opinions of the newspaper-reading public and from the evidence given by the witnesses before the Select Committee of 1846 is of a young man whose ignorance, even in relation to personal matters, was so profound that he often did not know his own name and went by some outlandish sobriquet. In a large number of cases, the navvy came from Ireland and his home on the contracts was frequently a corner of a hut in some insanitary encampment. His progress about the country, so the story goes, was accompanied by theft and drunken assaults on policemen and women. Altogether, the tranquil rural communities which had the misfortune to be visited by navvies experienced only a little less disturbance than had been created by the 'Swing Riots' of 1830.

In the following account, the writer draws upon two other sources of information, the census returns and the records of the criminal courts of south-western England, in order to present a somewhat different picture of the origins and behaviour of the railway navvy.

FIG. 1. Image of the navvy: 'spades & trumps' (from *Punch*, 1855).

The Workforce in the Census Returns

The British decennial census of population commenced in 1801 and the first to coincide with a time of railway building was that of June 1841. Unfortunately, in this enumeration the population had not to give an exact place of birth and, of further

relevance for the listing of those who were building railways, the Registrar General allowed the census takers to give only an estimate of numbers if they encountered outstanding problems in compiling their returns. Thus the official covering the area through which Clayton Tunnel was being driven for the London & Brighton Railway, having found himself in a large encampment of temporary huts, provided only an estimate of the number of people there and, as if to justify his decision, added the comment "Labourers on the Rail Road, Strangers to the Parish—'Here today and gone tomorrow' " [11]. In contrast, complete information was gathered by the enumerator for another large body in the area, those to the north in the Ouse Valley engaged in building Balcombe Viaduct. The next census contains exact places of birth and ages, and the family relationships of the people listed. The same is true of subsequent enumerations through to 1881, which is at present the last census open to the public under the Hundred Year Rule.

As early as 1851, a pattern begins to emerge in relation to the origins of the men engaged in this type of work in England and Wales. Approximately 25 per cent of them in 1841 had been born in the county in which building was taking place and, according to later censuses, about 50 per cent in that county plus those immediately adjacent to it. Lines in the counties of the south-west, where there was little industry to compete for labour, had especially high levels of local participation. For example, 75 per cent of the men working on the Wilts, Somerset & Weymouth in 1851 came from the south-west, and 81 per cent of those building the Devon & Somerset twenty years later [12]. The majority of these people were, almost certainly, agricultural labourers and other groups, such as handloom weavers, who found themselves increasingly under the pressure of competition from machinery. As Charles Robert Hemingway, the head of a leading firm of contractors, testified: "Navvies were the pick of the agricultural districts through which the new railways were being made, both as regards physique and intelligence . . . " [13].

The attractions of railway work for the farm labourer were twofold: firstly, it was better paid. Earnings and wage rates varied considerably according to the experience and physical abilities of individual men, but it appears on evidence derived from court depositions and the proceedings of Petty Sessions that railway labourers in southern Gloucestershire were being offered 11p–14p for a 10 hour day in the early 1840s as compared with 9p on the land. Secondly, many farm workers suffered from underemployment because their work was often of a casual nature. Railway building may not finally have brought the rewards that many hoped for, partly because of the Truck System [14], but it certainly had a better potential than did agriculture.

In these circumstances, contractors rarely had difficulty in finding sufficient workers for the job and thus no formal and frequently-used recruitment machinery appears to have been required. To give an example of what often occurred: hundreds of men gathered in the neighbourhood of Cullompton, Devon, in the spring of 1843 when word spread that work would soon commence on the southern part of the Bristol & Exeter line. News had gone round the district that men would then be needed on the railway and many deserted their existing masters [15].

There were, however, some circumstances that led to shortages of labour. Very difficult pieces of work could produce requirements which exhausted local reserves. Blisworth Cutting in Northamptonshire on the London & Birmingham created such a demand for workers that its contractors posted agents on the roads of the district with instructions to offer any male pedestrian a job [16]. Next, when railway construction occurred in parts of the country that were thinly populated, such as the border counties of Scotland or the northern Pennines, contractors had to rely on itinerant labour. Only about 6 per cent of the workers on the southern sections of the Settle–Carlisle line in 1871 had been born in Yorkshire. In contrast, 17 per cent came from south-eastern England and their presence in north-west Yorkshire and Westmorland almost certainly came as a result of the transfer of labourers from several major contracts in the London area completed by Joseph Firbank in the 1860s to the scene of his works on the Settle–Carlisle [17]. Finally, through the entire history of railway building, men deserted the contracts in the hay and cereal harvest months of June to September. They may simply have wanted a change of working circumstances, and every hand was required on the land at this time of the year. Whatever the motivation, in summer ancient patterns of work and behaviour, allied to instinctive affinities with the land, briefly triumphed over the onward drive of the new technology. For the contractor, the loss of men in summer was doubly unfortunate since this was the most favourable period of the year for his work.

On the basis of this evaluation, therefore, the most important single source of workers for railway construction was generally labour which came from the surrounding countryside. This was simply a consequence of the huge surpluses of men on the land in the mid-nineteenth century and, no doubt, most of these people went back to the fields when work in their district had ceased.

But it cannot be denied that another element existed amongst the men in railway building. Whilst the bulk of the work may have been done by former farm labourers, from the earliest years of the railways there were groups of peripatetic workers who went about the country from one contract to another. In 1841, the census taker for the village of Bletchingley, Surrey, where a tunnel was being driven on the South Eastern Railway, noted in his returns on the workforce: "As to the kind of persons, they are chiefly from Derbyshire, Staffordshire and Yorkshire, and are the most uncultivated set of beings on earth" [18]. In their previous employment they may have been constructing the Manchester & Leeds and North Midland lines. As another example of mobility, when Enoch Naylor was charged before Somerset Quarter Sessions in 1844 with having been a member of a gang which committed a number of robberies in villages in the Black Down Hills, two of his fellow workers at Whiteball Tunnel on the Bristol & Exeter Railway came forward to give evidence in his favour. They had, they said, all left Lancashire together in 1834 and had subsequently worked with him on a series of lines, including the London–Southampton, Paris–Rouen and, shortly before, the Folkestone–Dover, and had "never heard any thing against him before this" [19]. Naylor and his companion, John Green and Jack Champion, were amongst the professional navvies and, no doubt, their training and experience made them individually worth several of the former farm labourers to any contractor.

The sequence of events, it appears, was that the news of railway building attracted agricultural labourers out of the fields and they constituted the bulk of the labour in most parts of England and Wales. Construction gangs were reinforced, however, by a leavening of men, the 'true' navvies, whose life was dedicated to heavy manual labour. These people moved around the country choosing their own projects or as part of a rather select group which followed a particular contractor.

As for the Irish, the nationality that is sometimes given the credit for having built the entire system, they were at work on railways throughout England even before the great outflow from Ireland which followed the famine of the 1840s. But in England they played a significant role only in those parts of the country where at least one of two conditions held: where industry was a counter attraction for resident labour, and

where there was heavy immigration at the time, such as Lancashire and the west Midlands. Only approximately 2 per cent of the men on the Great Western in Wiltshire in 1841, for example, came from Ireland, and 3 per cent of those building the South Eastern in the neighbourhood of Tunbridge Wells ten years later. In contrast, 23 per cent and 26 per cent of the labour forces of the Shrewsbury & Hereford (1851) and West Lancashire (1881), respectively, had been born in Ireland. However, in Scotland, which experienced considerably more Irish immigration than did England or Wales, they were the leading railway builders of the country from the Borders to the Grampians; in northern Scotland their place was taken by Highlanders who were experiencing the same problems in relation to employment as were English farm workers [20].

Tradesmen

The majority of the work in railway building, such as excavating cuttings and making embankments, could be carried out by a reasonably fit labourer after only a little training. But any corps of railwaymen also contained workers with a wide variety of skills. Amongst the main trades which sustained the industry for almost a hundred years were masons, carpenters, blacksmiths, quarrymen, brickmakers and layers, miners, wheelwrights, millwrights, engine men, etc. On most lines, skilled workers probably accounted for 10–20 per cent of all labour [21]. Contractors rewarded these men with wages that were about 5p per day more than those received by labourers. By the 1880s they had been joined by at least one new skill, steel erecting, principally for bridges. Labourers also had to learn to use a new material. Concrete made a very early appearance with its use for a bridge on the District line in London in the 1860s [22], but it was first employed on an extensive scale in the building of the West Highland Railway thirty years later.

Tunnel miners were a rather special group of workers because of the hazards and unpredictable nature of their chosen occupation. Many railway miners may have gained their first experience of this craft in coal mining, but by the 1870s they were being joined by others in the mining fraternity, notably by men from the declining Cornish copper industry. The customary method of tunnelling used in Britain, the 'English System', began with the sinking of working and ventilation shafts. Miners then cut a narrow heading at the height of the crown of the proposed tunnel and this was later enlarged downwards. A complicated system of poles and boards supported the new bore [23]. Pneumatic drills were not given a sustained and mass trial in British tunnelling until the building of the Severn Tunnel in the 1880s—that is at least ten years after they had been successfully used in Europe for driving the Alpine Frejus Tunnel.

It is also late in the century before some of the slog of removing masses of earth, clay and loose rock is reduced by the introduction of mechanical excavators, the 'Steam Navvy'. Until then the only mechanical source of power, apart from cranes, which could regularly be found on contracts was the locomotive. At an early date in the construction of Britain's railways, Robert Stephenson and Brunel encouraged contractors to buy them for use on the London & Birmingham and Great Western main lines, chiefly for hauling trains of wagons between cuttings and embankments. Nevertheless, taking the whole railway building scene, for most of the century it was mainly human and horse power, shovels, pick axes and common gunpowder.

Casualties and Crime

The misdeeds of the navvy are given a prominent place in most accounts of railway building and, according to many authorities at the time, he clearly belonged to the 'dangerous classes' of Victorian society. Navvies were apparently capable of the most outrageous behaviour: they raffled the corpses of dead comrades, encouraged prostitutes to live in their insanitary hovels, gratuitously attacked policemen and Irishmen, spread smallpox and typhus wherever they went and even destroyed the last vestiges of the gravestone of Robin Hood, the legendary protector of the oppressed [24]. After reading these catalogues of immorality and violence, one is left to wonder how such atrocious folk could have finished a single mile of line, let alone several thousands. It would be equally wrong to suppose that they were a docile group. Railway building could be a savage business and it sometimes produced a savage response from the men.

Deaths and serious injuries occurred frequently on the contracts. Thomas Nicholson in his *Strictures* listed 26 deaths at Woodhead [25] and at least 21 occurred at Box, usually through men falling down shafts. Altogether, 65 deaths and 57 very serious injuries are recorded as having happened on the Great Western between Maidenhead and Bristol in the years 1838–41. Even the very easy route for building between Swindon and Kemble, near Cirencester, saw nine deaths in 1840 alone [26]. This is the minimum number of casualties since the extant records on the matter are far from complete.

It is clear from the reports of coroners that contractors and their agents could have done more to prevent accidents; sometimes not even the most commonsense precautions were taken. When three men died in an explosion at Wickwar Tunnel (near Bristol on the line to Gloucester) in November 1841, it transpired that J. W. Nowell, the tunnel contractor, stored his gunpowder in the blacksmith's shop and it had, almost certainly, been ignited by a spark [27]. Prosecutions of contractors for negligence were a rare event. After a drunken Irishman had fallen to his death in an unfenced cutting near Chippenham in 1839, the coroner ordered the Surveyor of Highways for Wiltshire to proceed against the contractor [28]. This usually resulted in only a fine by Petty Sessions. To those outside navvy circles, accidents were, more often than not, the fault of the men themselves. As the editor of the *Wiltshire Gazette* commented after a series of deaths at Box: "There is great carelessness in the workforce" [29].

The impression amongst the men that many contractors felt no sense of responsibility towards them can only have been reinforced by the knowledge that they could be left destitute and without the wages which they had earned. In May 1838, hundreds of men gathered in the centre of Reading after William Ranger, contractor at Sonning cutting, had become insolvent. He owed them two weeks' wages and so they were in an ugly mood. Trouble was averted only because the Mayor and Town Clerk offered to provide £1000 out of their own pockets [30]. Things did not often end so well. When Thomas Townshend, a contractor on the Bristol & Exeter, failed in 1842, a mob of navvies attacked the house of his agent, Robert Dunn, smashed up his furniture, threatened to kill Mrs Dunn and drank several casks of beer. Although they complained before Somerset Assizes that at the time of the offence they were starving, having not eaten for four days, the court sent the ring leaders to Australia for fifteen years [31].

Episodes such as this must not, however, be taken as proof that the navvy and the law were in perpetual conflict. On scores of other occasions, as the records of the Petty Sessions courts of the south west show, the men had sufficient confidence in the law

and its machinery to take their wage claims before magistrates and they rarely failed to get a satisfactory award against their employers.

At the same time, it would be wrong to ignore the fact that the general public—or perhaps, more accurately, those in the middle classes who were their self-elected spokesmen—felt apprehensive at the news that railway builders were coming to their area. This may in part have stemmed from the absence in early Victorian society of a satisfactory rural police system. Many towns and cities possessed police forces by 1840, but the enforcement of the law in the countryside, where most railway building took place, was largely the responsibility of unpaid and part-time parish constables. There is a good deal of evidence to show that these men varied considerably in their prowess and dedication. The Rural Police Act of 1839 allowed county authorities to establish paid, uniformed and full-time forces, but few counties immediately adopted the Act because of opposition on financial grounds from ratepayers. Thus, until well into the second half of the century, when England and Wales had become truly policed societies, in many parts of the country during episodes of civil disorder there was virtually no agency of the law between the parish constables and the military—and the authorities were as reluctant to deploy the military then as they are today [32]. It is hardly surprising, therefore, that the indigenous populations of small towns and villages felt alarm about the impending arrival of hundreds, perhaps even thousands, of lusty navvies in their vicinity.

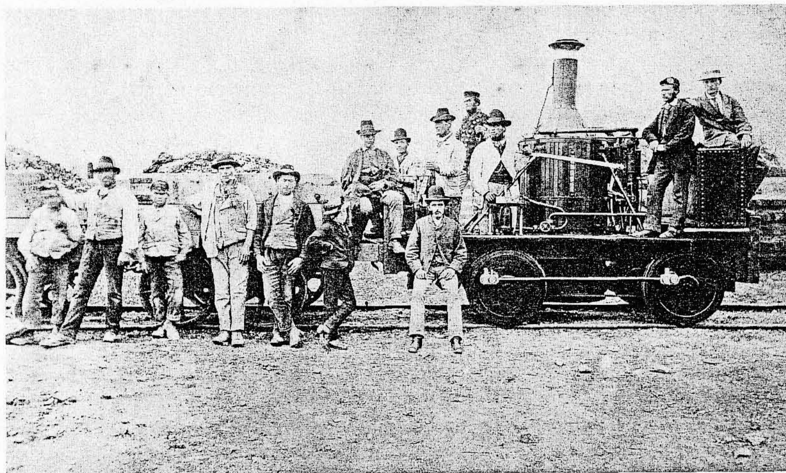

FIG. 2. Reality of the navvy: labourers with a contractor's locomotive in the 1870s (Wiltshire Record Office).

The majority of the episodes of disorder which occurred during railway building had their roots in one or both of two circumstances. Firstly, the antipathy which the English, Scots and Welsh felt towards Irish navvies. Trouble involving the Irish usually happened when they were a substantial proportion of a workforce and it arose chiefly because of the conviction that the Irish were prepared to work for lower rates of pay. Contractors claimed that they did not pay the Irish less than other nationalities,

but it is difficult to get at the truth of the matter and dislike of the Irish was fanned by those occasions on which they were used as strikebreakers.

The second leading cause of the majority of the trouble involving navvies was excessive drinking; this is what lay behind the majority of the assault, drunk and disorderly, etc., charges in the courts. For example, in June 1838 the house of the constable of Twyford, Berkshire, was besieged by a mob of about 100 navvies after he had attempted to arrest a man who was seen stealing a parcel from the Reading Mail Coach. One of the leaders of the crowd, 'Lankey' John Johnson ('out of Lancashire') in a statement before Berkshire Quarter Sessions pleaded: "I was mad drunk and when I have had any Beer I do not know what I am doing" [33]. It did not save him from a sentence of six months hard labour, but the courts heard the same excuse on scores of other occasions. Whilst it is true that navvies were renowed for their heavy drinking, this has to be put into the context of an age in which drunkenness and its associated violence were common. It was part of the accepted and regular pattern of entertainment in town and country for an evening of heavy drinking to be concluded by a series of pugilistic contests in the streets, and not infrequently things got out of hand. The most serious disturbance which occurred in the neighbourhood of Box Tunnel in the years 1838–41, when most of the construction took place, was caused not by navvies but by a drunken mob from Box village. In September 1839, a crowd of 50–60 people descended on Kingsdown Common, where the largest annual fair in the district was being held, and destroyed stalls and tents, stole money and drink and attacked anyone who did not escape. A navvy who was violently assaulted later said in his deposition to Wiltshire Quarter Sessions: "I was beaten so much that I could not walk . . . I crawled away and went home" [34].

The early Victorian countryside was thus a crude, rough and boisterous place and, on the strength of a review of over 8000 cases heard by the Quarter Sessions courts of the counties Gloucester, Somerset, Wiltshire, Berkshire and Devon in the years 1837–45, it can be said that early railway building in the south-west made no significant contribution to the incidence of indictable crime. Even in the north of England and Scotland, where the majority of the worst attacks on the Irish occurred, its impact on levels of crime may have been only minimal. According to one well-placed observer, Frederic Hill, Chief Inspector of Prisons for Scotland and Northumberland and a former Government railway inspector: "The whole number of railway labourers committed to prison has been but small, and with few exceptions . . . the offences have been of a minor description, chiefly drunken quarrels" [35].

In conclusion, it appears that the battalions who built the railway network consisted of two types of men. Firstly, there was the itinerant element, the sort of men whose lives were dedicated to work on a series of civil engineering projects; they may have been a minority on most contracts but their experience gave them an importance out of all proportion to their numbers. Secondly, there were the masses of 'common' labourers, people from agriculture and declining industries, who grasped the opportunity to make a little money whilst construction was under way in their district. This dominant group was not, as popular legend claims, composed of social outcasts whose background and customs divided them from the inhabitants of the town and villages near which they were working. For the thousands of householders who provided them with lodgings during their brief stay in a locality, they were fellow country people driven by necessity into trying their luck in another form of employment. Their proclivities were those of the general working population. Thus, they showed an inclination towards excessive drinking in times of full employment, and a dislike of the

policeman who interfered with their old and often brutal pastimes, and yet they were prepared to use the machinery of the law to prosecute those who stole a tool or an article of clothing from them.

Finally, the navvy, like other members of the working classes in a time which had no official retiring age or state pension, worked as long as his physical strength allowed even if this meant going on into his sixties. They were, according to the censuses, an ageing group; 32 per cent of the men on construction work in England in 1881 were aged 40 years and over, as compared with 13 per cent in 1841. This may indicate that by the end of the century, in a time of greater labour mobility, navvying had lost some of its attractions as a form of employment for young men [36].

The last word should be left to Elizabeth Garnett, secretary of the Navvy Mission Society and one of the few people to devote their lives to the welfare of these workers:

> "Certainly no men in all the world", she wrote in 1879, "so improve their country as Navvies do England. Their work will last for ages, and if the world remains so long, people will come hundreds of years hence to look at and to wonder at what they have done". [37]

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References

[1] The use of the alternative measurement of line distance, 'track' miles, gives an even greater total.
[2] D. Sullivan, *Navvyman* (1983), p. 228.
[3] Parliamentary Papers, 1841, Vol. XXV.
[4] Parliamentary Papers, 1847, Vol. LXIII, and annually to 1860, Vol. LXI.
[5] Amongst these enquiries are the Select Committee on Canals, 1883, the Select Committee on Canal Boats, 1884, and the Royal Commission on Labour (Group B), 1893–4.
[6] See, for example, A. R. Tregelles, *The Ways of the Line: A Monograph on Excavators* (London & Edinburgh, 1858).
[7] Parliamentary Papers, 1846, Vol. XIII.
[8] An excellent account of the background to this investigation is contained in R. A. Lewis, 'Edwin Chadwick and the Railway Labourers', *Economic History Review*, New Series, 3, no. 1, (1950), pp. 107–118.
[9] Royal Commission on Children in Mines, Parliamentary Papers, 1842, Vol. XVI.
[10] T. Nicholson, *Strictures on a Pamphlet Published at the Request of the Manchester Statistical Society* (Manchester, 1846).
[11] P.R.O. 1841 Census, Poynings, HO 107/1112.
[12] For further information on statistics obtained from the census returns for England & Wales and Scotland, see D. Brooke, *The Railway Navvy* (Newton Abbot, 1983), pp. 175–92; also, D. Brooke, 'Railway Navvies on the Pennines', *Journal of Transport History*, N.S. III, no. 1 (February 1975), pp. 41–53, and 'The Railway Navvy of the 1881 Census', *Quarterly Journal of Social Affairs*, 2 (4) (1986), pp. 363–77.
[13] G. Y. Hemingway, 'The Hemingway Masons and Contractors from Dewsbury and their Associates' (typescript, undated), p. 675, Dewsbury Central Library.
[14] The system used by many contractors under which men were paid not in coin of the realm but in tickets; these could be exchanged for goods at the contractor's Tommy Shop. The general opinion was that this depreciated the value of earnings.
[15] *Taunton Courier*, 26 April 1843.
[16] P.R.O. London & Birmingham Railway: Engineer's Reports, 1 Sept. 1836, and Birmingham Committee Minutes, 22 July 1836, RAIL 384/68 and 103.
[17] Brooke, *Railway Navvy*, p. 189.
[18] P.R.O. 1841 Census, Reigate, HO 107/1076.
[19] Somerset County Record Office, Taunton, Depositions in the cases of Enoch Naylor and Ann Starr, Somerset Epiphany Adjourned Quarter Sessions, 1844.
[20] Brooke, *Railway Navvy*, pp. 28–9.
[21] ibid., pp. 53–4.
[22] B. Morgan, *Railways: Civil Engineering* (1973), p. 149.
[23] A succinct description of this method is contained in G. E. Sandström, *The History of Tunnelling* (1963), p. 114.
[24] P. Valentine Harris, *The Truth About Robin Hood* (Mansfield, 1978), p. 36.
[25] Nicholson, *Strictures*, pp. 4–8.
[26] Based on reports for various dates in the *Devizes & Wiltshire Gazette*, *Reading Mercury*, *Bath Chronicle* and *Gloucester Journal*, and Returns on Railway Accidents, Parliamentary Papers, 1841, Vol. XXV.
[27] Gloucestershire County Record Office, Gloucester, Inquest Book of J. G. Ball, 7 Nov. 1841, CO 3/2.
[28] *Devizes & Wiltshire Gazette*, 10 Oct. 1839.
[29] ibid., 1 Nov. 1838.
[30] *Berkshire Chronicle*, 2 June 1838.
[31] *Taunton Courier*, 6 April 1842.
[32] Although at this time men from the Metropolitan force, the first experts in crowd control, were "borrowed" on several occasions by authorities in the north to suppress disorder caused by navvies and opposition to the New Poor Law.
[33] Deposition in the case of John Johnson, Berks. Midsummer Quarter Sessions, 1838, Berks. County Record Office, Reading.
[34] Depositions Nos. 62–70, Wilts. Michaelmas Quarter Sessions, 1839, Wilts. County Record Office, Trowbridge.
[35] Twelfth Report on the Prisons of Scotland, Parliamentary Papers, 1847, Vol. XXIX.
[36] This shift is not related to movements in the age structure of the entire population, and it had occurred amongst both itinerant and locally-born navvies.
[37] Quoted in Sullivan, *Navvyman*, p. 89.