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THE CONSTRUCTION OF THE SEVENOAKS RAILWAY TUNNEL 1863-1868

TESSA LEEDS

The northern entrance to Sevenoaks tunnel lay a short distance south of Sevenoaks railway station. It runs roughly north-south on the line linking St John's, Lewisham to Tonbridge.¹ It was built between 1863 and 1868 by the South Eastern Railway Company (SER) and lies wholly within the parish of Sevenoaks, with its southern entrance in the Liberty of Weald.² On completion it was 1 mile 1693yd long³ and the fifth longest tunnel in Britain: it still ranks as the thirteenth longest today.⁴

At the time of the tunnel's construction geology as a science was in its infancy. The rock strata through which the tunnel passes was to prove difficult for its builders, through the Lower Greensand ridge which rises to almost six hundred feet above sea level. The ridge is comprised of Atherfield and Weald Clays topped by the Hythe Beds, which consist of bands of ragstone, chert, sands and hassock, pronounced by the miners as 'assig'. The clay they encountered was usually blue in colour and they called it 'bine'.⁵ At the southern entrance, on the scarp slope of the Greensand ridge, large structural disturbances can occur causing massive blocks of the upper Hythe Beds to subside into the clays. This, in turn, causes further instability in the form of heaving and land slips, compounded by a spring line formed where the clays meet the more porous beds. (The same area was still causing engineering problems with the construction of the Sevenoaks bypass in the 1960s.) On the northern dip slope the geological structure allows great quantities of artesian water to collect.⁶ Trial borings by Edward Ryde, the SER's surveyor failed to identify this problem. At that time little work had been undertaken on climate and its effect. The collection and classification of British rainfall records was initiated only in 1860, but during the middle of the construction period (1865-1866) rainfall was clearly well above average.⁷

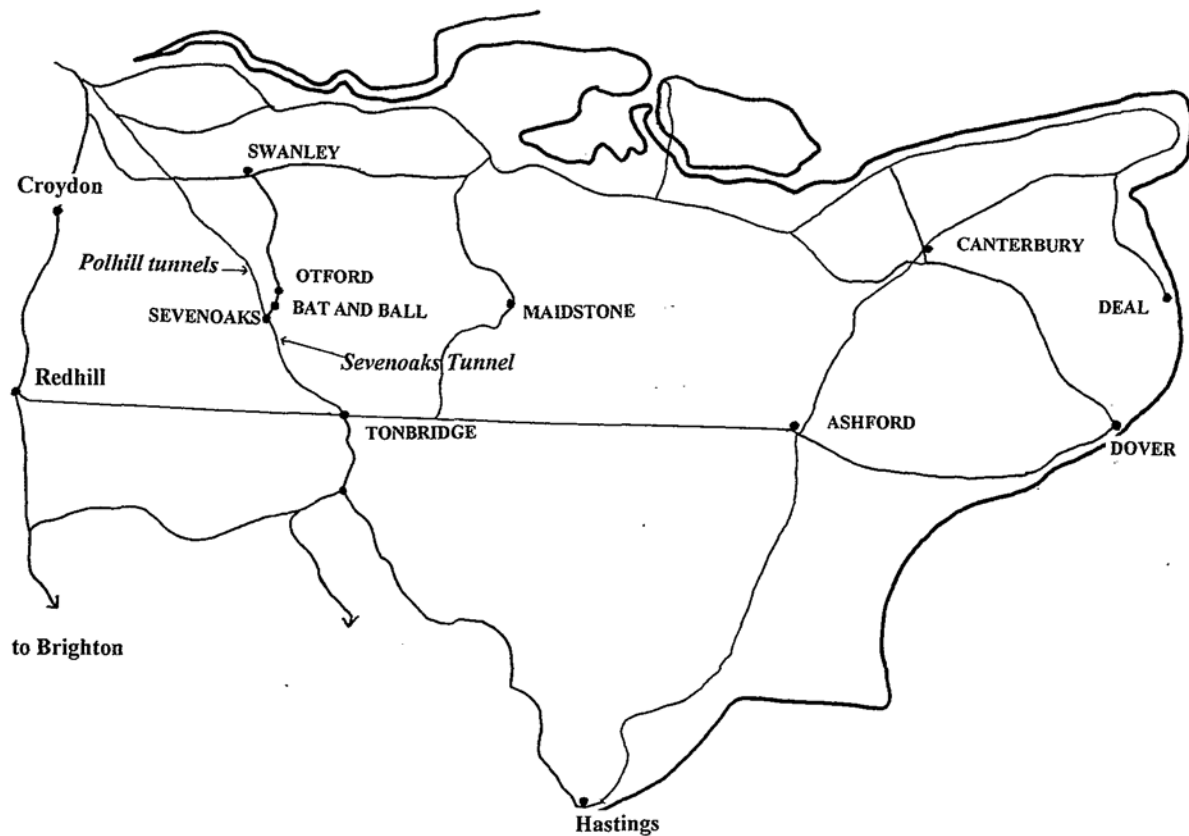
Planning and Preparations for Building

In the mid nineteenth century several schemes were proposed for railways in north-west Kent by a variety of rail companies. These did not materialize mainly due to lack of finance, government opposition and agreements between rival companies not to proceed. Eight years before construction began the Sevenoaks-London route had been surveyed by Sir John Hawkshaw but the SER board rejected his plans on the grounds of the costs involved in building the lengthy tunnels.⁸

However, in 1862 the SER was put under increased pressure and a Bill for the line, incorporating the Sevenoaks tunnel, was brought before Parliament. Several factors forced the company to review the previously rejected route. In 1850 the London, Chatham and Dover Railway Company (LC&DR), the SER's major rival in Kent, had spanned the Medway at Rochester. The LC&DR planned to push the route on to Dover Harbour (which it reached in 1864). This would enable them to undercut the SER's journey time between London and Dover, and afford them the chance of obtaining the lucrative European mail contract. Also, in 1859, the Sevenoaks Railway Company had been formed, with plans for a line to run from Sevenoaks down the Darenth valley to Swanley where it would connect with the LC&DR. As small rail companies were frequently subject to take-over by larger ones it became apparent that the LC&DR might soon gain a foothold in north-west Kent, a territory the SER wished to have to itself. This line was completed and officially opened to Sevenoaks, later re-named Bat and Ball, station on 2 June 1862. Demand was so great that this single track had to be doubled within scarcely more than a year of opening.

To compound its discomfort, and due to earlier government policy to restrict the number of railway termini in the capital, the SER were still involved in a most unsatisfactory track sharing arrangement on their mail route to the south coast. This ran out of London via the Greenwich Line, then via the Croydon Railway, owned by the London, Brighton and South Coast Railway, to East Croydon. Still on the rails of that company it ran to Redhill, from which point it was on its own tracks.⁹

On 15 May 1862 a Commons Select Committee sat to examine the Bill proposed by the SER to construct a line roughly 25 miles in length. Its purpose was to rid the SER of its route sharing and shorten the journey from the capital to the coast by 15 miles, or 12 and a half minutes,¹⁰ by turning north to London at Tunbridge rather than at Redhill (**Map 1**). It was to be afforded access to the new termini being constructed at Charing Cross and Cannon Street. Besides the



Map 1. The Railway network in the South East by the end of the 1860s

Sevenoaks tunnel three other shorter ones were needed, two of which were through the North Downs at Polhill, a few miles north of Sevenoaks. Edward Ryde informed the Select Committee that he considered the line would not be easily made but could be completed in two and a half years if no problems were encountered in the Sevenoaks tunnel. By the time the Select Committee met most opposition to the Bill had been bought off. To meet the objections of the LC&DR, the SER agreed to give that company access to the Hastings traffic. The Sevenoaks Railway Company was to build a line linking both companies' stations at Sevenoaks for the purpose. The SER had further agreed to withdraw its opposition to the LC&DR's proposed branch line between Otford and Maidstone.

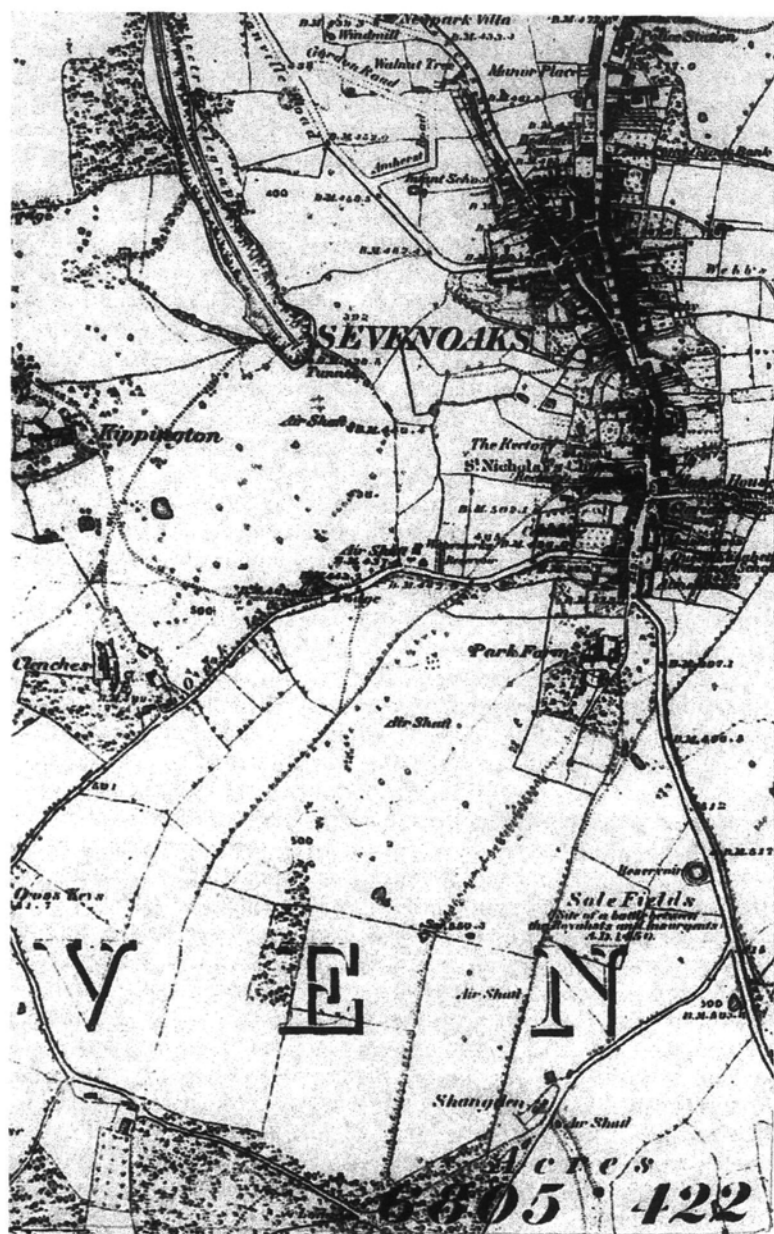
The Act gained Royal Assent on 30 June 1862 and contained a clause stating that the works were to be completed within five years of commencement or construction was to cease.¹¹ Three-year leases, such as that taken by the contractor on the land for the navvies' chapel, confirm that it was hoped the completion date would be well within that time. However, it was to be almost five years from the day of the opening ceremony before the line was fully open to both passengers and goods.

The estimate for the overall cost of the Sevenoaks line, for both land and works, was £901,849, the value of the land being reckoned at £192,000.¹² Apart from two small parcels, the land under which the tunnel passed was owned by three estates. The northern end, the area in which the station was built, the cutting beside it, the tunnel entrance and probably half the distance of the tunnel's length, lay within the bounds of the *Kippington* estate (**Map 2a**). This property was owned by Francis Austen whose family were not using *Kippington* as their main residence in 1862. They settled for the sum of £6,009 for the strip of land under which the tunnel passed and then leased the same back to the SER on a 999 year lease.¹³ A small portion of the land over the centre of the tunnel belonged to the *Knole* estate, this being from Shangden, later known as Shenden, through White Hart Wood to the road outside the large house called *Beechmont*, standing in what is now known as Gracious Lane. *Knole* was in the hands of the Dowager Countess Amherst who, as Lady of the Manor, resided at *Knole House*. In an agreement dated 27 April 1863 she received £1,025, all surveyors', solicitors' and engineers' fees being met by the SER. She allowed access to an area of 11 acres, permission for spoil to be deposited within White Hart Wood and for the erection of huts which were to be removed upon completion of the work. There was also a clause by which the SER retained the right of access to maintain and repair the ventilation shafts.¹⁴

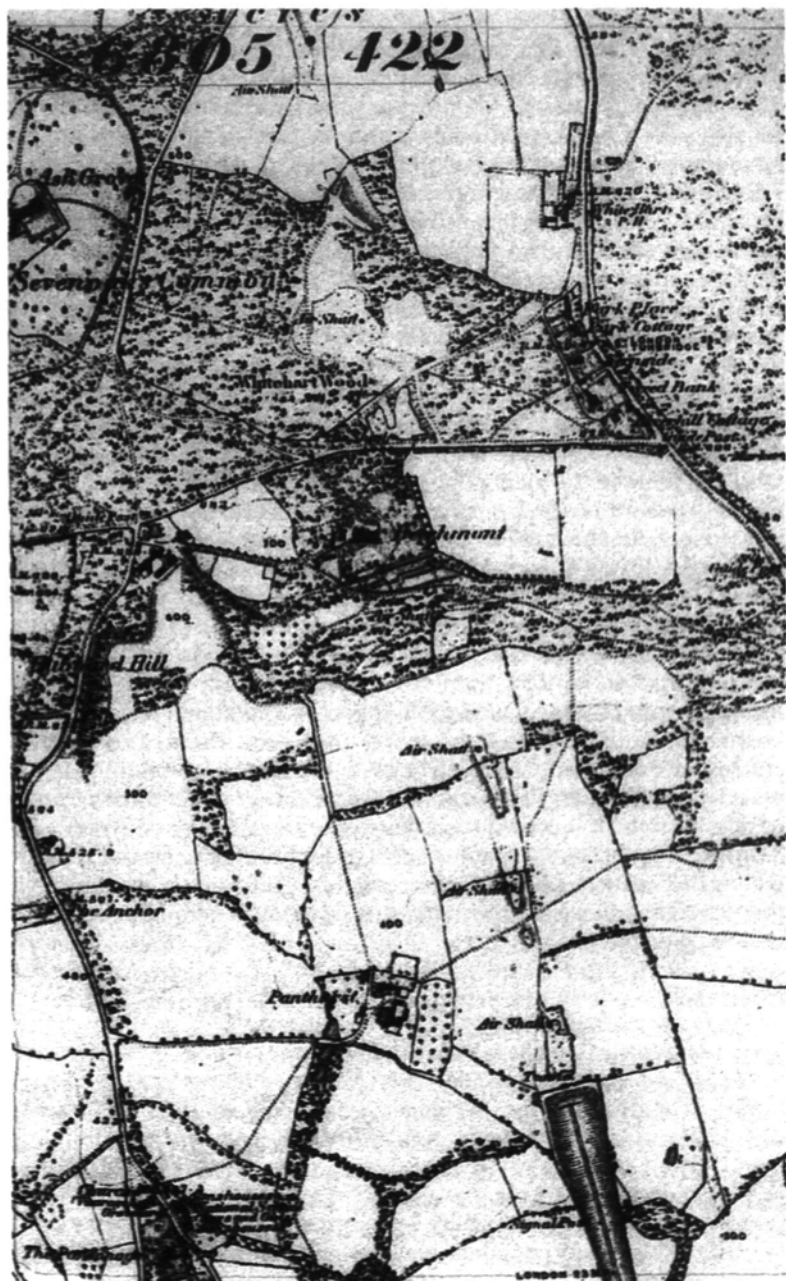
The rest of the land through which the tunnel passed, as well as the cutting at the southern end and the brickfield, was held by the Lambarde family (**Map 2b**). Although without title the Lambardes were one of the most prominent families in the town. Their large and well favoured house was *Beechmont*. Sitting just on the edge of the scarp slope, the tunnel was to run directly under the property and the line would be visible from its windows. It is possible that William Lambarde felt Francis Austen had struck a better deal with the SER. For his own eight and a half acres, which he was to keep after completion, he was to receive £3,500 and to be paid £200 an acre for any further land required, plus costs. A descendant of the author of *A Perambulation of Kent* (1576) and a JP, who rarely missed an attendance at Petty Sessions, William Lambarde was no stranger to litigation which he seems to have regarded as a full time hobby. After signing an initial Heads of Management agreement with the SER he was not to confirm it until the day before the opening ceremony. By June 1863 he was already in dispute with the contractor.¹⁵

On gaining Royal Assent the SER put a contract out to tender for the building of the line from Lewisham to Tunbridge, of which the tunnel forms part. The tenders ranged from £600-850,000, the SER accepting that of John Jay at the lower figure.¹⁶ Little is known of Jay, although his tender was supposedly submitted on the advice of Francis Brady the resident engineer.¹⁷ Jay was reported to have been responsible for construction of part of the Metropolitan Railway where it crossed the Fleet river.¹⁸ Although this line was run though the notorious London Clay much of it was a 'cut and cover' operation and would hardly have afforded the contractor the experience necessary to undertake such difficult engineering as was called for at Sevenoaks tunnel. This was a period of intensive railway building in the South-East; many of the major contractors were already taken up with other contracts, but Jay must have appeared financially sound.

From the passing of the Bill almost a year was to elapse before the starting date, during which time other tenders were considered and further negotiations with landowners took place. Jay's centre of operations was to be in Sevenoaks and he leased the *Kippington* estate from the Austen family, moving into the mansion with his two daughters. The SER was represented by the previously mentioned Francis Brady, a civil engineer of over twenty years standing, and his two assistants, Hurst and Truman. A company agent named Corser was also appointed to keep the books and be responsible for the stores. All four tunnels on the line were to be sub-contracted out to the firm of Hawley, Turner and Else. They in turn were to let pieces of the work out to 'gangers' who employed perhaps 40 men, each



Map 2a. The northern section of the Sevenoaks Tunnel (O.S. 1871, K 40
Sevenoaks, 6in. to the mile)



Map 2b. The southern section of the Sevenoaks Tunnel

gang being responsible for a given section of work. Peter Ashcroft, Chief Engineer to the SER for the previous ten years, was to oversee the whole operation. He was responsible for the half-yearly reports found in the Company Minutes where he repeatedly referred to the Sevenoaks Tunnel as 'the key to the works'.

Eventually, on 16 May 1863, the ceremony of the 'Turning of the First Sod' took place.¹⁹ It centred on the Royal Crown Hotel, not only the largest and most salubrious establishment in town but also one whose lands, conveniently, backed on to the *Kippington* estate at a point through which the line was to be constructed. The ceremony was to follow common custom for such events. The dignitaries and a band of the Grenadier Guards, which had preceded them, and all of whom had arrived by the trains of the Sevenoaks Railway Company, marched to the town. The procession was completed by some navvies, who were reported arriving over the previous week, together with members of the local populace. Little did they know the foul wet weather was to prove a portent of the vast quantity of water which was to plague the whole undertaking. On arrival in the meadow behind the Royal Crown Hotel the Chairman of the SER, the Hon. John Byng, entered a tent. Presented with tools for the purpose by the contractor Jay, he cut the first sod. The tent was then given over to the *hoi polloi*, along with two barrels of ale. Meanwhile the dignitaries retired to the Royal Crown Hotel, where 120 people sat down to a meal, provided by Jay. During the speeches Peter Ashcroft called for huts to be built to house the work force, and these were quickly erected at Tub's Hill, Shangden and in White Hart Wood.

The 1861 population census returned a figure of 4,695 for Sevenoaks town, which included the Liberties of Riverhead and Weald. *The South Eastern Gazette* made almost weekly reports on the town in which the railway featured prominently. That May it was reported that 1,000 navvies were shortly expected to descend on Sevenoaks in search of employment.

Construction

The contractor gained access to the *Beechmont* estate on 28 May and, to obtain the line of the tunnel, theodolites were installed in towers. Some difficulties were experienced when, in June 1863, the intractable William Lambarde refused to allow any such contrivance on his land.²⁰ The Company offered to either remove it or to turn it into a belvedere upon completion of the work. Lambarde still refused and, to the constructors' frustration, a tower had to be sited further down the hill where it did not command a view over the brow as intended.

Although the tunnel bends to the right within a quarter of a mile of its northern entrance this was, presumably, intentional. It is a great credit to its builders that from that point it runs so straight. This indicates that some of the towers must have been of substantial height as the ground through Sevenoaks Common was not only very uneven but also, for most of its length, covered by ancient woodland of massive beech trees.

In July 1863 work started on shaft 5, just below the garden at *Beechmont*. Unfortunately for Jay his sub-contractor had miscalculated and built it on a trackway; they also erected a steam engine in the same spot. William Lambarde now had three grievances against the SER and was threatening to bring an injunction. In August 1863 Peter Ashcroft reported to the Board of the SER that the contractor 'had made considerable progress'. However, he also indicated that there had been a labour shortage which it was hoped would improve after the harvest, the annual hiring fayre being in October. It can have pleased him and the contractor little when, in the same month, *The Sevenoaks Express* announced that the LC&DR intended to start the branch line linking the two Sevenoaks stations, 'after the harvest'.²¹

Work on the Sevenoaks tunnel had begun with the sinking of thirteen shafts, originally numbered from the southern end; later the ones at either extremity were to be the points where the tunnel entrances turned into cuttings. These shafts were to be of varying depths ranging from approximately 75ft to over 400ft, their dimensions dependent on material circumstances. Those in Sevenoaks tunnel were between 10ft and 12ft. On completion these shafts were to be topped with brick turrets of a common design. During construction a small hut for 'drumming up'²² and either a horse gin or steam engine, occasionally both, stood at the top of each shaft. To the power source was attached a metal hawser which was used for lifting the rocks and earth in a small wheeled skip, or carriage. On reaching the surface the skip was fitted to railway tracks and wheeled away. Water came up in a large tub and was turned out into troughs. Men were lowered and returned to the surface in the traditional navvie fashion sitting, legs astride and four to a skip. There were many dreadful accidents occasioned by this mode of conveyance, at least two where the bucket plummeted to the bottom of the shaft. The tops of these shafts were surrounded only by deal planking and this became especially dangerous in damp weather. To provide ventilation, as the shafts deepened, a brick stove was placed at the top of each. From the back of these stoves a wooden conduit ran to the base of the shaft, the air being circulated by the drawing of the fire. On damp mornings, the fires could not be made to light.²³ The Sevenoaks Common area is

high and renowned for its low cloud and fogs making it likely that this was a common occurrence.

The shafts were bricked downward with the wooden shuttering being removed and the next row of bricks being added as the shaft descended. At the bottom of each shaft was a sump, and one of these accounted for the first fatality on the works when in November 1863 William Leaver fell in and drowned.²⁴ In the same month one of the shaft steam pumps failed one night. The consequence of this was a rise in water of 7ft in two hours and apparently the men barely escaped with their lives.²⁵ However, within six months of the start of construction, that is December 1863, at least one shaft reached a depth of 200ft. The first bricks were laid in the tunnel proper on 15 December 1863.

Although the winter of 1863-4 was not especially wet it was a particularly cold one. Adverse weather conditions were not helpful to cutting and embankment construction and on very wet days no work was possible. In making embankments unskilled labourers could be given the job of tipping which involved running beside a horse pulling a truck of spoil on rail tracks. At the end of the track man and horse pulled away and the truck, hitting the buffers, tipped over spilling the spoil on to the forming embankment. It was extremely dangerous, especially in damp conditions, and was the cause of several accidents. Further accidents occurred in the making of the cuttings at the entrances. Here wooden wheel barrows were pulled up steep inclines of deal planking by metal hawsers attached to horse gins. The navvies who had to run up behind the barrows, controlling them, often suffered broken limbs.

In Oak Lane, previously known as Flood Lane, the water encountered in shaft 13 presented a problem which a horse gin and a Watt's engine combined could not surmount, causing work to be held up. A pond at this point was infilled by the navvies and a surface water course, which had run down Hop Garden Lane into Grassy Lane and then Oak Lane, was enclosed in a drain and run parallel to the line. This was ultimately discharged into a soakaway in the Granville Road area beyond the northern portals of the tunnel. In this shaft two 6in. pipes were inserted, to take some of the excess water down to the 15in. culvert which ran between the tracks.²⁶

During this first year Jay fulfilled his moral duty, retaining the services of Dr Browne as medical attendant to the works. The services of at least six other doctors were also retained either by the sub-contractors or by self-help clubs formed by groups of navvies. The contractor had also erected accommodation in White Hart Wood, where over 170 persons were to be found the following summer

sharing only two privies. Jay had proposed the erection of a church to look after the spiritual welfare of the men. Promising £50 towards the salary of the incumbent, he leased a plot of land on Tub's Hill for the purpose, then met the cost of the erection of a tin church, and a works chaplain was duly appointed.²⁷

By February 1864 both day and night shifts were being worked. Peter Ashcroft informed the Board that the work was being 'pushed on with vigour'. He felt able to say this as twelve of the thirteen shafts were now down to track level and headings being driven.²⁸ Skilled workers were still hard to come by. Within the tunnel a minimum ten hour day was worked carried on regardless of the weather, as long as the pumps ran. Water was always a problem especially at shaft 13 in Oak Lane, a short distance from the Sevenoaks end of the tunnel. Men were constantly working up to their knees, with water dripping from above. Jay, thinking to turn the water at Oak Lane to his advantage, now formed the Sevenoaks Water Company, of which he was the major shareholder.²⁹ An underground reservoir was constructed in Oak Lane which pumped water to another at Bailey's Hill.

A tunnel boring machine was not used within the tunnel. The use of mechanical drills was not then common in Britain although English contractors were using them on the Mont Cenis Tunnel, in the French Alps, by 1866. Where hard rock was encountered blasting took place, black gunpowder being the explosive preferred by miners. Those handling the explosives were fairly proficient as only one injury was reported due to its use.³⁰ The construction tools were hand drills and jumpers, picks, shovels, crowbars, wooden hand barrows and much human and horse muscle power. For lighting the navvies had candles, also used to align the tunnel, and naphtha.

Once a length was excavated bricking was done with men working from a stage. Each bricklayer had his own section, about six feet being bricked before the stage was moved forward again. The Sevenoaks tunnel is bricked throughout with stock bricks, five deep in places. As the thickness of the brickwork is not uniform it would be impossible to estimate the number of bricks used. They were produced in the SER's brick yards, of which there were three locally, and a yard (near Bat and Ball station) belonging to Thomas Crampton, the engineer and contractor. The first was in Sevenoaks Weald and surrounded the end of the cutting near the southern entrance to the tunnel. The second was in White Hart Wood and used the spoil from shafts 6 and 7 as well as from the tunnel itself. The third was in Dunton Green, nearer to Polhill than Sevenoaks, its bricks being used for the tunnels at both places.

Within the tunnel timber was used for shuttering and props. The

men were supplied weekly with a bag of coal, to the value of 2s. 4d., to lessen the amount of pilfering of pit props used to fuel cooking fires. Removal of supports obviously put lives at greater risk. In March 1864 Jay applied to the magistrates for the appointment of a works constable, in to which post William Neville was sworn in July of that year. Except for cases of theft from the works he seems not to have intervened in any of the other illegal activities, such as poaching, fighting, gambling, home brewing for re-sale or theft from shops, in which the navvies regularly participated.

In April 1864 William Lambarde's solicitors threatened to serve notice on Jay to stop the contractor from using the trackway below his house, the same one in which shaft 5 had been mistakenly started. The letter also complained of the steam engines, of which there were now at least two under the hillside. Jay wrote back claiming that he had spent £200 on repairs to the trackway, always referred to by William Lambarde as a roadway, and that it was still being worked on and would ultimately be in a better condition than at any time previously. To lessen the obnoxious fumes he also offered to use coke or Welsh coal in his steam engines.

There were strikes during April 1864, and August was to witness a huge influx of water into shafts 13, 14, and 15. By then only 2250yd of tunnel had been driven and 400yd of brickwork completed. Peter Ashcroft was again reporting to the board the contractor's failure to procure enough labour, a situation which he still hoped would improve after the harvest.³¹

In that summer Jay opened a small school for the navvies' children in the tin church. He also opened his grounds for a children's treat and allowed the Temperance Society the same facility.³² However, things were going badly for him. The SER do not appear to have advanced extra money to meet the difficulties caused by the water encountered in the tunnel. In the heat of the summer living conditions for many of the work force were very unsanitary. Karl Marx was to refer to a report of the cases of smallpox in the Polhill encampments during 1864.³³ September saw a riot in Weald involving over 200 people, most of whom appear to have been gangs of Irish and navvies' families involved in hop picking.³⁴ In October the Sevenoaks Nuisances Removal Committee were suing Jay for the lack of sanitation on the huts in Shangden. William Lambarde's solicitors wrote complaining that the Notice served in August had not been complied with but by this time Jay had probably already left the works. In November a Bill was filed by William Lambarde against the SER in Chancery.³⁵

By January 1865 Jay had been usurped in both his position on the board of the Water Company and his lease of *Kippington* by W. J.

Thompson, a London tea merchant. The Company Minutes and several references in the *South Eastern Gazette* indicate that Jay did not remain to complete the undertaking although no evidence can be found for bankruptcy. He had to leave his plant, as this automatically became the property of the SER once it had been brought on to the site. A lengthy legal battle for its return continued even after his death in 1872 while it lay in a meadow opposite Sevenoaks Station. Peter Ashcroft took over and completed the works. In his report to the Board of February 1865 he was optimistic, reporting that he felt sure the water problems had been resolved and that skilled labour would shortly be arriving. The Bickley tunnel (on another SER construction project) had been completed and the five locomotives, sixteen pumping and winding engines, twelve brick and sawing machines, 150 horses and 1,500 men used in that work could now be redeployed to Sevenoaks. In the same month a driver lost control of his engine and plummeted four men over 100ft down a shaft.³⁶ By the following July, the sub-contractors Hawley, Turner and Else had failed and 100 unpaid navvies marched on the SER office in Sevenoaks to demand wages.³⁷ Someone wrote to the Privy Council anonymously complaining that smallpox was so rife in the town that the Pest House had insufficient room to house all the cases.³⁸

The cutting at the northern entrance to the tunnel was badly held up for want of masons, with 140,000 of the 355,000 cubic yards. it contained remaining to be cut. This 800ft long cutting was over 100ft deep at the tunnel entrance which was unusual in that it was considered that a cutting of over 60ft was more expensive to execute than a tunnel. By August 1865 there had been more strikes and the water had again broken through in the tunnel. Yet despite these problems Peter Ashcroft could report to the board that 30yd a week were being completed in the tunnel.³⁹ In Sevenoaks a small celebration took place with a dinner for 80 guests held at the *Prince of Wales*, a shant⁴⁰ at the Weald end of the tunnel. It was to mark the meeting of the headings between shafts 2 and 3, the heading from shaft 2 to the cutting was also well advanced.⁴¹

Lambarde's case against the SER was being actively pursued in Chancery during 1865. Not only was he complaining about the misuse of his roadway and presence of steam engines but also about the distribution of spoil, demanding the right to direct where it was put. The final outcome has not been ascertained but a handwritten paper, signed by Peter Ashcroft, suggests that William Lambarde was to be given a further £1,100 to allow the SER to get on with the job.⁴²

The early months of 1866 may have looked promising as work was advancing by 40-45yd a week. This year, however, was to see 'Black

Friday', 11 May, when Overend, Gurney & Co. Ltd., stopped trading and the Stock market crashed causing shock waves throughout the railway companies. The cholera epidemic of 1866 may have had an effect on construction. (There were cases amongst the navvies on another line at the Blackham works, approximately 8 miles from the Sevenoaks tunnel.) The lack of reported cases in the Sevenoaks area may have been due to the fact that doctors either failed to recognise the disease or hoped to cover it up as they had tried previously with the smallpox outbreak.

Accident figures were rising for the tunnel, although they were low compared to similar works of the period. They were often horrific as when four men fell 250ft to the bottom of a shaft in April; in August a man was struck on the head by a brick dropped from the top of a shaft.⁴³ Many smaller incidents would have gone unreported. The badly injured were loaded aboard the trains of the Sevenoaks Railway Company and sent to Guy's Hospital, London. Sevenoaks had no hospital of its own at the time and it was considered that it would be an unnecessary expense to build one as it would not be required once the railway had been constructed. At least six men lost their lives on the construction of the tunnel and cuttings at either end. Severely injured men were often sent to the place from which they originated; by their removal from the area deaths attributable to the tunnel construction were not always reported locally.

For want of labour, so much of which was now employed by the rail company, the excess traffic, caused by rail construction, and the pipe laying of the water company, the roads were in a terrible state of repair. Well above average rainfall further added to their deterioration hampering the delivery of materials to the construction site. By the end of August 1866 work on the tunnel had slowed, advancing by only 28yd a week. The tunnel had been completed from the southern end with all the shafts bricked to the point where the water was encountered, from shaft 11 at Shangden to shaft 15 at the northern entrance. It was now apparent that the line would not be open for the Paris Exhibition in April 1867. The SER had hoped to pick up extra passenger traffic by advertising this more direct rail route from London to the Continent. The cutting at the southern end was still proving a major challenge, the 'bine' proving difficult to handle and in February Peter Ashcroft complained to the board of the troubles and cost involved in forming this into an embankment. Being very unstable it had been the scene of at least two fatalities due to slips.

By May 1867 the line from Chislehurst was completed to the Polhill tunnels, those tunnels being on the point of completion, as was the Sevenoaks tunnel with only the track remaining to be laid. The line

from the southern end of the tunnel to Tonbridge still required work. Several inspections were made by Captain Tyler, the Government-appointed Inspector, before the line, to Sevenoaks only, was passed in February 1868. Passengers were carried from 2 March from Sevenoaks to London but it was not until the 1 May 1868 that the line through the tunnel was opened for both goods and passengers, with none of the customary ceremony to mark the event.

Conclusion

Labour and water were the main concerns of the engineers on the Sevenoaks tunnel. With regard to the labour force the press and local population seem to have considered almost everyone involved with the railway, including those in the brickyards, as navvies. Local men were, initially, only taken on in the brickyards or for pick and shovel work, mostly outside the tunnel. Poorly fed farm labourers had developed neither the skills nor the physique for such strenuous work as tunnel construction. Agricultural labourers were not only tied to their employer for a year but married men with families also had to consider the accommodation which they would lose. For the Sevenoaks and Polhill tunnels a large number of experienced navvies with a wide variety of skills was required, working as miners, masons, bricklayers, timbermen and explosives experts inside the tunnel, and carters, smiths and engine drivers outside. What evidence can be found for their prior residence, mostly through parish registers or nicknames, indicates that they were drawn from all over the country, but little foreign or Irish labour was employed. (A myth has grown up locally that Welsh miners were employed in cutting the Polhill tunnels, but there is no evidence of this.) The abundance of work and the knowledge of their worth led to some militancy. Wages were good; a bricklayer could earn 36s. a week and unskilled men 2s. 4d. - 4s. 0d. a day. Pay was weekly via the 'gangers' who collected the wages from the SER Company office in Sevenoaks.⁴⁴ Wage levels were affected by periods of lay-off due to the weather, strikes, and the honesty of the 'gangers' who employed the men. The strikes reported in both 1864 and 1865, were called in order to keep out foreign or Irish labour, as the men believed they undercut English wages.

The span of the Sevenoaks tunnel is 24ft 8in. and it was built to contain a double track, this being originally laid on shingle from Dungeness beach. Its gradient runs uphill from Tonbridge, being 1 in 132 through the tunnel, and then slightly downhill into Sevenoaks Station. The cross-section of the tunnel was determined by the strata through which it passed, and is best described as horseshoe-shaped.



Fig. 3. A team of Navvies

Jay's failure was probably due to an incorrect assumption that only an easily worked homogeneous sandstone would be encountered.

On completion the roof of the Sevenoaks tunnel required lining with galvanised iron sheet to deflect the water; the tunnel sleepers and rails still only lasted half the time of those in the drier conditions *outside*. The SER only carried small loads on good trains for some time not wishing to strain the embankments. The shingle was held responsible for a major derailment in 1927 and in consequence eventually replaced. The clay to the southern end has slipped on more than one occasion, closing the line for some months prior to the Second World War.

As a feat of engineering Sevenoaks tunnel is mostly an unseen marvel, said in its whole length to be no more than half a brick out of alignment.⁴⁵ Even with all the trouble the water caused the total cost of making the line, including stations and signals, came to £900,000, less than the Company's original estimate.

NOTES

¹ At the time Tonbridge was still being spelt Tunbridge.

² Sevenoaks Weald became a civil parish in 1894.

³ Details kindly provided by John King, Records Manager, RAILTRACK, Waterloo Station, London.

THE CONSTRUCTION OF THE SEVENOAKS RAILWAY TUNNEL 1863-1868

- ⁴ A. Blower, *British Railway Tunnels* (1964), 103.
- ⁵ Personal correspondence, in private hands, of the tourist Johnathan Hutchinson F.R.S. who stayed at the *White Hart Inn* at the time of the tunnel construction.
- ⁶ S. W. S. Skempton and A. G. Weeks, *The Quaternary list of the Lower Greensand escarpment and Weald Clay vale near Sevenoaks, Kent*, The Royal Society, London (1976).
- ⁷ W. A. L. Marshall, *A Century of London Weather*, H.M.S.O. (1952), 68 - 71.
- ⁸ H.L.R.O., The House of Commons Committee on the Tunbridge and Dartford Railway Bill, Select Committee Evidence, Volume 1, (1862), 7.
- ⁹ *Ibid.*
- ¹⁰ *Ibid.*
- ¹¹ P.R.O. 26. Vic. c. 96, (1862), Clause X.
- ¹² Select Committee Evidence, *op. cit.* (see note 8).
- ¹³ RAILTRACK (formerly British Rail Property Board), Deed Room, South-eastern, Euston, Francis Austen, Articles of Agreement (1863).
- ¹⁴ *Ibid.* Mary, Dowager Countess Amherst, Articles of Agreement (1863). (Source, as for note 13)
- ¹⁵ C.K.S. Sevenoaks Library, U. 962/L10A, Beechmont Estate Papers, Affidavits, William Lambarde v. The South-eastern Railway Co., 10 January 1865.
- ¹⁶ P.R.O. RAIL 635, South-eastern Railway Directors' Minutes, 1863 - 1868, 27 August 1863.
- ¹⁷ C. M. Devereux, *Railways to Sevenoaks*, Oakwood Press, Blandford, Dorset (1976), 9.
- ¹⁸ As reported in *The South Eastern Gazette* (hereafter *S.E.G.*) 19 May 1863, 2 e - f. Sir John Fowler constructed the Metropolitan Railway line from Paddington to Farringdon Street in 1859 and it is therefore likely that John Jay had worked under him.
- ¹⁹ A report of the opening ceremony can be found in *S.E.G.*, 19 May 1863, 5 e - f.
- ²⁰ S.E.R. Directors' Minutes, *op. cit.* (see note 16).
- ²¹ *The Sevenoaks Express*, 4 August 1863.
- ²² 'Drumming up', the brewing of tea.
- ²³ Hutchinson, *op. cit.* (note 5).
- ²⁴ Although reported in at least two local papers as being a man named Cheale. The death was recorded, by the Tunbridge Wells Registrar's Office, as Entry 156, Sevenoaks District, 21 November 1863, William Leaver, male, 17 years, Railway Labourer, cause of death drowning.
- ²⁵ *S.E.G.*, 24 November 1863, 5 c - d.
- ²⁶ This then ran all the way to Tonbridge Station where it supplied the steam trains until no longer required in 1963.
- ²⁷ *S.E.G.*, 15 December 1863, 5 d.
- ²⁸ S.E.R. Directors' Minutes, 25 February 1864.
- ²⁹ P.R.O., Sevenoaks Water Works Company Limited, 1864, BT 31, 1473c.. Indentures.
- ³⁰ A man named as Hoare died after being struck by flying timber as reported in the *S.E.G.*, 17 January 1865, 5 d.
- ³¹ SER Directors' Minutes, 25 August 1864.
- ³² Several papers reported that, due to the death of Mary, Dowager Countess Amherst, the Temperance Society had kindly been allowed the use of the grounds of Kippington.
- ³³ K. Marx, *Capital*, vol. 1, 1867, Penguin (1986 ed.) 818-20.

³⁴ *S.E.G.*, 13 September 1864, 5 d - e.

³⁵ Chancery Proceedings. See note 15.

³⁶ *S.E.G.*, 14 February 1865, 5 d.

³⁷ *S.E.G.*, 11 July 1865, 5 e.

³⁸ *S.E.G.*, 22 August 1865, 5 d.

³⁹ SER Director's minutes, 31 August 1865.

⁴⁰ Poor quality accommodation for itinerant labour, often constructed by a ganger for his employees.

⁴¹ *S.E.G.*, 18 July 1865, 5e-f.

⁴² Beechmont Estate papers (see note 15).

⁴³ *S.E.G.*, 21 August 1866 5-d, reported that a man named Basby was in such pain, having had a brick dropped on his head from the top of the shaft, that it took six men to hold him down on his journey to Guy's Hospital in London.

⁴⁴ *S.E.G.*, 19 June 1866, 5 d, recorded the wage of a bricklayer; the other wages are deduced from T. Brassey, *Work and Wages* (1872), 23.

⁴⁵ Information from Mr A. J. Gibbard, employed as a ganger within the tunnel (1935-75), both of whose grandfathers were employed on the construction.