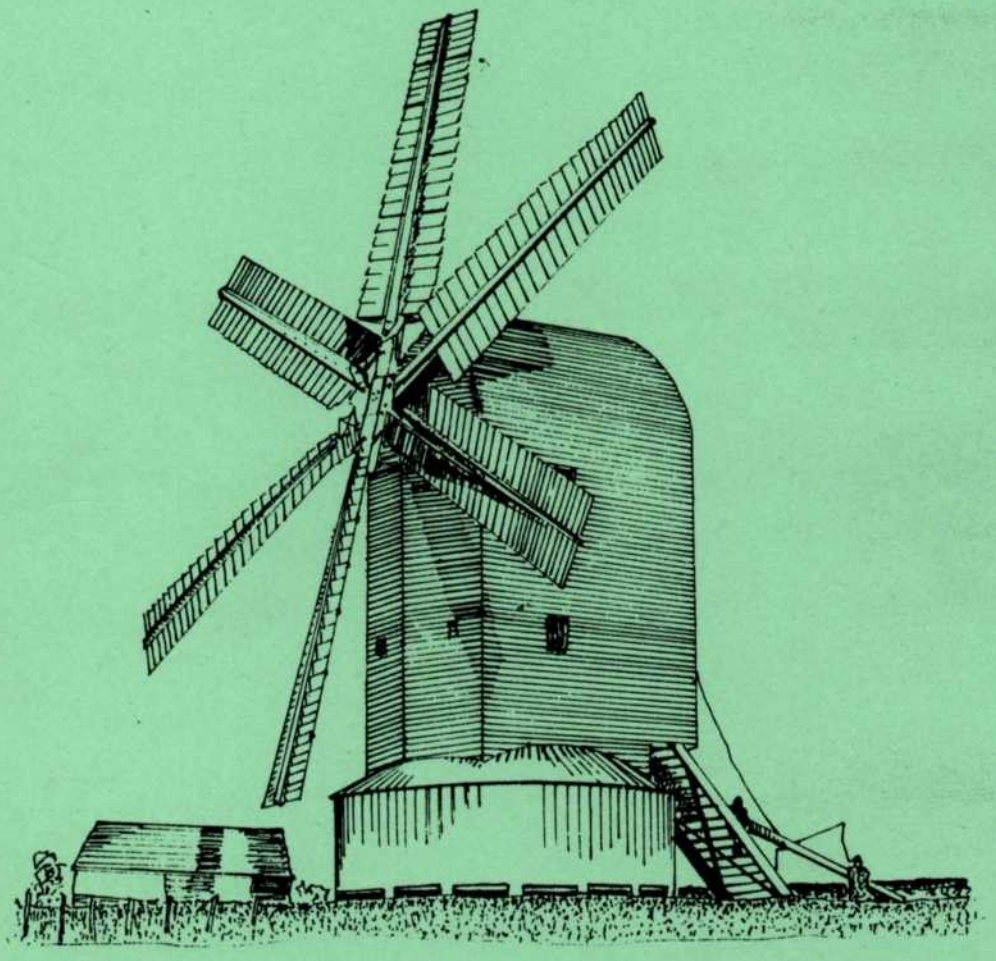
SUSSEX INDUSTRIAL HISTORY



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WILLIAM GAGE

The Bognor Gas, Light & Coke Company Ltd. 1865-1939

The use of gas as an illuminant was adopted by many towns during the first half of the nineteenth century and in the majority of cases the supply of gas especially during those early years was in the hands of private statutory companies. In most places the local authorities of the day were quite incapable of organising a utility of this kind.

The first evidence of a gas supply for Bognor exists with a contract dated 4th March 1851 between Messrs Snooke & Others of Chichester and the Commissioners of the Local Board for the erection of a gas works on land now known as Argyle Circus and for the supply of public lamps with gas.(1) However, it was not until 1865 that the Bognor Gas Light and Coke Company Ltd was formed for the purpose of making supplying gas, coke and other by products to Bognor and adjoining parishes.

On 7th March of that year fifteen gentlemen subscribed to a Memorandum of Association drawn up by a local solicitor, a Frederick Elkins, who was further instructed to draw up Articles of Association.(2) Both the Memorandum & Articles according to Mr Elkins' bill of costs, were duly registered at the Joint Stock Registry on 19th April 1865. The original capital was £3000 divided into 600 shares each of £5 and the Memorandum stated that the qualification to become a director was the possession of at least five shares.

Of the original issue of 600 shares ten were held by John Hammond Senior who was one of the subscribing members to the Memorandum. John Hammond Senior was born in Lewes in 1816, the son of Henry and Ruth Hammond. By trade Henry Hammond was a brazier. In 1840 John Hammond married Mary, the daughter of William Southon, a baker of Brighton and the first of their twelve children was born at Bognor in 1842, named John after his father. John Hammond Senior described himself as a whitesmith and a billhead of c1850 lists his activities as a brazier, tin and iron plate worker, gas fitter and manufacturer, ironmonger and bell hanger. He died in 1889. A further ten shares were held by his brother Alfred. John Hammond Junior was also a shareholder and he eventually became manager of the Company until 1874 when he left to go to a similar post at Lewes and then to Eastbourne. He died in 1914. He was succeeded at Bognor by his youngest brother William Hammond who remained Manager and Secretary of the Company until his death in 1906. His place was taken by his son Wallace William Hammond who remained manager until his retirement in 1942.(3)

While the company was being formed John Hammond Senior was given the task of preparing a tender for the supply of gas to the town's street lamps which was accepted on 20th March 1865. Nevertheless the Company's solicitor had to amend the draft agreement by the addition of a clause giving the Company the exclusive right to supply private consumers as long as the Company was willing to supply the public lamps of the town at a price not exceeding 7/- per 1000 cubic feet of gas.(4) The Commissioners of the Local Board had previously insisted that the price should never exceed 6/- per 1000 cubic feet, however, the Company's revised figure being agreed, the contract was duly signed by both parties on 16th May 1865.(5) It should be noted that four years later (November 1869) the Company accused the Local Board of breaking the agreement and the Commissioners countered by asking for the appointment of an arbitrator to interpret the terms of the agreement in dispute(6) - for many years afterwards there were disagreements between the Board and the Company usually over payment for damages which had been caused by workmen in the process of laying pipes or over the terms of

the supply of gas - but back to the Company.

It was with the knowledge of an assured source of revenue that the Company set forth to find premises of its own. Indeed at the first recorded meeting of the Directors on 22nd April 1865 the Secretary was instructed to negotiate the purchase of a piece of land for £300 from a Mr Gardener, while at a meeting four days later he was also instructed to purchase the existing Gas Works at Argyle Circus, which belonged to the Chichester Gas Company and located a little to the north of Mr Gardener's land.(7) However the purchase of the latter was not concluded for on 23rd May a meeting of the Directors approved the purchase of the Chichester Company's Argyle Works for the sum of £1,400.(8) This meeting also approved the appointment of William Longthorne as manager of the works for a "weekly stipend of 28/-, the use of Cottage, coals and gas free of charge". The purchase of the works was completed in June and the Bognor Company became the owners of a gasometer, cottage and other buildings, complete with stock and tools worth £177-10s-9d.(9) A year later an additional piece of land was purchased to enlarge the site of the works, at a price of £100 from Thomas Charles Marshall.

At the time of the formation of the Bognor Gas Company the nearest railway station was at Woodgate, a matter of four miles distance from Bognor so coal for gas manufacture was brought in small sailing vessels from Newcastle, unloaded on the sands at low water and then carted through the town to the gas works situated only half a mile from the sea shore. However some captains were reluctant to risk beaching their vessel and therefore unloaded their cargo of coal at Littlehampton which meant a much longer journey overland of approximately 12 miles.(10)

Nevertheless whether the coal was landed off Bognor or at Littlehampton it was subject to duty of 2/- per ton this being the amount of the Town due then enforced which was also imposed on goods such as coke, timber and ashes. As gas coal could then be bought and transported for 14/- per ton it can be seen that this duty was a heavy one for the Company to bear, but in spite of this taxation the Bognor Gas Company prospered even though Town dues continued to be imposed by the local authority (the successors of the Board), until they were eventually abandoned in 1912.

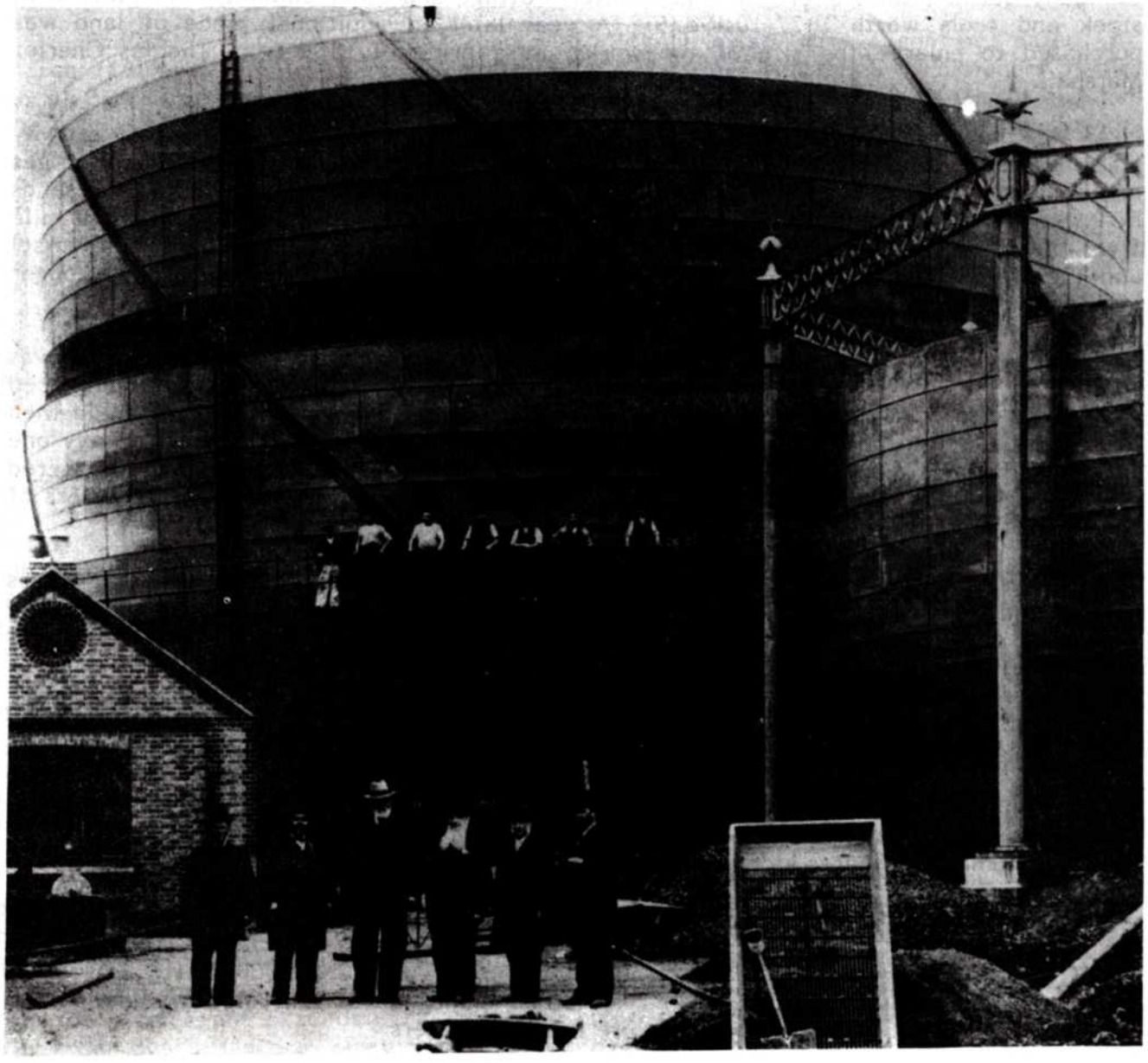
All seaside resorts were becoming very popular not only for holidays but as places to live and Bognor was no exception, therefore, there was an increasing demand for the supply of gas as more houses were built in the Bognor area. Practically every other meeting of the directors during the early years approved applications for the laying of pipes in order to extend the company's supply of gas. In 1883 the minutes for January recorded that the quantity of gas sold was 220,000 cubic feet more than during the same period the previous year and with a net balance to the credit of profit and loss account of £916-9s-8d a dividend at the rate of 10% was recommended.(11) The dividend on the original shares remained at this level until 1898 when it dropped to 5% on the original shares and 3½% on new shares - these had been issued on a number of occasions and by 1892 the number of shares stood at 2350.(12)

Ever increasing amounts of gas continued to be consumed. In 1883 the amount of gas made was 11,132,000 cu.ft. while 10,146,000 cu.ft. was sold using 1,110 tons of coal.(13) Two years later the corresponding figures were 12,446,000 cu.ft., 11,430,000 cu.ft. and 1206 tons respectively.(14) Not all of this gas was consumed by illumination, for in 1883 the Company had begun to hire out gas cookers.

By this time a railway line had been built to Bognor, but as the station was the same distance from the gas works as was the seashore, coal continued to be transported by ship. However, this form of transport had its disadvantages, for example, the minutes of November 1893 state that the ship "Green Olive" on her way north to take on a cargo of coal from the Pelaw Main Colliery Company of Newcastle upon Tyne, at 5/6d a ton lost her sails in a gale and had to put into Gravesend to refit.(15) As by 28th December

she had still not returned with the awaited shipment, coal had to be ordered from local merchants, Stephenson, Clarke & Co. In 1895 the Worthing Gas Company was in a similar difficulty over coal supplies and an arrangement was reached with the Bognor Company whereby Worthing took one hundred tons of coal from a load for Bognor which was being discharged at Littlehampton on the understanding that repayment would be made when the Worthing Company's ship came in.

In order to secure a regular supply of coal and at the same time avoid the payment of Town dues, the manager in a report to the directors, proposed a new works situated outside of the town boundaries together with a direct rail link to the main line which would enable a reduction of the coal bill by 2/6d per ton on 1,200 tons of coal. The



Gasholder at the Argyle Works of the Bognor Gas Light and Coke Co., possibly the commissioning of the new gasholder authorised in 1893. Of the group in the foreground the second from the left is John Hammond Junior and the first on the right is his brother William Hammond.
(Gerard Young Collection, Bognor Regis College, West Sussex Institute of Higher Education)

report was received by the directors in 1885 but such a scheme would have cost £10,000(16) - a sum beyond the Company's means and so the decision was taken to remain on the Argyle site and extend the works with a new coal shed and a new tar and liquor tank capable of holding 4000 gallons. Two years later a new retort house at a cost of £250 was planned and in June 1889 the manager reported that it was in operation with the old one being taken down,(17) while 1893 saw the construction of a house for the manager's use and of a Company boardroom.

The Company continued to prosper, and to meet the ever increasing demand for gas, the directors decided in 1893 to build a larger gas holder which could be in use by 1895. On the advice of the manager, William Hammond and of his brother John, who was not only a director of the Bognor Company but also the manager of Eastbourne Gas Works, the Company accepted the tender of R. & J. Dempster of Manchester for the erection of a Gadd & Mason Gas Holder for £2,760.(18)

By this time Government standards had to be adhered to in the supply of gas and accordingly in 1894 the Bognor Company purchased a photometer to measure the candle power of the gas. In the following year the Board of Trade's minimum of fourteen candle power was increased to fifteen and at the same time the maximum price of gas was fixed at 4s1d per 1000 cu.ft.

The Company during this period was frequently introducing new schemes, for example in the director's minutes of October 1899 there are references to the "Penny in the Slot System" i.e. gas meters, which had attracted twenty-one new customers on a new estate, and that "three dozen slot cookers had been installed with another three dozen on order".(19) Nevertheless the increasing consumer demand required the purchase of more coal which also meant the substantial payment of Town dues to the Council with whom relations had been anything but cordial. There had been a number of disagreements over the payment of damages caused through the installation of gas mains as well as over the payment for the actual supply of gas; regarding the latter the Council threatened to extinguish all lamps after midnight.(20) In this situation the Gas Company re-examined its plan for a new works outside of the town boundary to escape the dues and to obtain a direct connection to the railway system to facilitate the delivery of coal.

In May 1902 Bognor Gas purchased a six acre field at Bersted from a Carolus Munday for the sum of £1,100.(21) It could afford this outlay for the balance sheet presented for the last half year of 1901 showed a net balance of £2,085-6s-8d for there had been an increase in consumption for the last quarter of 1,058,000 cu.ft. compared with the figure for the previous year. This was, according to the directors "satisfactory considering the high price of coal" and they recommended a dividend of 10% on the original shares and 7% on the new ones.(22)

In the same way as a Parliamentary provisional order had been obtained for the erection of the new gas holder, so another had to be made allowing for the erection of a new works on the site acquired at Bersted, to extend the Company's supply to the neighbouring districts of Pagham, Barnham & Eastergate, and to raise the acquired capital to the extent of £35,000. Accordingly an Order was deposited with the Board of Trade and eventually on 5th May 1904 a letter from the Company's Parliamentary agents William Bell of Westminster confirming that the Order had been made was reported to a meeting of the directors.(23)

Even though the Company was now preoccupied with the planning of the new works, improvements continued to be made at the existing site. In 1904 a new office and showroom was constructed and a new carberetted water gas plant boiler together with new purifiers were purchased and installed.(24) The Company continued to prosper and in the manager's report to the directors, of 4th September 1906 he announced "an increase of 9.69% in gas sold during the past year while over a period of five years this increase was 55% culminating in a total production for 1904 of 20,284,000 cu.ft of coal gas and

1,311,000 cu.ft of carburetted water gas.(25)

In 1908 the Bognor Company obtained a Bill for the purposes of dissolving and re-incorporating the Company and enabling it to extend its area of supply.(26) This year also saw the Company providing the manager with a means of transport - the directors empowered the manager to purchase a bicylce for his own use at a cost of around £9.(27)

The following year witnessed a great deal of activity in obtaining estimates for equipment for the new works - a new 12 inch trunk main was required to link the existing gas holder at the Argyle Works to the new gas holder to be constructed at Bersted. The specification for the latter required "a 6" pressure in the first lift" and a capacity of 250,000 cu.ft. "with a suitable steel tank and spiral guides to the holder and with provisions for a second lift when the demand for gas necessitated enlargements which would be in 10 to 15 years later".(28) The contract for the latter was awarded to Messrs Clayton & Sons for £5,026.(29)

The year 1910 saw the start on the construction of the new works under the direction of the construction engineer, John Hammond who had earlier been the manager of the Bognor Works prior to his departure to Lewes in 1874. The first phase of the work was the installation of the Company's vital link to the London & Brighton South Coast Company's railway line together with the erection of the gas holder. By the end of the year the engineer had written to the directors stating a total cost for the new works of £17,511.(39) The foresight of the directors to build a new works at a time when electricity was being introduced for lighting was probably confirmed by the appearance of an article in Gas World which reported the removal of electricity from the premises of the Society of Medical Officers of Health and the re-installation of gas.(31) When the directors saw this paper they requested the Secretary to circulate copies to the Company's consumers.

March 1911 saw the directors approving further works "according to the plans and specifications and prices as submitted by the Engineer", so that, "the works could be erected within the time specified by this Company's Act of Parliament".(32) However the directors became quite concerned when the progress was far from steady. John Hammond wrote to them on 31st August, 1911 reporting "that the new 12" Trunk Main to join the old Gas Works to the new Works has been carefully connected up at both ends, with all necessary valves and fittings to control the satisfactory working, and gas is now being stored in the new Holder ready to be turned on to the new extension of the Mains, probably today or tomorrow. The New Retort House is erected, and is a most satisfactory job, but other parts of the plant are and have been seriously hindered by the simultaneous construction of a new double line of railway through the new works site, also the dumping of over 1000 tons of new embankment".(33) It seems that not long after the new siding had been installed for the new works the railway connection had to be rearranged owing to the railway company making its line to Bognor, double, instead of single track.

About this time the Company was threatened with competition from electricity, for a man by the name of William Tate had built his own electrical generating plant and was, with the Board of Trade's permission, supplying energy to a number of premises in the town. The Company therefore commissioned experts to examine the desirability of the Company seeking its own powers to supply electricity. They reported that "we are both mutually agreed that it's essential to the best interest of the Gas Company that steps be at once taken to secure the proposed powers", moreover the Company "could supply Electricity much cheaper than either the Urban District Council or Mr. Tate ... and thus stop the competition of the Urban District Council or Mr. Tate in the future".(34) This reference to the local council was made because at the last Parliamentary session the U.D.C. had applied for a renewal of its Order to supply electrical power which had been granted some years earlier but which it had failed to initiate. However, this most recent application was refused on the grounds that the

Urban District Council could not show the scheme to be economically viable.

Accordingly at the end of the year (1911) the terms of a Bill for the Bognor Company to supply electrical power in its existing area were drawn up and submitted to Parliament. By May 1912 the Parliamentary agents had reported the passage of the Bill through the House of Commons and on 12th August 1912 the Chairman of the Company reported to the directors that the Royal Assent had been given to the Bill.(35)

Following the successful passage of the Bill the Company proceeded to negotiate with Mr Tate and buy out his electrical generating concern "in consideration of £1,750 for the said plant ... of which plant to the value of $1,450 passes by delivery and the sum or balance of £250 for the said easements, wayleaves rights and facilities of access (sic)".(36) Much to the disgust of John Hammond who wished to retain the old works for gas in case of emergencies at the new works, the directors decided to use the old gas works site at Argyle Road as the location for a new generating station for electricity. Most of the buildings were adaptable for that purpose and eventually after the purchase of electrical plant for the sum of £11,000(37) the Company sent out electricity in July of 1913. In spite of all this expenditure the Company's balance sheet showed a profit on the previous six months working of £2,531-2s-3d - in fact the new works was producing 370,000 cu.ft of gas per day to keep up with the demand. The Company, however, still required capital as the total cost of the new works eventually came to £23,701(39) and during this year there were a number of sales of stock.

During the period of the First World War, the Company's plans for extension, i.e. the laying of new cables and mains were, in common with other concerns, seriously hampered by financial restraints. As early as December 1914 the Lighting Committee of the Bognor Urban District Council informed the Company that "having regard to recent hostile Air Raids on the East Coast.....considered that in the general interests of the public it would be safer for military reasons that no public lamps be lighted in the town and had decided not to enter into a fresh contract, at present, for the supply of gas for public lighting".(40) It would be interesting to know whether this decision had any bearing on the refusal of the directors in September 1915 to pay a subscription to a fund organized by the Red Cross for the provision of a motor ambulance for the wounded at the Front.(41) Nevertheless during the second half of 1916 the company made a profit in the gas and electricity departments of £2,796-19s-5d and £141-15s-9d respectively.(42) However at the end of the year the manager was instructed to inform the staff that in the present circumstances they had probably received the last allowance for Christmas gifts.(43)

The following year saw the conversion of Bognor's most prestigious hotel, The Royal Norfolk (a position which it still holds) from gas to electric lighting. The year 1917 also witnessed dissatisfaction among the staff, and eventually at a directors' meeting on 10th August a deputation of three men waited upon the Board with a request for an increase in wages of at least 25%.(44) With so many men away at the Front, and labour hard to come by it was hardly surprising that at this meeting the Board agreed an increase in the war bonus that was being paid, furthermore, at a meeting the following year it also agreed to a "further 12½% increase to workmen which the Government were granting to Gas Undertakings".(45) This increase cost the Company £693 p.a. Having appeased the men the Company eventually increased the salaries of its Manager, Secretary and Electrical Engineer to £400, £300 & £260 p.a. respectively.(46)

By the early 1920s the Company was in a more prosperous position, having issued in 1919 £16,257 worth of redeemable debenture stock.(47) Once again further gas mains were being laid and an electrical supply was made available to the rapidly growing residential area of Aldwick, situated approximately three miles from the town centre. The statement of accounts for the six months ending December 1922 showed a working balance of £5,833-13s-6d for gas (allowing for the usual depreciation of meters and stoves) and £2,390-9s-3d for electricity.(48)

During the war as materials etc. had become scarce the price of energy had risen but as supplies became more abundant the Company was able to make a reduction in the prices of gas and electricity. In 1923 the Company reported to shareholders "a reduction of 2s 5d per 1000 cu.ft. to gas consumers since 1921 and electricity consumers had the benefit of a good reduction in the price of current, now 10d per unit for the first 100, 9d per unit for the second 100 and 8d per unit for all over 200 units consumed per quarter".(49)

Bognor continued to grow in popularity and this lead to many more properties being built in the area and consequently increased demand for both gas and electricity. To cope with the requirements for electrical power a three cylinder engine and dynamo had been ordered from Mirrlees Bickerton & Day Ltd. at a cost of £5,650.(50)

Another Act was passed in 1927 enabling the Company to extend its area of supply chiefly for electricity "to include the parishes of Arundel and twelve parishes in East Preston and Westhampnett Rural Districts" and to raise additional share capital of £150,000.(51) Under the terms of the Act the Company became known as the Bognor Gas & Electricity Company.

At this time both the output of gas and electricity had increased by 15 & 20% respectively compared with the corresponding period of 1925, and there was a need for additional manufacturing plant.(52) Therefore the Company decided to erect a modern carburetted water gas plant of 500,000 cu:ft. daily capacity, together with a new boiler house, engine room, with provision for an additional carburetted water gas plant.

This eased the situation for a time but the plant was still insufficient to meet the ever growing needs of the town and so in 1930 arrangements were made for an additional new carbonising plant with electrical machinery for charging, discharging and handling the coal and coke etc.(53) This was soon followed by the erection of a coke cutting and grading plant giving three grades of gas coke and another section of four purifiers and a napthalene brush washer. A year earlier the Company had also decided to change its electrical supply from direct current to alternating current (a.c. had been found to be more adaptable and has remained in use ever since). The Secretary informed the directors in January 1929 that the Company would incur an expense of some £850 to change over "the West End section of the town".(54)

The Company continued to prosper. The accounts for the end of 1931 showed an amount standing to the credit of profit and loss account of £19,178-15s-6d with dividends amounting to £6,882 leaving £12,296-15s-6d to be carried forward".(55) With this favourable financial situation the Company built new offices and showrooms on a corner of the Argyle Road Works, opened at Easter 1931. This new and up to date addition to the Company's premises was constructed by The Nautilus Company of Luton and provided ample and comfortable accommodation for the staff as well as a finely equipped showroom which enabled both gas and electrical appliances to be shown to the best advantage.

The question of gas storage and pressure was then examined by the Company and after careful consideration it was decided to erect a waterless gasholder of 1 million cu.ft. capacity which would provide a maximum pressure of twelve inches - the contract for the supply of the holder was awarded to Messrs R. & J. Dempster Ltd. of Manchester for the sum of £2,440.(56) The actual construction was commenced in March 1933 and it was completed and commissioned in December of the same year. Even today this same holder dominates the skyline of Bognor Regis.

The prosperity and expansion of the Company continued and in 1935 a gross profit of £16,292-11s-4d was reported to a meeting of the shareholders.(57) During this year Bognor Urban District Council offered to purchase the Company's undertakings. The Directors however "decided that the best interests of the consumers & the Town will be

served by the Company retaining its undertakings, consequently all offers had been declined".(58) This decision was endorsed at a meeting of the shareholders. The Company then placed further legislation before Parliament and the Bognor Gas & Electricity Act 1935 which received the Royal Assent on 2nd August authorised the Company to raise additional money and conferred further powers upon the Company for other purposes.(59) In 1937 under the terms of the Act the shareholders agreed to raise £100,000 by the creation and issue of new and consolidated stock. Sales of gas and electricity had also increased by 3 & 18% respectively and after the payment of dividends £19,421-7s-2d was carried forward.(60)

On 16th August, 1938 the Bognor Company's seal was affixed to an agreement made with the City of Chichester Gas Company.(61) However owing to the nature of the agreement an application had to be made to the Board of Trade for the necessary Order & Act to give effect to the agreement. The legislation received the Royal Assent on 13th July and the Bognor & District Gas & Electricity Act 1939 authorised "the transfer to the Bognor Gas & Electricity Company of the Undertaking of the City of Chichester Gas Company" and conferred "further powers upon the Bognor Gas and Electricity Company" and permitted it to "change the name of that Company".(62) Under the terms of the original 1938 agreement the Bognor Company had to issue to the Chichester Company £46,676-10s and 9⅗d of Consolidated Ordinary Stock A in respect of each one pound of consolidated stock of the Chichester Company and £22,000 4½% preference stock of the Bognor Company in respect of each one pound 4½ per cent stock of the Chichester Company. The Chairman of the Chichester Company also had a seat on the Board of Directors.

The new company was called The Bognor and District Gas and Electricity Company and thus the 1939 Act witnessed the end of a Gas Company which during the past sixty-four years had been solely concerned with the supply of gas, and in the latter years of electricity to the town of Bognor and its localities. Nevertheless the accountant who had prepared a report on the proposed merger was proved correct when he wrote "I think the proposal is a sound one and one which should operate in the interests of both Companies and both sets of consumers".(63) In 1940 new showrooms and offices were built in East Street, Chichester, (seven miles from Bognor) and the Company returned a nett profit of £18,614-9s-11d for the year ending December 1939.(64) After 1940 the Company, by order of the Board of Trade was not permitted to present accounts or balance sheets owing to war time hostilities.

Although contemporary local newspapers reported that the Company suffered war damage to its plant and premises, this was not as severe as that received by other gas companies elsewhere. Nevertheless the large gas holder at the Bersted Works was such a prominent landmark that it was a constant target of enemy planes. Fortunately the bombs usually missed, with one exception, when in December 1942 a crippled enemy bomber crashed into the holder - even then the bombs which landed inside failed to explode.

The prohibition of financial statements lasted until 1948 by which time legislation had brought the public utilities of electricity and gas under full public ownership. At the last meeting of the shareholders, held on 11th March, 1949 the proprietors carried unanimously a record of their "appreciation of the services of the officers and all the employees of the Company not only during the past year but during the whole period of their service to the Undertaking".(65)

Today the Argyle Works and offices have all long since vanished, all that remains on this site is a small electricity depot, while the Bersted Works ceased the manufacture of gas in 1958. Yet the 1 million cu.ft. gas holder erected in 1933, and now painted in light blue still dominates the skyline of the town and remains a fitting monument to the Bognor Gas, Light & Coke Company Ltd.

West Sussex Record Office, Chichester

Appendix Financial Statistics from Directors' Reports W.S.R.O., Add MS 13,081

Date six months ending	Net Profit	Balance to reserves after payment of dividends
June 1885	£782 16s 1d	£305 6s 1d
Dec 1906	£3,128 7s 9d	£2,109 10s 3d
June 1907	£3,122 5s 9d	£2,153 5s 9d
Dec 1907	£3,800 3s 5d	£2,770 12s 2d
June 1908	£3,287 2s 4d	£2,196 19s 10d
Dec 1908	£3,3220 4s 3d	£2,132 5s 11d
June 1909	£3,133 9s 0d	£2,055 19s 4d
Dec 1909	£3,224 5s 7d	£2,145 18s 2d
June 1910	£3,156 1s 3d	£2,077 13s 10d
Dec 1910	£3,258 8s 7d	£2,048 0s 4d
June 1911	£3,266 5s 6d	£2,079 12s 3d
Dec 1911	£3,318 18s 2d	£2,001 4s 8d
June 1912	£3,095 14s 6d	£1,762 11s 0d
Dec 1912	£3,241 9s 5d	£1,765 13s 5d
June 1913	£3,376 16s 3d	£1,800 7s 9d
Dec 1913	£3,471 10s 7d	£1,703 8s 9d
June 1914	£2,767 13s 9d	£1,724 13s 9d
Dec 1914	£3,645 14s 0d	£1,803 4s 0d
June 1915	£2,911 14s 11d	£1,806 4s 11d
Dec 1915	£3,734 9s 2d	£1,988 9s 2d
June 1916	£3,413 11s 11d	£2,249 11s 11d
Dec 1916	£4,475 15s 9d	£2,729 15s 9d
June 1917	£4,330 18s 2d	£3,166 18s 2d
Dec 1917	£5,341 16s 0d	£3,563 11s 6d
June 1918	£5,198 5s 3d	£3,581 16s 3d
Dec 1918	£4,338 12s 2d	£3,174 12s 2d
June 1919	£3,959 15s 6d	£2,936 10s 0d
Dec 1919	£4,464 14 8d	£3,009 14s 8d
June 1920	£4,473 3s 11d	£3,018 3s 11d
Dec 1920	£4,815 17s 10d	£3,360 17s 10d
June 1921	£5,040 6s 11d	£3,585 6s 11d
Dec 1921	£7,986 17s 8d	£6,531 17s 8d
June 1922	£9,108 18s 5d	£7,168 18s 5d
Dec 1922	£11,589 7s 5d	£9,379 14s 11d
June 1923	£12,428 1s 5d	£9,948 16s 6d
Dec 1923	£12,903 1s 8d	£10,423 16s 8d
June 1924	£13,190 13s 9d	£10,603 11s 9d
Dec 1924	£13,787 17s 5d	£11,092 18s 5d
June 1925	£13, 11s 4d	£11,144 12s 4d
Dec 1925	£14,159 13s 1d	£11,230 10s 4d
June 1926	£16,020 15s 4d	£13,091 12s 7d
Dec 1926	£15,762 11s 2d	£13,067 12s 2d
June 1927	£16,771 18s 0d	£13,632 4s 0d
Dec 1927	£12,915 9s 6d	£9,591 7s 6d
Year ending 31st		
Dec 1928	£15,187 8s 7d	£10,794 10s 7d
Dec 1929	£15,999 1s 11d	£10,381 3s 11d
Dec 1930	£17,211 19s 9d	£11,129 19s 9d
Dec 1931	£19,178 15s 6d	£12,296 15s 6d
Dec 1932	£22,341 16s 11d	£15,459 16s 11d
Dec 1933	£23,282 15s 11d	£16,233 3s 11d
Dec 1934	£23,476 13s 0d	£16,259 9s 0d

Date Year ending 31st	Net Profit	Balance to reserves after payment of dividends
Dec 1935	£23,509 15s 4d	£16,292 11s 4d
Dec 1936	£23,985 19s 5d	£16,768 15s 5d
Dec 1937	£26,638 11s 2d	£19,421 7s 2d
Dec 1938	£28,555 0s 7d	£19,937 16s 7d
Dec 1939	£27,231 13s 11d	£18,614 9s 11d
Dec 1940	£22,251 11s 0d	£11,272 5s 5d
Dec 1941	£21,858 10s 0d	£11,269 17s 9d
Dec 1942	£22,163 5s 2d	£11,574 12s 11d
Dec 1943	£22,366 0s 0d	£11,777 7s 9d
Dec 1944	£23,555	£12,967
Dec 1945	£24,985	£14,397
Dec 1946	£26,259	£15,671
Dec 1947	£25,493	£15,887
Dec 1948	£35,962	£26,366

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M. I. POPE

Mineral Transport by the Telpher System - The Pioneering Work of Prof. H. C. F. Fleeming-Jenkin (The Story of the Glynde Aerial Railway)

Introduction

This is the story of the Telpher aerial electric railway at Glynde, Sussex; also of its inventor and promoter, Prof H C Fleeming-Jenkin. Both are largely forgotten today, yet in their time the construction and operation of this aerial railway created immense interest, which was widely reported in both the technical and popular press.

The most striking evidence of its existence now surviving is the wood-cut engraving shown in Fig 1, which once served as a book illustration. When the Telpher Line opened on 17 October 1885, it became the first electrically powered aerial railway in the world. Even then it incorporated an automatic system of absolute block working, making it physically impossible for two Telpher trains to enter the same section of track.(1) To put this achievement into perspective, it should be remembered that the world's first public electricity supply only came into operation at Godalming, Surrey, on September 1881.(2) Then, less than two years later, the first public passenger carrying electric railway in Great Britain was constructed in Sussex, by Magnus Volk of Brighton.(3) The original line ran for $\frac{1}{4}$ mile along the Brighton sea front in an easterly direction, starting from the Aquarium. It was constructed to a two foot gauge and opened to fare paying passengers on 4 August 1883.(4) Following its immediate success, work started in January 1884 to re-build the line using a 2' 8$\frac{1}{2}$" gauge and extend the route to Paston Place, giving a total length of 1400 yards, including a passing loop.

The Telpher system of mineral transport was first patented in 1882(5) and so dated from the earliest days of the commercial exploitation of electric power. It is this factor which makes the sohpistication of the Telpher line at Glynde all the more remarkable.

The life and Work of Henry Charles Fleeming-Jenkin

Henry was the only son of a Royal Navy officer, Capt Charles Jenkins RN, of Hythe in Kent. He was born on 25 March 1833, near Dungeness, where his father was posted on coastguard duty. The unusual name of Fleeming-Jenkin seems to have been in deference to an Admiral Fleeming who had, at some time, been a patron of his father.

Because Capt Jenkin was often away at sea, his wife spent much of her time in Scotland, with the result that Henry was educated first at Jedburgh and later at the Edinburgh Academy. On his father's retirement from the Navy, Henry moved with the family to Frankfurt in 1847. Then followed another move to Paris, in 1848, just at the start of unrest leading up to the Revolution of that year. This necessitated a further rapid move, now to Genoa. Fleeming-Jenkin, as he became known, attended the University of Genoa, subsequently obtaining a first class honours degree, with specialisation in electro-magnetism, during 1850.

After graduating, he spent some time working in a locomotive engineering shop, where he acquired many of the skills that would subsequently be put to good use in development of the "Telpher" system. On returning to England, he held various posts involving engineering and draughtsmanship, eventually settling in London where he met his future wife, Annie Austin.

In 1857, Fleeming-Jenkin joined Messrs R.S. Newall and Company of Gateshead, to work on the first Atlantic submarine telegraph cable. He continued with other submarine cable contracts until 1861, when he left Newall and Co to set up a business partnership with a Mr H.C. Forde. In this capacity he was involved in designing a submarine telegraph cable for a "Mr Reuter", who subsequently became world famous. This cable was manufactured by Messrs W T Henley and Company, then laid between Lowestoft and Norderney in 1866.

During the same year (1866) H C Fleeming-Jenkin was appointed Professor of Engineering at University College, London, but insisted on retaining his business partnership. Then two years later he became Professor of Engineering at Edinburgh University, subsequently forming another partnership with Sir William Thomson.

For the next few years little information is available about his career, until in 1882 he patented the system of transporting materials by aerial railway, which he called "Telpherage". This is described on the following pages.

Tragically, Prof Fleeming-Jenkin died before the first commercial Telpher System opened for traffic, at Glynde, Sussex, in October 1885. In fact he died in June 1885, probably as a result of blood poisoning, following a minor operation. Apart from his invention of the Telpher system, which is still in use, Prof Fleeming-Jenkin is also remembered as the author of a standard text book on electrical engineering,(6) now of course obsolete.

The Telpher Line at Glynde

The history of aerial ropeways can be traced back a very long way indeed, certainly as far as 1411.(7) However, Telpherage differs from the earlier aerial ropeways in that instead of hauling the suspended wagons by means of a continuous moving cable, the wagons themselves were powered by electric motors, taking their current from the aerial lines.

Telpherage was the invention of Prof H C Fleeming-Jenkin, who patented the system in 1882. The first experimental line was installed at Weston, near Baldock in 1883. This line was approximately 700ft in length and designed to carry a suspended load of up to one ton. Power was supplied to the motorised wagon by means of two contact wires, carried above the cable which supported the wagon itself. In the following year a similar system was set up at the Millwall Docks, London.

One great advantage claimed for the Telpher system was that it provided automatic block working, comparable with the best railway practice. Each train of wagons automatically cut off the electricity supply to the previous section, thereby ensuring that there would always be a "dead" section of line between any two trains. The ways in which this was achieved are discussed in the next section. Telpher trains

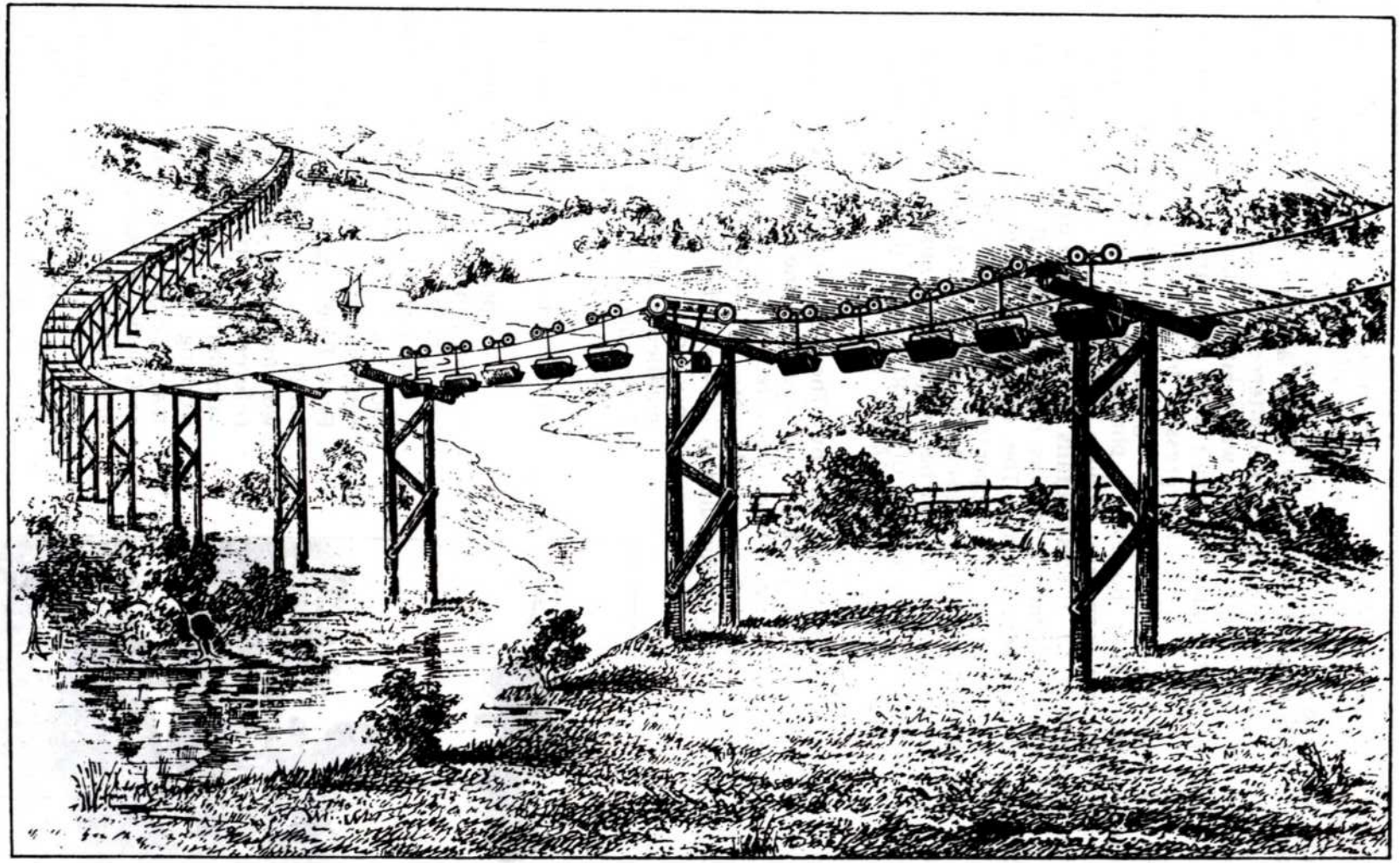


Fig. 1 - S.M.F. Brabner (ed.), The National Encyclopaedia (Glasgow 1884-85) Vol.13 facing p.347

could either be run on taut aerial cable ways, or on overhead steel monorails supported by poles.(8)

The first commercial application of the Telpher system was the installation of a double track aerial cableway between transfer sidings at the LB & SCR station, Glynde, Sussex, and some brick clay pits on the estate of Viscount Hampden. The route was approximately one mile in length but crossed about $\frac{1}{4}$ mile of tidal marsh on the banks of Glynde Reach, a tributary of the River Ouse, as well as the waterway itself. A conventional railway could thus have encountered considerable engineering problems, while the value of the goods to be carried was relatively low. The Telpher line employed steel rods as running rails supported about 18 ft from the ground by wooden posts, at intervals of 66 ft. A good general impression of the line and its environment can be gained from the contemporary wood-cut engraving, shown in Fig 1. Unfortunately no comparable photographs exist; however, a photograph does survive of a Telpher wagon in use during the nineteenth century, showing some details of the electro motors and traction power supply (Fig 2.) Precise details of the method of operation remain obscure, but it clear that a live contact wire was carried above the electric motors and the running rod provided an earth return. The length of each train of wagons was kept exactly to the distance between the supporting posts, which divided the track into block sections. As it advanced, a train energised the section of track ahead and automatically cut off the power supply to the section behind, thereby ensuring that it was impossible for two trains to enter the same section of track. Hence if one train stopped, then they all did.

Construction work was carried out by "The Telpherage Co Ltd" and the line was officially opened on 17 October 1885. A copy of the programme for the opening ceremony is shown in Fig 3. Each train consisted of ten wagons, travelling at 5mph; in this way some 300 tons of clay per week were delivered to the main line at Glynde Station. Sadly, Prof Fleeming-Jenkin died in 1885 and the system did not survive him for very long. However, Telpher lines were installed abroad by the "Consolidated Telpherage Co" of New York and later by Siemens Brothers at Woolwich.

Fig. 2 - Installation on Telpher System: Portion of Line with Truck and Carrier.

Mechanism of Operation of the Telpher System

Surprisingly few details of the method of operation of the Glynde Telpher Line can be gleaned from contemporary reports. Quite possibly this was regarded as an industrial secret at that time. However reference to the various patents(10) filed by Prof Fleeming-Jenkin during 1884 indicate fairly clearly how automatic absolute block working could have been achieved. Of the references cited, No.8751 is the most informative. Two methods of absolute block working are described; both apply to double track Telpher lines such as that constructed at Glynde. A pair of heavy gauge conductors are used both to carry current to the traction motors and to support the Telpher trains, forming one "up" and one "down" line. In addition, two auxiliary conductors are needed, one for each line, to carry the return current. These auxiliary conductors are much lighter, since they do not have to support any load, apart from their own weight.

OCTOBER 17th, 1888.

The Telpherage Company, Limited.

PROGRAMME

OF

OPENING CEREMONY

OF THE

FIRST TELPHER LINE

ERECTED IN ENGLAND

ON THE ESTATE OF

The Right Hon. Viscount Hampden,

AT

GLYNDE, SUSSEX.

ON THE ARRIVAL OF THE TRAIN AT GLYNDE,

A Man bearing a Flag will be in attendance

TO CONDUCT THE COMPANY'S GUESTS

TO THE

MANSION HOUSE.

They are requested to get themselves ON THE

LOADS OF THE CANAL, where they will have a

FULL VIEW OF THE

STARTING GEAR AND PLATFORM,

AND ALSO OF THE TRAINS.

THE LINE WILL BE FORMALLY OPENED

BY THE

Right Hon. Viscountess Hampden.

AFTER THE

OPENING CEREMONY,

A Man with a Flag will lead the Visitors to

THE LUNCHEON TENT,

FROM WHICH

A Good View of the Discharging End of the Line

AND THE

OPERATION OF TIPPING THE SKEPS

will be got. Also a

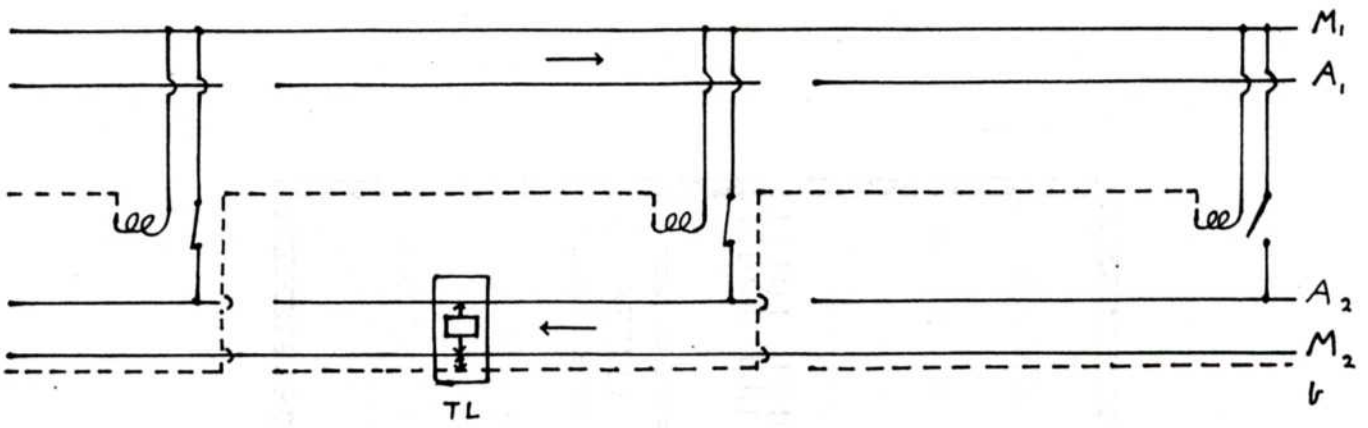
Bird's-eye View of the Greater Part of the Line

Those Visitors who prefer to walk on and examine the Line will find competent people to go with them.

A Flag will be hoisted at the Tent, and the Whistle of the Engine sounded FIFTEEN MINUTES BEFORE THE BEGINNING OF LUNCH. The Flag will be lowered and the Whistle again sounded AT THE MOMENT OF THE CHAIR BEING TAKEN.

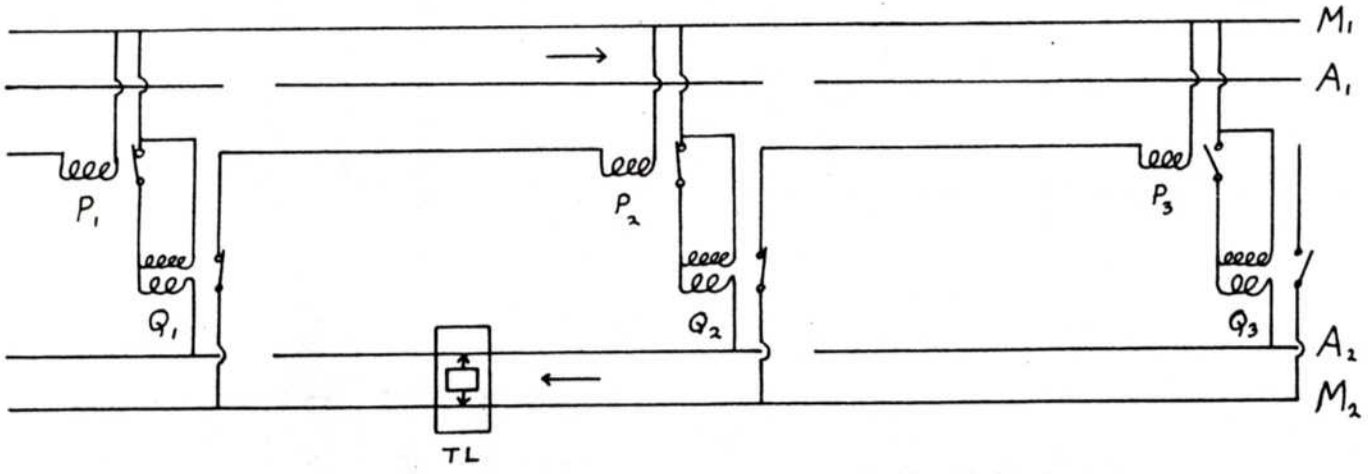
NOTE.—The Officers of the Company and others competent to explain the Working of the Line will wear Red Ribbons in their Button Holes.

FIGURE 3



Relay opens circuit when energised

Fig. 4



Relay P normally closed
Relay Q normally open

Fig. 5

The auxiliary conductors are divided into block sections, each of which is cross connected to the heavy power cable of the opposite track, as shown in Fig. 4. Power is supplied continuously from a suitable generator to the two main cables M_1 and M_2.

The simple method of absolute block working requires the use of a third conductor resembling a telegraph line; this was termed "the blocking cable". As a Telpher locomotive (TL) travels along a block section, a contact on the locomotive connects the blocking cable (b) to the main supply cable (M_2), thereby energising the relay from M_1 M_2) and switching off power to the auxiliary line of the previous section (A_2). Since power is supplied to the Telpher locomotives via M_2 and A_2, any train coming to the previous section will be brought to a stop. Only when the locomotive, shown as TL in Fig. 4, has progressed beyond the centre section, can the relay release the contacts which connect A_2 to M_1, electrifying the right hand section. Hence there should always be a "dead" section between each Telpher train, the length of which must clearly be less than that of a block section. For ease of explanation, only the block circuit of the lower line is illustrated in Fig. 4; the upper-line would be exactly the same in its method of operation.

It will be obvious that any failure in the contact between the blocking cable and M_2 will invalidate the blocking system, while intermittent contact could lead to current surges if a locomotive was standing at the previous section. Fig. 2 shows no evidence of a separate blocking cable, so it seems probable that the second method of absolute block working described by Fleeming-Jenkin(10) was employed in practice.

This more sophisticated system of automatic absolute block working is illustrated in Fig. 5 and no longer relies on switch contacts being operated mechanically by the Telpher locomotive itself; the blocking cable is also dispensed with. Instead, two separate relays are employed to control each block section. Relay P has a high resistance electromagnetic coil, while Q is double wound with high and low resistance coils, both creating a field in the same direction. The Telpher locomotive (TL) is shown on the middle section of Fig. 5, power being supplied by the main and auxiliary cables M_2 and A_2. The contacts of relay P are normally in the closed position when the coil is not energised; conversely, the contacts of relay Q are normally open.

Hence on the unoccupied sections of track ahead of the locomotive TL, P_1 is closed. Current can then pass from M_1 through the series low resistance coil of Q_1 and energises A_2. This section of track is therefore "live"; however, with no locomotive on this section, no current actually flows, so that Q_1 remains open.

Considering now the centre, occupied, section of track, since Q_1 is open P_2 is closed (normal position); current flows through the series coil of Q_2 and the motor of the Telpher locomotive. This closes the contacts of Q_2, thereby operating P_3.

With the contacts of P_3 open, no power is available on the previous section, which becomes "dead"; Q_3 remains in the open position. In this way the presence of a Telpher locomotive on any section ensures that the preceding block section remains "dead", thereby making powered collisions impossible.

Conclusion

It is hoped that this paper helps to explain one of the least recorded, but nevertheless brilliant achievements of Victorian engineering. The name of Prof H C Fleeming-Jenkin seldom comes to be mentioned when great engineers of the nineteenth century are discussed. This is a pity and is due largely to the fact that he died before he could exploit the immense potential of Telpher transport. Telpherage systems remain in use today, in many different countries, although sadly little trace of the pioneering installation at Glynde is still visible.

Acknowledgements

The author would like to thank Mr T R Smith, of G.L.I.A.S., Mr R F Jones and Prof E O Taylor of S.I.A.S., for information and advice.

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MOLLY BESWICK

Bricks for the Martello Towers in Sussex

The story of the building of the Martello towers as coastal defences during the Napoleonic Wars has been told elsewhere.(1). The purpose of this article is to determine how the vast quantities of bricks required for their construction were assembled in the short space of time available.

1804 - The Threat of Invasion

After the breathing space accorded by the Treaty of Amiens, hostilities with France broke out again in 1803. Some attempt had been made to strengthen the coastal defences in the earlier stages of the war. For example two forts, or batteries, had been erected at Langney Point in 1795. But when, in 1804, Napoleon massed a force of

100,000 men and 1,500 barges at Boulogne, the threat of imminent invasion made more drastic action necessary. A variety of schemes were canvassed for defence works along the Kent and Sussex coasts, including the building of the Military Canal, but it was not until William Pitt was returned to power in May 1804 that any major decisions were taken.

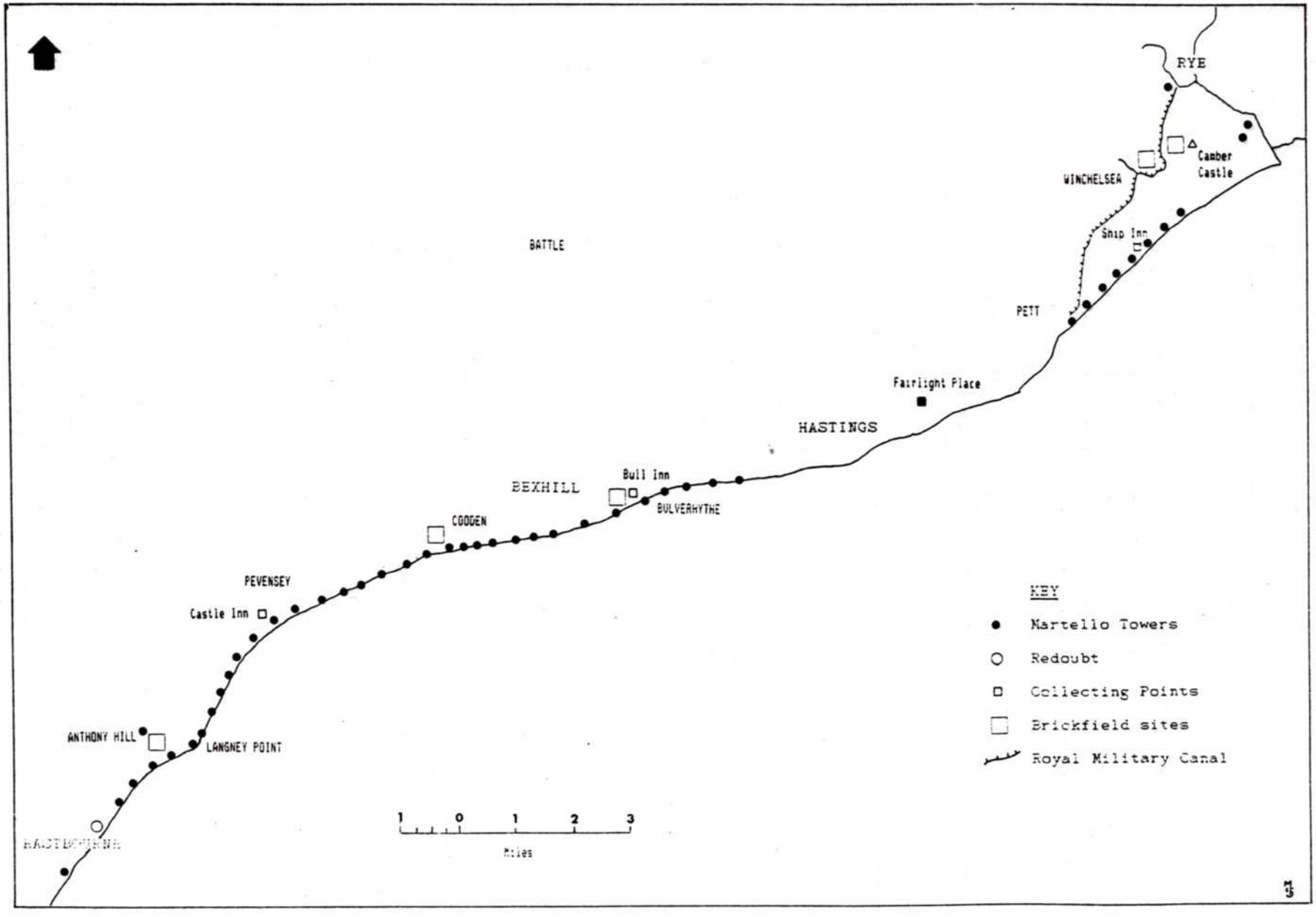
A report recommending the building of 58 towers was produced at the beginning of September and, although the final design for the towers themselves was not approved until a month later, the purchase of bricks in the London area began at once. Between 4 September and 19 October, 13,450,000 bricks had been assembled and shipped from Tower Wharf to sites along the coast.(2)

As these are the only actual purchases of bricks mentioned in the War Office Records, it is sometimes assumed that all the Martello towers, including the Sussex ones, were built entirely of 'London stocks', but this was neither desirable nor practicable. For one thing, the demand for bricks on this scale sent prices soaring immediately. To this the cost of transport had to be added and shipping was itself in short supply. Also the problems faced in shipping bricks from London are shown by the following incident. On 2 October 1804, the sloop 'Larkins' 66 tons, belonging to the Port of London, took on board at Tower Wharf a cargo of 40,000 bricks for the Board of Ordnance bound for Cowden (Cooden) Sluice in Pevensey Bay. Because of unfavourable weather, this boat did not reach its destination until 22 November. It lay anchored off the beach for two more days waiting for carts to take out the cargo. At this point a south-westerly gale began to blow and 'at three-quarter flood she filled and sunk with her whole cargo, in which situation she lay the remainder of that tide, beating violently upon the shingle'. The following day they managed to unload the cargo and eventually, having caulked the seams, the master took her along the coast to Newhaven, where, on 31 December, nearly three months after leaving London, he made his affidavit before a local notary.(3)

Already in October 1804, Lt-Gen. Morse, Inspector General of Fortifications, had written to the Earl of Chatham, Pitt's elder brother, who was Master General of the Board of Ordnance: '... from the fluctuating price of bricks and the extravagant freight demanded for transport of them to the coast, no correct computation of the expense of these towers can be formed until bricks are made upon the Coast, for which purpose measures are in progress'.(4) From this it is clear that bulk purchases of bricks, like those made in the London area as a means of getting building operations under way, were never contemplated in Sussex. For one thing, there was already an acute shortage of bricks along the Sussex coast, occasioned by the influx of soldiery. Furthermore, any bricks purchased from local yards had to be transported to the building sites by water and the brickyards suitably situated were both few in number and of very small capacity. For example, Edward Milward of Hastings had sold almost his entire output of bricks and tiles in 1803, at 55s per thousand, to the shippers Thomas Breeds & Co., their destination being the new barracks at Eastbourne.(5) The high price obtained (40s per thousand was the going rate in London in 1804) and the fact that there were insufficient bricks in the Eastbourne area itself, are both indicative of the inability of local yards to meet the demand.

The Ordnance Brickfields

The Board of Ordnance, which had overall responsibility for the construction of the towers, therefore resolved on a programme of direct works. A Mr Dalloway, probably a contractor with experience of brickmaking on a large scale in the London area, was dispatched to the Sussex coast to select sites for digging brick earth. He seems to have begun work in the Rye area as, on 23 November 1804, Sir William Ashburnham, of Broomham in Guestling, wrote to his agent informing him that 'Government have applied to the tenant of the Sheephouse Farm for leave to dig for materials with which to make Bricks to the amount of 5,000,000 upon the Castle lands at Winchelsea for the purpose of building 5 or 6 towers upon the beach adjoining'.(6)



SITES OF THE ORDNANCE BRICKFIELDS

During the next two months Dalloway continued his search for suitable sites until, on 11 February 1805, he wrote from Hastings to John Cresset Pelham Esq., of Crowhurst, who was living in Shropshire at the time: 'The Board of Ordnance has directed me to make Bricks upon your land at Bulverhithe to Build Towers upon the Beach. As I have agreed for lands in 3 or 4 places of the Duke of Dorset, Sir William Ashburnham and others at £100 per acre for all that shall be Distroyed and £5 per acre for the use of such land as may be necessary to dry the Bricks upon, I propose to give you the same terms ... I shall want 6 or 7 acres and must begin using it next week'.(7)

There were four main locations in which bricks were made (see map):

1. Sheephouse Farm, which was in the parish of Icklesham but in the vicinity of Winchelsea (Camber) Castle. Owner: Sir William Ashburnham Bart. The site marked on the map between Camber Castle and the Royal Military Canal is the one suggested for brickmaking operations in 1805, for which little precise information is available. The site marked on the opposite side of the Canal is where brickmaking took place in 1806, details of which are given later.

2. Pebsham Farm, Bulverhythe. Owner: John Cressett Pelham Esq. Tenant: Benjamin Crump. An early 19th-century map of Pebsham Farm shows what is almost certainly the site of the brickfield on a detached portion of the estate on the coast between Glyne Gap and Galley Hill.(8) Coastal erosion and the building of the railway have combined to destroy all trace of it.

3. Cooden Farm, Bexhill. Owner: Duke of Dorset. 'Brickyard Field and Pond' on the Cooden estate, named on the tithe award for Bexhill of 1839, seems the most probable location.(9) This site also was disturbed when the railway was built.

4. Near Anthony Hill (now known as St. Anthony's Hill), Willingdon. Owner: Duchy of Lancaster. Lessee: Lord George Cavendish. The hill itself, on which a battery was sited prior to the building of the Martello tower, had been sold to the Board of Ordnance in the 1790s.(10) The brickfield, which covered 8 acres, was on an outlying exposure of gault clay in the area known as the Crumbles opposite to the hill.(11)

1805 - Brickmaking Gets under Way

Work was scheduled to begin in the third week of February 1805. On 11 February the following advertisement appeared in the Sussex Weekly Advertiser:

TO COUNTRY BRICKMAKERS.

WANTED,

FIFTY good MOULDERS, and others to work with them, for two years certain, on the coaſt of Suſſex.

For further particulars enquire at Mr. Bragg's, the ſign of the Ship, at the New Harbour, near Winchelſea; or at the Bull, Bulwarhithe; and at Mr. Cane's, ſign of the Caſtle, near Pevenſey.

N.B. Six Shillings per Thouſand, and lodging paid.

This advertisement appeared on three consecutive Mondays and it may be assumed that by the end of February a sufficient workforce had been recruited. The three collecting points mentioned were situated conveniently for the sites already listed: the 'Ship' not far from Camber Castle; the 'Bull' on the coast road near Pebsham Farm and the

'Castle' at the mid-point between Cooden and Anthony Hill.

Now only one thing was lacking: fuel. No documentary evidence has so far been found to show either the type of fuel used or the means by which it was transported to the brickfields, so it is only possible to make assumptions. The traditional 'wealden' method of burning bricks in small intermittent wood-fired kilns, holding at most 30,000 bricks, was impractical. The 'London' method of firing in large open clamps was almost certainly preferred. This required quantities of town-ash, which was carefully sifted, the finer ash being incorporated with the brick earth before moulding and the coarser cinders used in a layer at the base of the clamp. Coal could in some measure be substituted and it seems probable that shipments of coal brought direct from the north-east coast of England were landed on the beaches, as this was the manner in which 'sea coal' was regularly delivered to Brighton and other coastal towns. Similarly, consignments of town-ash from Brighton, Hastings and even London could have been landed close to the sites of the brickfields on the coast.(12)

Thus equipped with brick earth and sand 'in situ' and fuel brought by sea, the newly-recruited workforce set about the business of producing bricks. Work was certainly in progress in early May, when reference was made in a letter, to land 'near the Brick Hacks at Langley (sic)' and on 5 July Lieut. Squire, of the Royal Engineers stationed at Eastbourne, wrote to the solicitor acting for the Board of Ordnance: 'According to your desire I take leave to enclose a survey of the Ordnance brickground near Anthony Hill'. Sadly, although the letter has survived, the enclosure has been lost.(13)

At this date all brickmaking was done out-of-doors and was necessarily a seasonal activity. Estimates vary, but it is generally agreed that a hand-moulder, with additional labour for tempering the brick earth and 'hacking' the bricks when moulded, could produce about 2,000 bricks per day.(14) Moulding would have continued for about 30 weeks, to allow sufficient time for the last bricks of the season to dry before the final firing took place in the autumn. If all went according to plan, the 50 moulders recruited early in 1805 could have produced up to 20 million bricks by the end of the year.

However, it seems that Dalloway had not proved equal to his task. At the end of the season he either gave up the job voluntarily or was dismissed as, on 4 November 1805, the Sussex Weekly Advertiser contained the following announcement:

> 'Mr. Dalloway the Contractor with Government for making Bricks on the coast of Sussex, requests that all persons who have any demand upon him, will immediately send an account thereof to this residence at Fairlight Place in order that the same may be examined and put in train for payment. And on Thursday the 7th day of November next, will be sold by auction, at Fairlight Place, on his account by James Tebay, Three Capital Horses, fit for the purpose of either riding or drawing any kind of carriage; a Single Horse Chaise, with a head and several saddles and sets of harness. The sale to begin at 10 o'clock in the forenoon.'

Dalloway was evidently on the point of departure.

J. C. Pelham's representatives failed to put in a claim in response to this advertisement. The following year they claimed compensation from the Board of Ordnance in respect of 'Oa. 2r. 15½p. of land taken by Mr. Dalloway on ... the Bulverhythe Estate for digging brick earth as per Agreement - £59. 13s. 6d.' but this was still outstanding in 1808 when the Board's solicitors in London wrote asking for further particulars, acknowledging, however, that the Board had 'agreed to take the agreements made by Mr. Dalloway off his hands.'(15)

1806 - The Second Season

Meanwhile events on the war front had taken a new turn. Even before the decisive naval victory at Trafalgar in October 1805, Napoleon had broken camp at Boulogne and

invasion no longer threatened. In September the erection of new barracks at Pett had been stopped by order of the government and there were rumours that the men employed in building the Martello towers were also to be dismissed, but this proved to be without foundation.(16) Building and also brickmaking continued throughout 1806.

Brickmaking during the second season was supervised by a Mr Trimmer. He called on William Shadwell, Sir William Ashburnham's agent, on 18 January 1806 to seek permission to continue making bricks at Winchelsea, on the same terms as those agreed on with Dalloway the previous year. However, he considered the location selected by Dalloway to be ill-chosen, 'very shallow and not proper for the purpose of making bricks' and he asked to be allowed to select a fresh site, nearer to Rye. Shadwell wrote to Sir William that he had suggested land 'adjoining the harbour, so as to take the Bricks by water to the Sea and do as little prejudice as possible to your land by passing over it'. However, when he and Trimmer visited this site on 19 February, the earth 'proved barely of 2 foot deep and then produced a stratum of sand'. Finally they fixed on 'the corner of an 18 acre piece adjoining the Rye Marsh'. After some haggling, a price of £200 per acre was agreed as suitable compensation for the landowner, exactly double the amount offered a year earlier.(17) When payment was made by Trimmer in 1808, this amounted to £348. 15s.(18) At the agreed price of £200 per acre, this indicated that brick earth had been dug over an area of $1\frac{3}{4}$ acres. Assuming that digging had taken place to a depth of four or five feet, then approximately 5,000,000 bricks would have been made,(19) the same number which had been envisaged in the previous year.

To calculate the total number of bricks required for all the towers in Sussex, reference has to be made to a letter written in May 1808 by Brig-Gen. Twiss, Commanding Engineer of the Southern Division, to the Secretary to the Board of Ordnance, which contains figures for the amount of masonry for which payment was to be made to Mr Hobson, the building contractor. Each tower, 46 of which were in Sussex, was deemed to contain 36,964 cu.ft. of masonry. In addition, seven of the Sussex towers had ditches round them with counterscarp walls, which accounted for another 23,777 cu. ft.(20) Given that a rod of brickwork (306 cu. ft.) contains 4,350 bricks - average work with mortar - then over 500,000 bricks would have been required for each ordinary tower, making a total of some 26 million bricks. To this must be added the 445,589 cu. ft. of masonry in the 'large battery at Sea houses near Eastbourne' (the redoubt). Some deduction must be made for stone, which was used for footings, dressings and parapet copings, but even so, the grand total must have been in the region of 32 million bricks.

If, as suggested earlier, about 10 million bricks were made at Winchelsea, these would have been more than enough to complete the three towers in the Rye area and the eight towers along the beach in front of Pett Level. Therefore some of the bricks made there must have been shipped to tower sites further along the coast. There is no evidence that bricks were made at Bulverhythe after 1805 but it seems likely that one or both of the brickfields at Cooden and Anthony Hill must have continued in use during 1806 for the requisite quantity of bricks to have been produced for the completion of the tower-building programme.

The Redoubt at Eastbourne and the Tower at Seaford

In only two places does it seem possible that private enterprise played a role in the provision of bricks: Eastbourne and Seaford. Unlike the surviving Martello towers, where the cement rendering remains generally intact, the brickwork of the redoubt at Eastbourne is exposed and can be examined closely. Apart from some modern repairs to the parapet the outside walls are built in header bond and reveal a motley collection of red and yellow bricks, together with a proportion of black headers. It is noticeable that the yellow 'stock' bricks have weathered appreciably, whereas the majority of the reds and all the blacks, being well-burnt, have offered better resistance to the elements. These latter are clearly the products of the type of wood-fired kiln referred to earlier and it seems probable that a local entrepreneur, realising the need for a large quantity of

bricks at this particular location, had built some kilns and set up in business. The most likely candidate is John Mann who, in 1805, held land to the west of the artillery barracks in Eastbourne.(21) He was a bricklayer who was reputed to have made money from the building of the Martello towers and was also, in 1816, the owner of a brickyard which lay $\frac{1}{4}$ mile inland from the redoubt.(22)

The Seaford tower was an afterthought, though not as late as has sometimes been supposed.(23) General Twiss marked out the site at the beginning of June 1806(24) and work was completed by the end of the 1807 building season, as this tower is included in the 46 for which payment was to be made to Hobson, the building contractor.(25) The source of the bricks is uncertain. They could well have been shipped along the coast from the Ordnance brickfields to the east. There were, however, local brickyards, as for example the one at Piddinghoe, which had a wharf on the River Ouse. This yard had advertised for a brick and tilemaker in 1804, when the demand for tiles for army barracks was at its height(26) and could well have switched to all-out brick production two years later. There are both red and yellow bricks visible in the moat of the Seaford tower, which suggests that they were collected from more than one source, as was the case with the Eastbourne redoubt and also the towers on Pevensey Bay.

So ended a brief but remarkable episode in the history of brickmaking in Sussex. The production of such a large quantity of bricks in such a short time was a considerable achievement. In fact it was the first occasion on which bricks were produced in the county on a truly industrial scale.

Acknowledgements

I am grateful principally to Brian Pegden, a fellow member of the British Brick Society, for providing me with valuable background material as well as information gathered from documents in the Public Record Office. Mr Pegden first wrote to the then Secretary of the Sussex Industrial Archaeology Society in 1976 to ask if anything was known about the manufacture of bricks on the Sussex coast in 1805-06. The answer at that point was: very little. The story has gradually been pieced together from a number of different sources and the following people have made useful suggestions in this repect: Ron Martin, of our own Brick Study Group; Gwen Jones, of Robertsbridge and District Archaeological Society and Christopher Whittick and Graham Mayhew, of the East Sussex County Record Office staff. My husband has given invaluable help with the various calculations involved and with the examination of samples of brick fabric. My thanks are also due to Cliff Bloomfield, formerly of the Southern Water Authority, who helped in identifying the 1806 brickmaking site at Winchelsea and to Michael Smith, who drew the map.

References and Notes

1. Commander Hilary F. Mead, 'The Martello Towers of England' Mariners Mirror Vol 34 (1948) pp 205-217 and 294-303; Sheila Sutcliffe, Martello Towers (Newton Abbott 1972)

2. B.K. Pegden, 'The Purchase of Bricks for Martello Towers in the year 1804' Fort (1980) pp 55-58 and 'Analysis of Bricks Purchased by Adam & Robertson of Old Bond Street, September 4 - October 19 1804' Information (Journal of the British Brick Society) No 19 (November 1979)

3. E(ast) S(ussex) R(ecord) O(ffice) LAN 14 f258

4. Mead, op. cit. p 212

5. Hastings Museum Mss MIL/G12 pp 124-5

6. do. ASH Eal/2a. This was the second time that bricks were made from the alluvial deposits in this area for defence purposes. The first was when Camber Castle itself was extended in 1539, its massive stone walls being largely lined with locally-made brick.

7. ESRO RAF Box 26. This contains the correspondence of John Tilden Sampson of Battle, the solicitor responsible for land transactions in connection with the sites of the Martello towers between Hastings and Eastbourne. He was also solicitor to John Cressett Pelham Esq., hence the references to the brickfield at Bulverhythe.

8. ESRO SAS Acc 1403

9. ESRO TDE 141

10. ESRO SAS ME 20

11. ESRO RAF Box 26. Letter of 6 December 1806

12. Samples of brick from Tower 57 in Pevensey Bay (destroyed) have been examined under a microscope. The fabric of both yellow and pink-coloured bricks contained inclusions of burnt coal residues, which supports the view that all the bricks for the towers, whether of London or Sussex origin, were clamp-burnt.

13. ESRO RAF Box 26.

14. John Woodforde, Bricks to Build a House (1976) p 59

15. ESRO RAF Box 26

16 S(ussex) W(eekly) A(dvertiser) 16 September 1805

17. Hastings Museum Mss ASH Ea3/47-49

18. do. ASH Ea3/65

19. One acre dug to a depth of one foot will produce 43,560 cu.ft. of clay. If an allowance of 18% is made for loss on heating the clay, 18 bricks can be made from 1 cu.ft. of dry clay.

20. P(ublic) R(ecord) O(ffice) WO 55/778. 'Masonry' is used here to denote work in both brick and stone.

21. ESRO GIL 432. Manor of Eastbourne lease of land for a new barrack ground.

22. Robert Cooper, Reminiscences of Eastbourne (Eastbourne 1903); ESRO GIL 30 & 127. Map of the parish of Eastbourne, with schedule (1816)

23. Sutcliffe, op. cit. p 62

24. SWA 9 June 1806

25. The 'extra' tower which makes up the final Sussex total of 47 was at Bexhill cf. Iwiss's letter of 29 May (Note 20)

26. SWA 22 July 1804

MARTIN BRUNNARIUS

Jesse Pumphery, Millwright

The following is extracted from the day-to-day accounts of a journeyman millwright who lived and worked in and around Lewes during the first half of the nineteenth century. This is fascinating in its way, for, although it may have seemed trivia at the time, this simple record gives us today an insight into his involvement with farmers, trades people and millwrights as well as forming many links great and small in local history.

Dates, charges made, names, work carried our at various mills, day to day housekeeping, rents & taxes paid, all give us a glimpse of a highly skilled artisan's working life between 1798 and 1852.

Jesse's notes put a little more flesh on the bones of the Industrial Archaeology of Lewes and its environs and bear out some family traditions handed down over 150 years through the milling fraternity.

Jesse Pumphery was born of farming stock at Barcombe in 1783. His father, also Jesse, saw that his son needed a good skilled trade. Millwrighting was regarded as the artisan's premier occupation and was providing the grounding which brought us into the steam age. Just before he was 15 Jesse was apprenticed(1) to Henry Stevens, Millwright of Southover, Lewes for seven years, meal, drink and lodging found. His wages were to be 2/6 weekly for the first five years, 4/- weekly for the sixth then 5/- for the seventh. It seems likely that he stayed on with his master for a while at least, as was customary for an indentured apprentice on becoming a journeyman.

In 1810 Jesse is shown working on his own account for he was asked to help in the manufacture of some small wheels for:-

> "Mr Bullstrode nor the blacksmith can go on with the pump without them. I am very much afraid the old pump will give out. If it does it will put us to very great inconvenience.
>
> J.M. Blackman March 5th 1810"

These were in all probability wooden cog wheels, part of the drive for a pump at one of the breweries or the local paper mill.

At this time Lewes was the centre of commerce in East and Mid Sussex. Many young men were making their way. Perhaps Jesse was unable to establish himself as a millwright. In any case he appears to have returned to Barcombe.

From the available evidence(1) we know that he was living in Barcombe, paying ground rent for '22 ft. of land' between 1818 and 1825 as a miller, grinding and selling provender, corn and flour to farmers and merchants. There is no direct reference to the location of his mill but it is virtually certain that this was Barcombe Place Estate Mill,(2) a tall hand winded post mill with cloth covered sweeps, erected in 1817-18. She stood until c.1911. The property deeds for the Mill House and plot in Bunny's Lane, Barcombe(3) show 'Pumphrey' followed by 'Holroyd', and a sale notice shows that Mr Holroyd(4) still owned the property in 1836:

> Sussex Advertiser 11 January 1836
>
> "Barcombe Place Estate
>
> To be sold: Property of John Holroyd
>
> Excellent windmill with cottage, barn & stable, lodge etc. in the occupation of Mr R. Jenner junior ..."

It seems now that Jesse realised an ambition, returning to Barcombe to build the Estate mill, subsequently taking it on himself. Customers came from an area bounded by Chailey, Cooksbridge, Hamsey, Lewes, Malling and Streat. Typically the produce was, in 1822-1824

"Wheat as:	per 4 bushel sack	per qtr.
Flour		1s.3d
Fine pollards	5s.4d	
Coarse pollards	3s.0d	
(Whole) meal	2s.8d	

Other Products:

Barley ground	3s.0d
Peases ground	1s.6d
Oats ground	2s.6d
Barley & wheat cracked	1s.0d
Beans cracked	1s.0d
Oats & Beans cracked	1s.0d
Sheep feed	5½d"

[These charges are approximately ¼ of those made by James Mitchell at Clayton Mill 25 years later.]

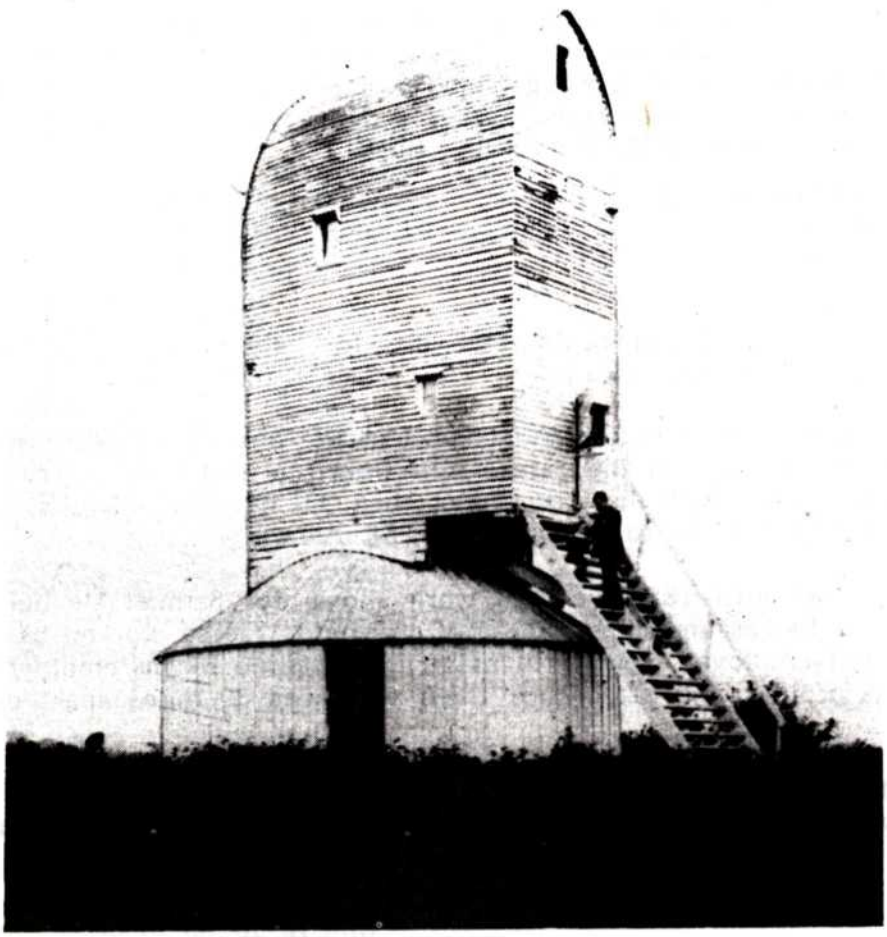
Jesse noted his total output:-

"Hog corn ground 1821-22	1,824 booshels	£38
Hog corn ground 1822-23	2,411 booshels	£50
Wheat ground for grists 1822-23	190 sacks	£25"

This represents 100 tons of feed corn alone, an average of 3 tons or so per week (when the wind blew). He worked at this for the years 1820-24 without reference to millwrighting save one series of entries:- in 1822

"Conttey of Sussex
By the request of Mr Langridge
Jan 19 Journey to Lewes 0-7-0
to in spack the tred mill"

He made this journey 9 times during the year to inspect the tread mill at the prison at North Street in Lewes where the inmates were employed to drive the wheel for milling equipment within.



Barcombe Post Mill in 1905. Erected by Jesse Pumphery for John Holroyd in 1817-18.

On several occasions Jesse mentions that he used "my oats" or "my wheat" indicating that he had taken to farming a piece of ground in still weather as most wind millers did. He also records that the straw was sold to the local thatcher at 9d per truss.

In the summer of 1824 Jesse went haymaking nearby at "Mr Bevan's Passons farm" at 2/6 per day.

These years at the mill must have been good to him for he seems to have been able to purchase land and property in St. Anne's parish, Lewes(5) letting:-

1825		"Sameuel Medhurst	
	June 24	1 years rent due	£18.0.0
1826	Jan 4	9 fute 2 inch appel tree planck	4.6
	June 24	1 years rent due to June 24 - 1827 for house shop & yarde	16.15.0
		ground rent for well	2.6
	Dec 25	½ years rent for saw pit & yarde	12.0"

This was the property at which Samuel and William Medhurst set up as millwrights working continuously until 1878.(6) Mr Aubrey Duff, a Lewes historian had been told in 1950(6) by Sam's grand-daughter that the yard had been Jesse Pumphery's. Here we find family tradition being borne out. Coincidentally Henry Steven's House yard and millwrights shop had been put up for auction on 3rd July 1824. I suspect that Jesse took this, his apprentice master's yard, on and then let to Sam Medhurst.

Mr John Weston of St. Anne's took on Jesse's farming assets in March 1825:-

"1 plowe, 1 hamer, 3 lines, 1 pringe, 1 hay cutter, 1 ladder, 4 pasels Dung, Dung from the ground, wheete from the ground - -
Hiered 4 passes of lan for 7 years at 15 pounds a year"

During 1825 we find that Jesse is carrying out various tasks other than milling. He began to dress stones at 2/6 per day. He charged Mr Jenner who had been renting property from Jesse, £4.2.0 for a waggon and £6.10.0 for a cart. The latter represented about five weeks' work plus materials. Also, in November he put in "3 days grinding at the mill" for which he charged Mr Jenner 9/-, then:-

"41 yardes of mill sayling		£2.4.5.
50 yardes of corde		4.6
twine to	do.	1.6
making	do.	10.0"

This was work for sail cloths, approximately 30ft for each sweep. These were large for commons and mans work to manage.

Serious occupation as a miller had ceased in the autumn of 1825 when Jesse was 42. Mr Richard Jenner took on the estate mill where he and then his son are shown for the next 15 years. Jesse with his wife Anne, then 33, daughter Martha, 10 and 3 year old son, Stephen left Barcombe to live in Lewes, St. Annes.

From this time until 1851 we find work shown for Samuel Medhurst, William & Edward Hubbard of Lewes and James Neal of Henfield. Jesse worked as a journeyman millwright on a self-employed basis with materials supplied by his employers. The work of these men was prolific and often took them to places 30 miles apart on consecutive days.

After renting his property to Sam Medhurst these two came to an arrangement for we find Jesse working with Sam in December 1825. His daily rate was 4s, more than twice that paid to a married farm labourer of the day. Here are examples of work done by Jesse.(7)

The first is for Mr Steere who had Spital post mill above the barracks to the west of St. Annes. Sam was 'modernising' by equipping the mill with patent sweeps and control gear. This required a cast iron wind shaft (round beam) reworked sweeps and shutters plus work to the framing and roof.

1826 "Mr Steere Lewes

March 25	¼	Day to stocks & swips	£0.1.0
April 22	1	Day to framing top	4.0
April 29	5	Days to framing top	1.0.0
May 6	2	Days to ronde beeme patton	8.0
	2½	Days to framing top & paintting	10.0
May 13	2½	Days to ronde beeme patton	1-.0
	½	Day to chane wheel patton	2.0
16	2	Days to chane wheel patton	8.0
20	3½	Days to fitting cowhe toogather	14.0
	1	Day to cowhe nut patton	4.0
2.0	½	Day to vanes	
June 6	1¼	Days to triming waller nut	5.0
8	6¼	Days at the mill	1.5.0
14	3½	Days to sack tackel at home	14.0
16	½	Day to brasses	1.0
17	2	Days at mill	8.0
24	7½	Days at Do.	1.10.0"

The next example illustrates something of a brave departure for Sam. In 1827-28 a lot of work is shown for a new mill for Mr Weston. This was the now famous 6 sweep post mill at Ashcombe near Kingston, the only one of its kind ever built. Jesse's accounts prove that this was definitely the work of Sam Medhurst (often argued) and five years earlier than suspected.(8)

During September and October 1827, half of Jesse's time is spent at the workshop preparing the timbers and setting out the framing. As with all windmills this was fitted together on the ground first, usually within the millwright's shop and then taken apart for erection so that the job should be right first time. Work in preparing the weatherboarding took 11 days in November. Jesse seems to have worked on the body and fitting out whilst Sam Medhurst almost certainly made the sweeps and control gear himself. Then, they and others, went to Kingston Down: the whole job was to take 15 months.

"Nov. 24	1¾	Days to lading timber	£0.7.0
27	2	Days to Rearing mill	8.0
28	1	Day to Tist	4.0
Dec. 1	3	Days to weather Bording	12.0
8	5½	Days to Do.	1.2.0
1828			
Feb. 7	1	Day to swips putting up	4.0
11	1	Day Mr Weston stayers	4.0"

The sweeps obviously presented problems. This was a huge assembly with sensitive patent control gear. We find more work in the shop.

"July 12	1	Day to swips in shop	4.0
19	5	Days to swips in shop	1.0.0
26	4	Days to swips in shop	16.0"

Oct. (The mill is being finished:)

"18	2	Days to paintting New Mill	8.0
25	5	Days to tackle	1.0.0
Nov. 1	3	Days to tackle at mill	12.0"

Mr Weston's famous 6 sweep mill at Ashcombe, Lewes in 1870
Jesse made the framing for the body whilst working for Sam Medhurst
in 1827 and kept the sweeps in working order for 20 years.

In 1829 one and a half Days was spent to setter "irons in shop and at mill", part of the sweep control gear. These and the sweeps themselves were to require attention at regular intervals during the rest of Jesse's working life.

Old Six Sweeps, as she was affectionately known, worked continuously until 1912. The massive 3 way windshaft and 6 large double shuttered sweeps put a heavy burden on the front of the body and she became very headsick, tipping forward over the years until she fell in March 1916.

Mr Beard of Oldland Mill, Keymer(9) had a great deal of work carried out in 1827, 1828 and 1829 including windshaft sweeps, stocks and framing. Jesse couldn't make up his mind about the location and had it variously at "Ditchelin", "Cimmer" and "Oldlan".

Next we find work for Mr William Hubbard of the Cliffe, Lewes. The customers to

the east of Lewes were of course different and much more of a mixture. Sadly most of Jesse's entries here are just for time spent, telling us much less.

Mr Hubbard had care of many water and power mills including those connected with industrial use:-

Barcombe Oil Mills(10)
: a large water mill complex with sets of granite edge runners to crush linseed

Isfield paper mill
: pulp stirring, rolling and pressing equipment

Lewes paper mill

Lewes Bark mill at the tannery
: crushing rollers for marinating oak bark

Lewes mortar mill
: edge runners

Southover sugar mill
: crushing rolls

The only complete new work shown is for Mr Kenward at Hailsham.(11) This was on a fine smock windmill with fantail and patent sweeps. There is a little more detail to the extract:-

1834

"New Mill Helsham

April to July (11 weeks work erecting the smock & cap)

July -	1¼ days to shaft patton	£0.5.0
	2½ days to Brakewheel	10.0
	4¼ days to Brakewheel	17.0
Sept	3 days to new mill vanes	12.0
Oct.	1 Day Do.	4.0
	3 Days Do.	12.0
	6 Days to Vanes & swips	1.4.0
	4½ Days Do.	18.0
	3½ Days to dressing mecheine	14.0
	7 Days to Helsham	1.8.0

(Etc. with some adjustment in 1837)

2 Days to setting Fantackle	8.0"

7 months' work in all.

Family tradition is again borne out for Mr Gilbert Catt of Hailsham, whose grandfather came to work for Mr Mercer, Robert Kenwood's successor in 1859, has always maintained that Hamlins mill, as she came to be known, was erected by Hubbard in 1834.

Mr Hubbard would have paid a royalty to Sam Medhurst who had the licence for Cubitts patent sweeps hereabouts. Jesse was an important link here I'm sure.

Martha, Jesse's daughter took to keeping the book at this time and her neat hand makes easier reading. She noted in 1836 that Stephen, Jesse's eldest son, now 14, was working with him, probably on an apprentice basis.

The year's income was as follows

"from Jan 1st - Dec 31st

Father earned	£53.19.1
& 31 weeks bord from home	12. 8.0
	66. 7.1
Stephens bord out from home	
22 weeks & 3 days @ 3s a week	3. 7.6
15 days at 6 per day	7.9
Total	70. 2.4"

Payment was in cash or in "bushels of flower".

In 1838 William Hubbard ceased operating. Jesse however continued in his work at Cliffe although his work for 1837 was not fully paid for until 1840 by Edward Hubbard who is shown in Pigots Directory for 1839. Edward was killed in a fall within a mill at Dyke Road, Brighton in 1850. In 1840 the accounts show that Jesse is back with Sam Medhurst and we find his customers are listed once more. Mr Weston's mill had been working for 15 years by now and we find in 1842 when Jesse was 59:-

"April	Mr Weston swips in shop	£0.4.0
	1½ Days to swips in shop	6.0
	¼ Day to mill post	1.0
	1½ Day to post cell & shores	6.0
	½ Day to post	2.0"

She was obviously showing signs of strain to sweeps and framing.

Mr Mitchell at Duncton post mill at Clayton had a major overhaul to his mill costing £19.6s.1½d + materials. Stephen Pumphery is also shown working at Medhursts. Then father and son went to work for James Neal who worked out of a yard at Nep town in Henfield. Work is shown for Mr Packham at Hurstpierpoint; this was Cobbs Water Mill(12) at Sayers Common and it is standing today with machinery intact. Both men returned to Medhurst and an interesting entry for June 10th 1843 shows:-

> Mr Woodhams Windoor(13) (Wind Mill Alfriston). Here a new post was put in. This took 12 days and 3 days overtime. The whole mill was jacked up, the trestle dismantled before the post could be put in and the mill let down again.
> All for £2.2s.0 + the post.

In 1844 his second son, Henry, was put to work:-

> "Dec 30 Henry Pumphery, Bound Prentes.
> I Jesse Pumphery promise to pay
> Mr Wilmshurst £6.10.0" (Founder and Smith)

Then in 1846

> April 17 "about 7 o'clock Mr Wilmshurst forman & Henry Pumphery, Bout cutting a bolt, & he struck him and kicked him and he came to me without cap and jacket an cride and said I have come away, and I went down to see his master."

Jesse worked at John Every's Iron Foundry on the banks of the Ouse during early 1848. He then started work on another "new mill at Lansing". This was becoming a rarity; Sam specialised in rebuilding older post mills as he was to at Clayton in 1852 and Cross-in-Hand in 1853 (both moved from a site elsewhere and re-erected with patent sweeps and tailpole fantackle). After 6 weeks work on the framing up and the weatherboarding, the new mill was "recded at Lansen"(14) in 3 days 24th, 25th and 26th August. Fitting out continued until July 1849.

By 1852 Jesse was only working the odd day for Sam on light work earning £17.19.7½ which was paid to him in February 1853 just after his 70th birthday.

Martha's book-keeping must also be quoted here if only to recognise the help that she gave her father:-

Day to day expenditure typical of 1835-38

"Stephen	1 pair of half boots	£0.9.6
Stephens	Trowsers	2.3
Stephens	Hat	6.0

Fathers	Round frock	5.4
Mothers	Linen	2.6
Calico		3.9
Fathers pocket money	3 months	17.4½
Housekeeping		(typically) 2.7.0 per month
Doctors Bill		1.6.0
Nurse		15.0
Grandfathers funeral		6.6
Money lost		2.0.0'

The family had moved to 32 Sun Street in St. John's in 1828 where Jesse paid Rates and taxes until 1839:-

"1839	Jan 5	tax	10.8
	March 2	paid poor tax	9.8
	March 18	paid town tax	2.5½
	Sept 17	paid poor rate	9.8
	Sept 30	paid paring rate	7.3
	Dec 6	paid poor rate	10.8"

They returned to St. Annes shortly after to "the house near the church".

Jesse Pumphery died in 1866 aged 83. His son Stephen's life is lost to us but he may well have continued on with Sam Medhurst. Henry who was the present Mr Greville Pumphrey's great grandfather did not continue in his apprentice trade for he went on to become a founder of the Co-operative Society in Lewes and Brighton in the 1870s. Then, as the secretary of the London Society he travelled Europe and North America, advising on the setting up of Co-operative movements. Henry died in 1908 at his home in Lewes.

References

1. I am indebted to Mr & Mrs Greville Pumphrey for the loan of great great grandfather's account book (1820-52) and for much additional help and information concerning him.
2. Brighton Reference Library, H.E.S. Simmons Collection. The mill is not shown on Mudge's tower map surveyed c1809 but shown on Greenwood's map surveyed c1823.
(Jesse was working her before 1820.)
3. Mr and Mrs Richards of Mill House, Bunnys Lane, Barcombe.
4. It appears that John Holroyd had been granted land and money to build Barcombe Place by the Prince Regent in 1817-18.
5. Brent & Rector, Victorian Lewes, pl.60
6. Sussex County Magazine 1952 p.8, Article by Aubrey Ruff
7. Victorian Lewes (op cit) pl.2 mill shown on skyline
8. Martin Brunnarius Windmills of Sussex, p.101 (now known to be 5 years earlier)
9. Still standing and the subject of restoration
10. A set of the huge granite edge runners may still be seen at the site TQ 438157
11. Brunnarius op cit pl.129 and p.116
12. Sussex Industrial History 11 (1981) Survey of Cobbs mill
13. Windo'or of Windover mill stood close to the tract which climbs over the Long Man (TQ 537035) now part of the South Downs Way; traces of roundhouse and buildings to be found today
14. H.E.S. Simmons Collection. This mill was in fact moved ¼ mile uphill and rebuilt. Site still discernable TQ186062.

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