SUSSEX INDUSTRIAL HISTORY

NUMBER 54

2024

SIAS - Its Founding Years
300 Years of Transport in the Lavant Valley
The Sussex Weekly Advertiser 1804
The Building of Newhaven's Breakwater

£5.00

SUSSEX INDUSTRIAL HISTORY

Journal of the Sussex Industrial Archaeology Society

AIA Publication Award 2010, 2011 and 2013

FIFTY-FOUR **2024**

CONTENTS

Cover illustration: Coppersmiths at work, from *Microcosm, or A picturesque delineation if the arts, agriculture, manufactures, etc, of Great Britain*, W H Pyne, 1808 (1974 edition)

Edited by Dr. Geoffrey Mead, 47 Hartfield Avenue, Hollingbury, Brighton BN1 8AD (tel. 01273 501590, email g.mead@sussex.ac.uk). Design and layout by Alan Durden. The Editor would be interested to hear from prospective contributors of articles of any length. Shorter notices can be included in the Society's *Newsletters* which are issued four times a year.

The annual subscription to the Sussex Industrial Archaeology Society is £15 payable on 1 April. Life membership is available at fifteen times the annual subscription. Members are entitled to copies of the *Sussex Industrial History* and the *Newsletters* without further charge.

Membership enquiries to the Membership Secretary, Ron Gordon, 52 Barons Down Road, Lewes BN7 1ET.(tel. 01273 474305, email ron.gordon@myphone.coop) Website: www.sussexias.co.uk

ISSN 0263 5151

© SIAS on behalf of the contributors

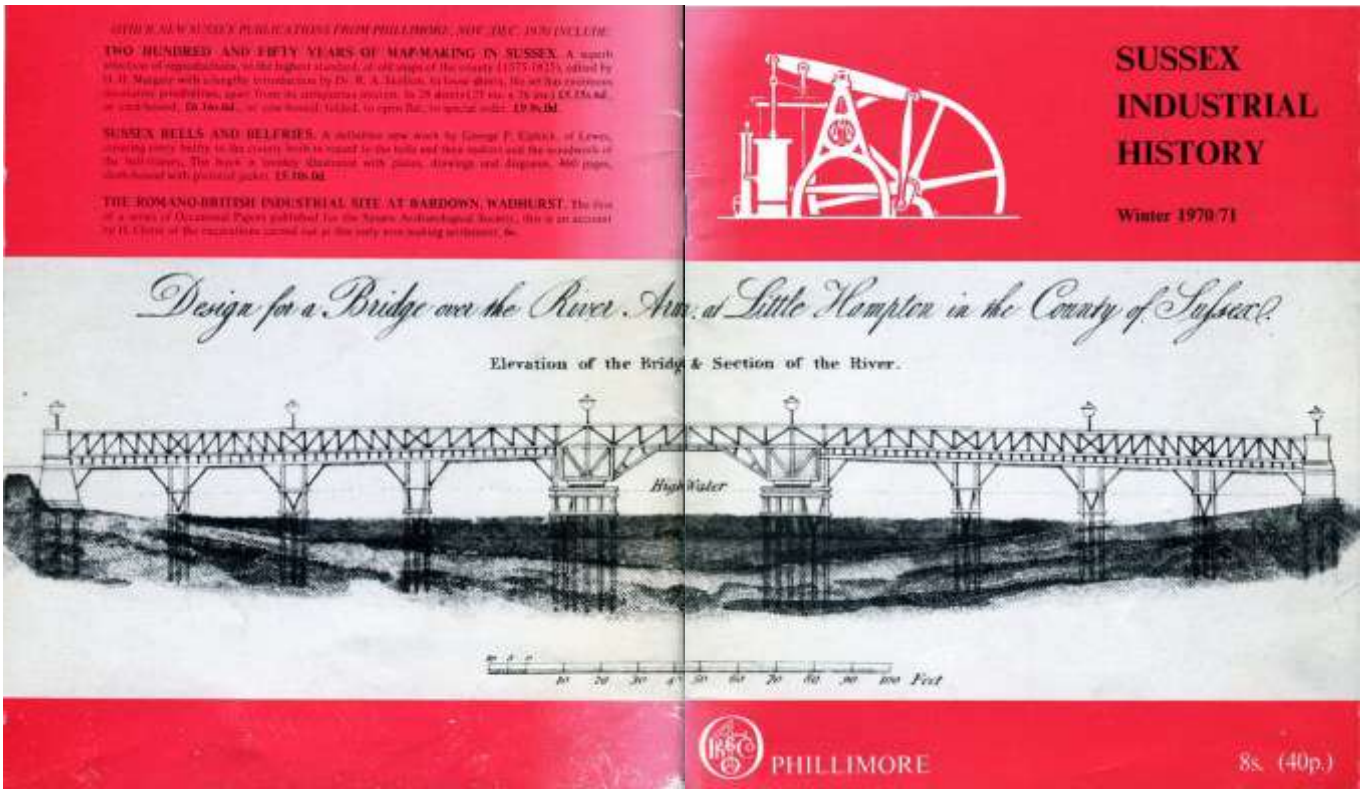
EDITORIAL

This edition of Sussex Industrial History, number 54, contains a wide range of content that reflects the 'broad church' that is Sussex Industrial History. The history of the early days of the Sussex Industrial Archaeology Society is covered by Kim Leslie; indeed the history starts even before SIAS was SIAS—when it was the Sussex Industrial Archaeology Study Group and Kim was a founding member in 1967. He worked for many years in West Sussex County Record Office and has published a great deal on Sussex history.

In a similar county-wide approach the Editor has trawled one of the county newspapers of 1804 to give a year long view of various Sussex historic occupations, locations and industrial practices. The Editor has had a long interest in the social history and geography of Sussex industry and its work patterns, having taught in the Geography department at the University of Sussex.

There are articles bracketing either end of Sussex. Alan Green is writing of transport change in the Lavant valley of West Sussex, both rail and road activities. Alan, a retired chartered civil engineer, has wide interests, but the two uppermost would seem to be Chichester and railways, although not always in that order. He has written extensively on the local history of the area.

The construction of Newhaven Harbour breakwater, in East Sussex, is described in detail by Dr Will Pilfold. He has employed a deal of previously unused primary source material from The National Archive at Kew. Will also taught Geography at the University of Sussex and worked there with the Editor on the Landscape Studies degree course. Born in Lewes and currently residing in the lower Ouse valley, he is the Honorary Secretary of Newhaven Museum.



The first issue of Sussex Industrial History journal, Winter 1970-71 (*see article on next page about the early history of SIAS*)

SUSSEX INDUSTRIAL ARCHAEOLOGY SOCIETY – Its Founding Years

Kim Leslie

Introduction

"Everything becomes an antique or an ancient monument in time, if it is allowed to survive…. The latest field for study and preservation covers industrial remains, and at a recent meeting at Brighton a Sussex Industrial Archaeological Study Group was formed…. Industrial archaeology may seem a dull subject. Some of the objects with which it is concerned have their own beauty, such as wind and water mills. But other things could hardly be called decorative, and are liable to disappear if the owners are not aware that they have a historic interest…. This is breaking new ground in archaeological study…." (West Sussex Gazette, Arundel, 2 November 1967)

"Group asks: Help us hunt down the vanishing industries. Industrialists all over the county have been asked by the Brighton headquarters of the Federation of Sussex Industries to 'turn detective' to help a new study group…." (The Evening News, London, 12 February 1968)

"It's fairly easy to get excited about preserving a beautiful park or stately home …. harder to feel romantic about a cast iron horse gin, or a one-ton water-powered tilt hammer. But the Sussex Industrial Archaeology Study Group gets excited about things like that, in a scholarly way." (Evening Argus, Brighton, 29 December 1969)

Press comments such as these were vital in the early days of the Sussex Industrial Archaeology Study Group. Here was a new field of interest, a new organisation hungry for publicity to attract members and discover unrecorded relics and remains around the county: ice houses, horse gins, tollhouses and milestones, malthouses and breweries just some of the areas that had escaped much, if any, interest in the past. Within three years of its founding, the group's work was celebrated by the BBC TV's *Chronicle* programme. And within a decade one of its recorded sites was highlighted in a worldwide study of industrial archaeology. The little estate brickworks at Ashburnham was still employing centuries-old techniques recorded by the Study Group. To see this in print alongside reports about the remains of the original Kellogg's cornflake factory in Michigan and other far-flung industrial sites was a great honour.[1] We'd come a long way. Sussex industrial archaeology was on the map.

The Sussex Industrial Archaeology Study Group

The Sussex Industrial Archaeology Study Group was originally founded in 1967. The change in name to the Sussex Industrial Archaeology Society dates from 1973. Its aims, membership and logo remained exactly the same. I write this as the founder of the Study Group based on papers now deposited in the West Sussex Record Office in Chichester.[2] It expands the references to these early years in *Sussex Industrial History* (no. 47) when the Society celebrated its fiftieth anniversary in 2017.

The 1960s were crucial years in the development of industrial archaeology with the setting up of the National Survey of Industrial Monuments in 1963 and the stimulus given by Kenneth Hudson in his *Industrial Archaeology: An Introduction* (John Baker, 1963), his editorship of the quarterly *Journal of Industrial Archaeology* (Lambarde Press, later David & Charles, from 1964) [3] and his *Handbook for Industrial Archaeologists* (John Baker, 1967). Michael Rix's Historical Association booklet, *Industrial Archaeology* (1967), did much to reinforce the urgent need for recording and preservation. It was against this groundswell of interest that the Study Group was founded.

Influenced by these publications, I was acutely aware that the traces of the more recent past in the county were in danger of being lost and unrecorded. Although we were – and still are – essentially a rural county, there were plenty of sites within Sussex falling within the scope of the National Survey of Industrial Monuments. Clearly the county could lay claim to some significant sites. At the time, I jotted a few down at random, jottings that underlined that something needed to be done:

> In 1808 the Earl of Ashburnham was described as 'the greatest lime-burner in all the kingdom' with his eighty-feet-deep mine at Dallington, worked by an underground tramway and horse-driven machinery.
>
> Late 19th-century wooden railway track at Brightling Park sawmill.

Brighton GPO's sorting office still using the country's only mechanical letter-sorting machines, the Transormas, in use since 1935.

Partial remains of Littlehampton's first railway station at Wick, 1845, a remarkable survival from the early days of railways.

Fig. 1 One of the Bow Bells milestones in East Sussex (*photo: John Upton*)

The Bow-Bells milestones in East Sussex, possibly one of the finest series of milestones in the country.

19th-century sandstone mine at Mare Hill, Pulborough (an adit mine using pillar and stall method).

The site of the Black Lion Street Brewery, Brighton, continuously occupied by a brewery since the mid-16th century.

The Eastbourne Destructor Works in the 1890s was one of the most advanced waste-disposal plants using compressed air operated by two surviving semi-vertical steam engines.

The 19th-century Goldstone pumping station in Hove, one of the finest Victorian industrial buildings in the county, its two beam engines still intact.

Sussex could clearly make a contribution to the study of industrial archaeology, but where to begin? What to do? I approached Kenneth Hudson – who led the crusade for industrial archaeology in the country – and two influential members of the Sussex Archaeological Society, both on its Council and both distinguished Sussex archaeologists themselves, Philip Burstow and Eric Holden. All three gave every encouragement. Hudson urging me to take the initiative in organising a conference, Holden arranging that I join the Sussex Archaeological Society's Research Committee, nominating my membership on the Society's Council and agreeing to publish details in its widely-circulated *Sussex Notes and Queries*.[4] Thus industrial archaeology had a voice at the top table. The upshot was the inaugural meeting of the Study Group at Brighton's Royal Pavilion on Saturday 14 October 1967 under the chairmanship of Philip Burstow. Eleven were present as founder members to whom I presented the following paper:

Paper presented by Kim Leslie, October 1967

In 1963 the Ministry of Public Buildings and Works, in conjunction with the Council for British Archaeology (CBA), began the National Survey of Industrial Monuments, the recording centre for which is Bath University of Technology. The latest statistics relating to the records held at Bath have been published in *The Journal of Industrial Archaeology* for August 1967, revealing that whereas the number of items recorded for Hertfordshire is 613, for Somerset 265, Kent 44, Surrey 38 and Hampshire 19, for Sussex the total is just 1 [for Worthing Corn Exchange, due for demolition].

The purpose of this National Survey is to record the evidence of the economic and technological life of the country, particularly over the last two or three centuries, then to assess the best examples of each type of monument for scheduling and preservation. The recording, and if possible, the preservation of the evidence, was – and is – considered to be particularly urgent in view of the rapid transformation of town and countryside, and the technical developments making early equipment and machinery obsolete. Perhaps the greatest single threat comes from a lack of appreciation for industrial relics, especially those of the nineteenth century, with the consequence that a whole period of history, in some places intact and complete at the present, is in danger of not being recorded and lost without trace. It's ironic that whereas a high place has been given to ancient monuments of many centuries ago, there hasn't been the same interest and importance given to an era which has probably affected our lives more profoundly than any other in history.

Although not an industrial county in the commonly-accepted sense of this term, Sussex has many examples of the type of monument the National Survey intends to record. This is partly because the scope of the survey is wide, and also because the agricultural counties of Britain, more slow to change traditional forms of living and working than are the industrial areas, are yielding valuable records for the National Survey.

The scope of the National Survey is shown by the 5-point classification recommended by the CBA: 1. Power (e.g. horse gins, steam engines); 2. Transport (e.g. tollhouses, milestones, warehouses, railway stations); 3. Raw Materials (e.g. chemical works, quarries, furnaces, forges); 4. Manufacturing (e.g. breweries, ice houses, tanyards, brickworks, ropeworks); 5. Industrial Housing (e.g. workhouses, model housing). In other words a systematic record

of the county based on these suggestions will record an area of the past hitherto largely untouched by historians and archaeologists.

In Sussex, attention has already been given to the iron and glass industries by Straker, Winbolt and Kenyon;[5] Sheffield University is currently extending Straker's pioneer work[6] and Kenyon, in his recently published book on Wealden glass, has stated that it is doubtful if half the glasshouse sites are known, or even suspected. Much has been recorded about wind and watermills, by Peter Hemming on Sussex windmills and by Frank Gregory of the Brighton and Hove Archaeological Society in his work on wind and water mills of the county.[7] It's therefore incorrect to claim that no work in the field of industrial archaeology has taken place; however, it *is* correct to claim that, firstly, the scope of recording has been limited, and, secondly, that no overall plan on a co-ordinated basis throughout the county has existed for industrial archaeology.

It's firstly necessary to organise a preliminary survey to determine the particular fields on which activity should concentrate. Both Bedfordshire and Hertfordshire have conducted similar outline surveys, the results of which have been published by their respective county councils this year.[8] In order to lay the foundations for future work, and for more detailed study and research, it's suggested that it might be profitable to produce a similar introductory study for Sussex, thus giving a guide to the possibilities of more specific lines of enquiry.[9]

Some recording has already been carried out. For example, the county has contributed information to a national survey of early forms of horse-powered machines for raising water.[10] Sussex possesses one of the earliest-known horizontal horse gins at Stanmer House, and what's so far recorded as the only specimen of the last type of horse gin to be manufactured in the county, at Okehurst Farm, Billingshurst, recently donated to Worthing Museum. The county also possesses what the National Survey reveals is one of the most complete mid-nineteenth century gins at Patching.[11]

Other significant items include the beautiful cast-iron hand crane, dated 1821, at the Phoenix Brewery, Brighton; the remarkable survival of a pottery and tile kiln at Piddinghoe, and an extremely rare horse-driven bark mill at Alfriston Tannery. Work has also started on photographing and measuring ice houses, one of the objects of which is to try and determine a classification by type, as in Warwickshire. Representative examples so far seen from the 1790s to the 1860s show a marked individuality. Nearly forty have so far been located for future recording.

Another field of interest is the ongoing recording of the Ashburnham Estate brickworks, reputed to be the last wood-fired commercial works still in use in the country where rapidly disappearing traditional hand methods can still be seen.[12] It's hoped to film the traditional method of charcoal burning in the Weald, but difficulty is being found in trying to locate a site where this is carried on.[13]

It's also suggested that the recording of the economic activity of the last two or three centuries should include the collecting of information about lost relics and defunct activities, but of which there is some photographic or documentary evidence, or unwritten but reliable knowledge. Into this category are the floating bridge at Littlehampton and the donkey wheel on Brighton seafront for raising water for sprinkling the dusty streets of the town.

EVENING ARGUS 23-10-67

INDUSTRIAL MONUMENTS OF SUSSEX

THE new Sussex Industrial Archaeological Study Group, formed in Brighton a week ago, will work in co-operation with the National Survey of Industrial Monuments, started in 1963 by the Ministry of Public Buildings and Works in conjunction with the Council for British Archaeology.

Function of the study group will be to record the evidence of the economic and technological life of the county, particularly with regard to the last two or three centuries.

A systematic survey of Sussex will be based on power, transport, raw materials, manufacturing and industrial housing, and will record an area of the past which has previously been largely untouched.

It is hoped to preserve as much of the evidence as possible.

People interested in assisting the study group should contact Mr. K. C. Leslie at Little Broadmark, Sea Lane, Rustington.

Fig. 2 Formation of Study Group announced in the *Evening Argus*, 23 October 1967

Further, it would be helpful if a bibliography of references were to be compiled, from, for example, early books such as the Reverend Arthur Young's *Agriculture of the County of Sussex* of 1808 in which the Ashburnham limeworks at Dallington is described in detail, [14] the *Sussex County Magazine* and parish histories. It will be useful to make reference to the 117 loose-leaf binders of the late Lady Wolseley in Hove Central Library, for which the Historical Manuscripts Commission noted will be of value to the industrial archaeologist because of their detailed parish information.

In the light of the urgency of much of the recording work, and in the interest shown in some form of co-ordinated activity, it's therefore moved that a Sussex Industrial Archaeology Study Group be established.

The Study Group is established

This meeting was the formal start of the group. Numbers grew, from an original 16 in 1967, [15] to 74 a year later, and to 114 by the end of 1969. In addition to individual members, corporate membership was offered and we were joined by several local history and archaeological societies such as at Battle, Littlehampton and Robertsbridge as well as public libraries and museums across the county. By the time the Study Group changed its name to Society in 1973 there were 165 members, mostly local, but with some addresses as far away as Hong Kong, Quito and Tehran.

What we needed in these early days was publicity, both to increase the membership and raise awareness of our aims, thereby finding out from local people what was hitherto unknown to local historians and archaeologists. As emphasised on one of our exhibition boards:

> So much of the information we want to know about can be difficult to find. Kilns and ice houses have been found in back gardens, malthouses in little-visited alleyways, horse gins and donkey wheels locked away in barns and outhouses. Such evidence is nearly always on private property. It might be that YOU could help in our searches…..

Littlehampton Gazette, Saturday, Oct. 28, 1967 7

Preserving monuments of Sussex industry

A RUSTINGTON resident has been elected secretary of the newly-formed Sussex Industrial Archaeological study group.

He is Mr Kim Leslie, of Little Broadmark, Sea-lane, Rustington, who was elected at the inaugural meeting at Brighton.

The purpose of the group is to record evidence of the economic and technological life of the county, especially with regard to the last two or three centuries.

The new study group will co-operate with the National Survey of Industrial Monuments, started in 1963 by the Ministry of Public Buildings and Works, in conjunction with the Council for British Archaeology.

Although not an industrial county in the usually accepted sense, Sussex possesses many examples of the type of monuments the survey means to record.

A systematic survey of Sussex will record an area of the past which has hitherto been largely untouched.

The recordings, and if possible preservation, of this evidence is considered to be particularly urgent in view of the rapid transformation of town and countryside and the technical developments making early equipment and machinery obsolete.

Perhaps the greatest single threat comes for a lack of appreciation for certain items, especially those of the 19th century, with the result that a whole period of history, in some places intact and complete at present, is in danger of being lost without a satisfactory record.

Certain aspects of industrial archaeology have previously been studied in Sussex, the watermills and iron and glass industries, for example, having been surveyed already. The scope of recordings has, up to now, been limited and no overall plan on a co-ordinated basis throughout the county has existed for industrial archaeology.

The meeting agreed that the immediate aim of the newly-formed study group would be to organise a preliminary outline survey in order to determine the particular fields on which activity should concentrate. It is hoped to publish these findings and lay the foundations for future recordings and research.

All inquiries and suggestions for recording should be addressed to Mr Leslie.

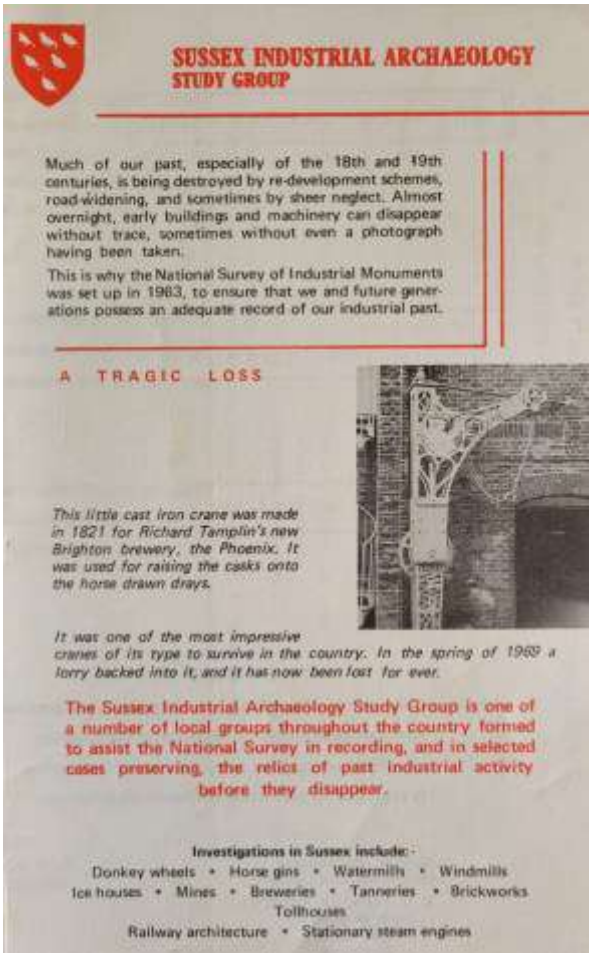
Fig. 3 Announcement of formation of the Study Group in the *Littlehampton Gazette*, October 1967

Gaining publicity

Fig. 4 The original logo designed by John Wilcox

Much attention was given to publicity with the active support and advice of my father, Jimmie Leslie, publicity and public relations manager for the Crusader Insurance Company. To grow, we needed to be well known, we needed a campaign to get known as widely and quickly as possible, and in this we scored with professional guidance. We needed a logo to give an identity and grab attention with something pictorially direct and simple: the beam engine motif for our notepaper and publicity was born, designed by John Wilcox, designer and printer of Rustington. And importantly we needed to convey our message with well-designed publicity material about our aims and objectives. And thus was born the group's illustrated newsletters outlining its intentions and activities and giving a record of finds and their recording. Five newsletters were published between April 1968 and April 1970, typeset and printed by Flexiprint in Worthing. (Appropriately they operated from the former 19th-century Egremont Brewery in the town, always such a delight to visit and enjoy the continuity of industrial use in such an atmospheric building.) These newsletters were highly effective in spreading information about the group. Copies were sent to all Sussex newspapers, BBC Radio Brighton and the BBC's and ITV's local stations – leading to extensive press coverage and appearances on radio and television – and were also sent to all local authorities: county and what were then urban and rural district councils.

Keen to help, a Brighton councillor, Alderman Leonard Knowles, gave contacts with the London *Evening News* and *The Daily Telegraph*, both of which brought national publicity. On receiving our first Newsletter, Rex Wailes (doyen of engineering history and industrial archaeology) wrote that 'it was a model of what such a publication should be'.



SUSSEX INDUSTRIAL ARCHAEOLOGY STUDY GROUP

Much of our past, especially of the 18th and 19th centuries, is being destroyed by re-development schemes, road-widening, and sometimes by sheer neglect. Almost overnight, early buildings and machinery can disappear without trace, sometimes without even a photograph having been taken.

This is why the National Survey of Industrial Monuments was set up in 1963, to ensure that we and future generations possess an adequate record of our industrial past.

A TRAGIC LOSS

This little cast iron crane was made in 1821 for Richard Tamplin's new Brighton brewery, the Phoenix. It was used for raising the casks onto the horse drawn drays.

It was one of the most impressive cranes of its type to survive in the country. In the spring of 1969 a lorry backed into it, and it has now been lost for ever.

The Sussex Industrial Archaeology Study Group is one of a number of local groups throughout the country formed to assist the National Survey in recording, and in selected cases preserving, the relics of past industrial activity before they disappear.

Investigations in Sussex include:-

Donkey wheels • Horse gins • Watermills • Windmills
Ice houses • Mines • Breweries • Tanneries • Brickworks
Tollhouses
Railway architecture • Stationary steam engines

Fig. 5 Publicity material for the Study Group

Kenneth Hudson similarly responded, asking for a statement for inclusion in the *Journal of Industrial Archaeology* (entitled 'The Sussex Potential')[16] and that a copy be sent to Sweden where they were starting to organise similar initiatives to record its industrial heritage of ironworks, pulp and paper mills.

Our publicity machine was a key factor in finding ourselves runners-up in the BBC TV's *Chronicle* programme to promote industrial archaeology through a competition: *Win a Second-hand Crane* in 1970. From a field of sixty entries, eight local organisations were selected. Sussex was one of the eight and all the groups were filmed in action. The Sussex film covered Bognor ice house, Littlehampton's first railway station, Bow-Bell milestones, Shipley Mill, Goldstone pumping station, Heathfield gas exploration and working with the National Trust and the Royal Engineers to restore Kipling's turbine at Bateman's, Burwash. The programme's presenter, Magnus Magnusson, commented that our strength was in our organisation and devoting much energy to stirring up public interest with our ability 'to attract the help of bodies like the National Trust and local councils'. [17]

Local councils get involved

It was important to have local councils on our side. West Sussex County Council requested representation on its Coast and Countryside Committee for help in compiling a list of 'countryside treasures', agreeing that 'appropriate officers of the County Council' bring to our attention 'any items which may be of interest' in its ownership, such as the old tannery buildings in Westgate, Chichester and the nearby wool-staplers and fellmongers site in Tower Street, soon to be demolished.

East Sussex County Council enlisted the group's help in preparing a report on the state of the Bow-Bell milestones with the result that the County Surveyor agreed to take action. Encouraging responses were received from Brighton Town Council in its wish to co-operate with the Study Group's Brighton and Hove Survey, leading to a request from the Brighton Urban Structure Plan to provide information on 'buildings, structures etc' of industrial archaeological interest for the coastal conurbation between Seaford and Lancing. Alderman Leonard Knowles of Brighton gave help by giving a contact with Brighton's Town Clerk, W.O. Dodd, who owned a lathe originally from the Volk railway workshop at Paston Place. The lathe, dating from the 1880s, almost certainly had significant associations with the building and maintenance of Magnus Volk's railway in Brighton, the country's first public electric train. Our interest encouraged Mr Dodd to donate the lathe to Brighton College of Technology. For Bognor Urban District Council we helped with the restoration of the Hotham Park ice house by clearing it of rubbish, providing a plan for the missing inner door based on one which had survived at Petworth and information on its history and function for the

Fig. 6 Ice-house at Hotham Park, Bognor (*photo: John Blackwell*)

interpretation board. Ice houses are usually hidden away in isolated spots on country estates, little seen and appreciated; this example, in London Road, Bognor, is probably one of the most publicly-visible icehouses in the country, making an important contribution to the history of food preservation.

Exhibitions

Exhibitions were another opportunity for attracting attention. Our aims and objectives were always explained with reference to the CBA's main categories of interest, illustrated with specific Sussex examples, and ensuring that each exhibition featured something special for the particular event. The first display was at Expo Sussex 68, held in July 1968 at Ardingly Show Ground, a major show celebrating the county at work and play. One of its features was Martlet Down, a village of working Sussex craftsmen. For this the Study Group organised a demonstration of brick, tile and land-drain making by the Ashburnham Estate and a collection of tools from the walking-stick manufactory from Plaistow on the Surrey-Sussex border. Over 50,000 attended the event.

Fig. 7 Ashburnham Brickworks, 1968 (*photo: Hugh Gordon*)

Next, having been approached by the Federation of Sussex Industries, we were given a free trade stand at the 4th Franco-British Exhibition in September 1968 at the Metropole Hotel in Brighton. The stand included a working model of a beam engine built about 1820 (formerly on permanent display at the offices of the *The Model Engineer* in London), owned by one of our members, Mr. C.S. Cowper-Essex; model windmills made by Frank Gregory and three small models of Halnaker, Ringmer and Rotting-dean windmills made from their original timbers by James Martin in the 1920s, [18] plus a cast-iron lion's-head hydrant from the Duke of Norfolk's private waterworks, on loan from Worthing Water Undertaking. Catering for visitors from both sides of the Channel, all text and publicity was bilingual. It brought contact with Sussex and French engineers and industrialists and a list of prospective members. Although the French were interested, many were curious of this '*Groupe pour l'Etude de l'Archéologie de l'Industrie du Sussex*' as they didn't really understand what the interest/fuss was all about! (After all, some of our decaying relics were types still used in rural France.) And as most French visitors came from Normandy, perhaps also indicating the feeling that we were crusading against in Sussex: that agricultural areas such as these have little to offer the industrial archaeologist.

Worthing Museum highlighted the group's work in December 1968 with several unusual exhibits, such as tollboards from Worthing Corn Exchange and Northchapel tollhouse, plus an unusual curiosity, a Victorian boot and flogger from Arundel's Swallow Brewery.[19] A little-known Shoreham activity was featured, the Norwegian ice trade through the Baltic Wharf which ceased with the First World War, the former ice store in the 1960s, then housing a furniture factory and wallpaper shop.

In association with the Wealden Iron Research Group, the Study Group exhibited at Horam Week in July 1969 in aid of the Sussex Churches Campaign. We staged our own display alongside the Research Group under archaeologist Henry Cleere who brought industrial activity to life in demonstrating iron smelting, claimed as the first iron made in the Weald for over 150 years.[20] It was a tremendous success, once more demonstrating the importance of directing publicity to the general public who wouldn't necessarily attend museums and archaeological events. Horam was billed as an ambitious week-long summer fête and fair with curios, a fairground, go-karts, a flower festival, brass rubbing and aeroplane rides, the type of events that attracts thousands. We wanted to popularise our work, to challenge the wider public with little or no knowledge of industrial archaeology.

Other partnerships

Throughout much of 1969 and 1970, the Study Group worked with the National Trust and the Wealden Iron Research Group in organising the Wealden Ironmasters exhibition at Bateman's, Burwash, a former local ironmaster's home, more famously the home of Rudyard Kipling. The exhibition led to other work with the National Trust. The group agreed to supervise the restoration of

Fig. 8 Kipling's turbine at Batemans, Burwash (*photo: John Upton*)

Bateman's watermill (Park Mill) on behalf of the Trust and to provide working parties to carry out the first stages of restoration, including cleaning out debris and treating timbers and machinery with pesticides and preservatives. Kipling, on the advice of Sir William Willcocks who designed the Aswan Dam, installed a water turbine in the mill to generate his own electricity for lighting the house in 1903; it ran successfully for twenty-five years without any trouble, except for eels getting into the turbine casing and seizing it up. It was disused for many years. Possibly one of the earliest electrical generating plants to survive intact in Sussex, and with such a distinguished association, its restoration was vigorously supported. One of our members, Colonel Hawkins, acted in an advisory capacity, arranging for the turbine to be taken to the Royal School of Military Engineering at Chatham to be restored to full working order. The Royal Engineers undertook to clear and clean the pond and dam.

In September 1966, just a year before the Study Group was founded in October 1967, the Committee for the Promotion of an Open Air Museum for the Weald and Downland held its first meeting at the University of Sussex. When the museum – since rebranded as the Weald and Downland Living Museum – eventually found its site on the West Dean Estate near Chichester, opening to the public in September 1970, it was to have a profound effect in the preservation not only of traditional buildings, but also industrial activities from around the region. The Study Group was represented on its Crafts and Industries Committee. Thus industrial archaeology had a new home for many of its relics that would otherwise have been destroyed: a working watermill from Lurgashall, animal-powered machinery for raising water from Hampshire and Patching, a reconstructed charcoal burners' camp, a windpump from Pevensey, a tollhouse from Upper Beeding, a working blacksmith's forge, woodcrafts and brickmaking equipment.

Another crucial area for gaining publicity was through talks and lectures. Three pioneer courses in Sussex industrial archaeology were offered by Southampton University's WEA local committee between 1969 and 1971. Roy Armstrong, founder of the Open Air Museum, broke new ground in Sussex in presenting the first series of lectures on industrial archaeology with Kim Leslie: a ten-week course given to the Worthing branch of the WEA from January 1969,[21] repeated at Crawley from January 1970 and Horsham from January 1971. Residential week-long and weekend courses were held in 1969 at Lodge Hill, near Pulborough, with field visits to places such as Horsham Brewery, hammer ponds in St Leonards Forest and the site of the industrial tramway at Offham, near Lewes. Dozens of one-off talks were given throughout the county.

To our own members, the Study Group offered an extensive programme of talks. Notably these included Kenneth Hudson, editor of the *Journal of Industrial Archaeology* – who had done so much to establish the credentials of the subject – on 'Aims and Methods in Industrial Archaeology' (Brighton College of Technology, 18/5/68); Peter White of the Inspectorate of Ancient Monuments on 'Why should we Preserve Industrial Monuments?' (Sussex University, 18/10/68); and Rex Wailes, Consultant on industrial monuments to the Ministry of Public Buildings and Works, on 'The Industrial Monuments Survey' (Brighton Teachers' Centre,15/11/69).

The BBC's *Chronicle* programme commended the Study Group group not only for its publicity, but also for its organisation, for the way the surveys were organised under co-ordinators. In these early days, leading parts were taken by Frank Gregory (Natural Power); F.G. Parker (Fuel Power); Brian Austen (Tollhouses and Milestones); Peter White (Breweries); Arthur Rule (Kilns); Adrian Barritt (Malthouses); and John Mudge (Shoreham Harbour).

Central to the running of the Study Group was Kim Leslie as the General Secretary and Editor of the Newsletter, supported by Norman West, a chartered accountant from Bognor who undertook the duties of treasurer. By the end of 1969 the work of the Study Group had expanded so much that new positions were created. Although Kim Leslie remained as General Secretary and Newsletter Editor, for specific matters about the surveys, Wilfred Beswick was appointed East Sussex Secretary with Kim Leslie retaining West Sussex. John Hoare was appointed Vice Chairman serving under Chairman Philip Burstow, and John Upton made Programme Secretary. John Farrant took up the editorship of the Study Group's journal, *Sussex Industrial History*, responsible for the first six editions published by Phillimore of Chichester.[22] The first issue, for Winter 1970/71 included papers on 'The Ashburnham Estate Brickworks 1840-1968' (by Kim Leslie) and 'The Upper Ouse Navigation 1790-1868' (by D.F. Gibbs and John Farrant), with a feature on 'Notes and News', in essence the successor to the Study Group's *Newsletter.*

Founded in the 1960s, by the early '70s, there were changes afoot. As recorded by Chairman John Blackwell in 2017, [23] the Study Group then 'appears to falter' with Philip Burstow resigning as Chairman through ill health and the present writer as its founder departing 'to pastures new'.[24] Revival wasn't far away when the Study Group morphed into the Sussex Industrial Archaeology Society and Wilfred Beswick was appointed Chairman. A new era was born…….

References

1. Kenneth Hudson, 'Making sense of a brickworks' in *World Industrial Archaeology* (Cambridge University Press, 1979), pp. 87-91.
2. West Sussex Record Office, Accession 12,418 (uncatalogued).
3. References to this journal in this article use this more commonly-used parlance and shorter form. Its full title is *Industrial Archaeology: The Journal of the History of Industry and Technology.*
4. 'Sussex Industrial Archaeology Study Group' in *Sussex Notes and Queries*, vol. XVII, no. 1 (Sussex Archaeological Society, May 1968), pp. 33-34.
5. Ernest Straker, *Wealden Iron* (G.Bell and Sons,1931); S.E.Winbolt, *Wealden Glass: The Surrey-Sussex Glass Industry (A.D. 1226-1615)* (Combridges, 1933); G.H. Kenyon, *The Glass Industry of the Weald* (1967, Leicester University Press, 1967).
6. Henry Cleere/David Crossley, *The Iron Industry of the Weald* (Leicester University Press, 1985).
7. Rev. Peter Hemming, *Windmills in Sussex: A Description of the Construction and Operation of Windmills exemplified by Up-to-Date Notes on the still existing Windmills in Sussex with photographic illustrations* (C.W. Daniel Company, 1936).The extensive records by Frank Gregory on mills and milling are held by the Weald and Downland Living Museum at Singleton.
8. W. Branch Johnson, *Industrial Monuments in Hertfordshire* (Hertfordshire County Council,1967); Anon., *Industrial Archaeology in Bedfordshire* (Bedfordshire County Council,1967).
9. A similar introductory survey was never published for Sussex.
10. Hugo Brunner/J.Kenneth Major, Water Raising by Animal Power (privately-published offprint, 1972), pp. 142-48.
11. The Patching horse gin was subsequently removed and is now on display at the Weald and Downland Living Museum.
12. Kim C. Leslie, 'The Ashburnham Estate Brickworks, 1840-1968' in *Sussex Industrial History*, No.1 (1970), pp. 2-22.
13. After this statement was written, a charcoal burners' camp, with sleeping hut and kiln, was built at the Weald and Downland Living Museum by retired charcoal burners, Mr and Mrs Langridge from Horsham, and has been fully recorded.
14. The 1813 edition of this book was reprinted in facsimile by David & Charles in 1970.
15. The original sixteen members were the eleven who attended the inaugural meeting on 14 October 1967: Philip Burstow, W.R. Clark, Eric Epps, Frank Gregory, Colin Harris, Kim Leslie, J.C.W. Ludlow, David Martin, John Martin, Arthur Rule and Roy White, with apologies received from Margaret Coleman, Hugh Gordon, Phoebe Keef, C.F. Tebbutt and Peter White.
16. 'The Sussex Potential' in *Industrial Archaeology: The Journal of the History of Industry and Technology*, vol.4, no.3 (David & Charles, 1967), pp.282-83.
17. Kenneth Hudson, 'Chronicle and the Industrial Archaeology Dilemma' in *Chronicle: essays from ten years television archaeology* (BBC,1978), pp. 127-38.This article describes the work of the eight finalists that took part in the BBC's competition. SIASG was a runner-up to the winning group, The Northern Mill Engine Society.
18. James Martin, antiquarian and artist of Brighton and later Henfield, illustrated R. Thurston's book *Old English Mills and Inns* (Cecil Palmer, 1927).These three models are in the possession of Kim Leslie, and are to be donated to a museum.
19. Worthing Corn Exchange's toll board is held by

Worthing Museum and the Northchapel toll board by the Weald and Downland Living Museum. The boot and flogger, a device for sealing bottles of beer, is in the possession of Kim Leslie and is to be donated to Arundel Museum.

20. For Henry Cleere's report see *Iron Smelting Experiments in a Reconstructed Roman Furnace* (Iron and Steel Institute, 1970).
21. The ten sessions for this pioneer course in Worthing covered: 1.The Introduction to Industrial Archaeology; 2. Power (animal and human, water, wind and steam); 3. Road Transport with emphasis on turnpikes; 4. Canals and Railways; 5. Industrial Development in Sussex from the mid-18th century; 6. Buildings and Architecture in the 18thand 19th centuries; 7. The Use of Records and Documents; 8/9. Industrial Archaeology and the Open Air Museum concept; 10. Methods of Investigation and the Preparation of Records.
22. The late John Farrant, a senior University of Sussex administrator and prolific writer on Sussex history, gave much wise counsel to the Study Group in its founding years.
23. John Blackwell, 'The Beginnings of SIAS' in Sussex Industrial History (no.47, 2017), p.2.
24. These 'pastures new' were two-fold. From 1970 I had been appointed to a new post in the West Sussex Record Office, as Education Officer, with a remit to promote local history within the county, a pioneer post in Sussex and one of the earliest such appointments to a record office in the country. At the same time, from 1967, I was a founder-trustee of what was then called the Weald and Downland Open Air Museum – now the Weald and Downland Living Museum – and its treasurer, with additional responsibility for matters industrial. It was difficult to cope – adequately – with the growing administrative duties of the Study Group…..

Fig. 9 Piddinghoe kiln after restoration (photo: *John Upton*)

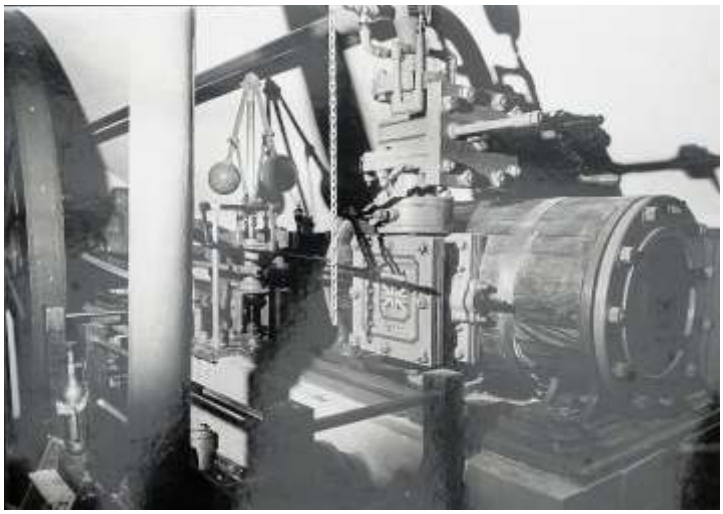


Fig. 10 Glynde Limeworks steam engine (*photo: John Upton*)

Fig. 11 Kingston malthouse, d.1972 (photo: *Peter Holtham*)

Fig. 12 Littlehampton swing bridge (*SIAS collection*)

FROM STAGECOACH TO STAGECOACH – 300 Years of Transport in the Lavant Valley

Alan H J Green

Introduction

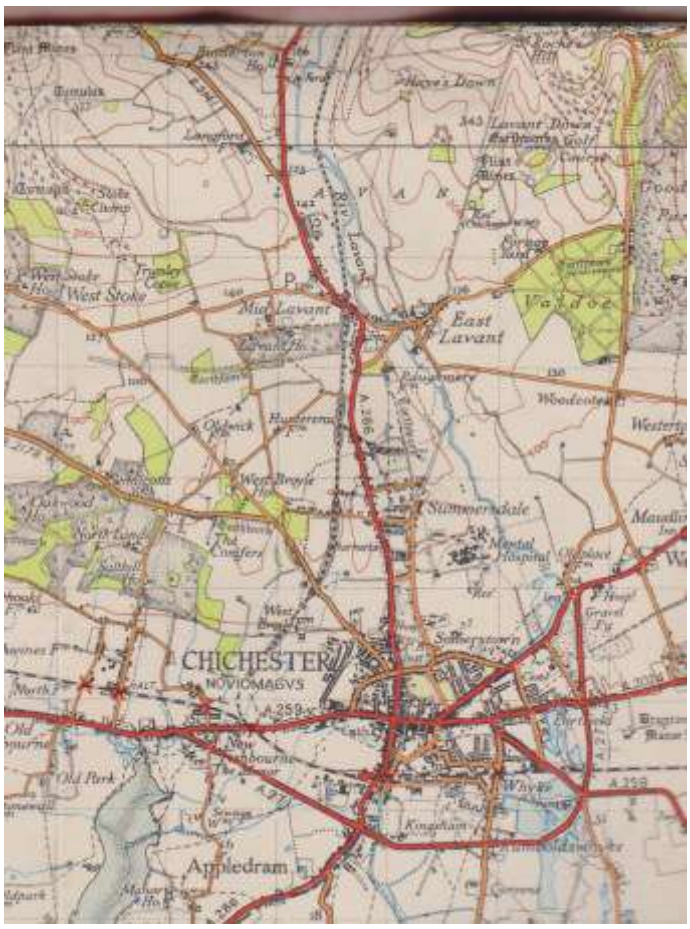


Fig. 1 A detail from the 1930 one-inch OS shewing the three Lavant villages, the Chichester & Midhurst Railway and the A286, all following the course of the River Lavant.

Three miles north of Chichester lie the three villages constituting Lavant - East, West and Mid - grouped around the main road to Midhurst, now the A286. The villages take their name from the River Lavant whose once-mighty waters carved out the eponymous valley in the lower slopes of the South Downs on their way to the sea. Today the River Lavant is just a rather pathetic winterbourne, but it can still flood the city when it is so minded.

In 1930, at the time of this map, few people had cars but Lavant was linked by a railway to Midhurst and Chichester and by Southdown bus services to Chichester, Midhurst and East Dean. This was the peak era of Lavant travel — but it was not to last.

Prior to the arrival of the railway it was horse, stagecoach or walk! In 1791 the *Sussex Advertiser* carried this useful advice about coach travel:-

> There are two modes of conveyance; either by common stages or by a post-chaise. By the common stage you are classed with company of every description and who may frequently turn out very disagreeable. You are also paid no attention at inns where you stop, although you pay exorbitant for refreshment, and are frequently insulted by the indecent behaviour of the coachman. And besides your fare, you have a considerable sum to pay for luggage.
>
> On the contrary, if two or three passengers choose to travel together, they may, by travelling in a post-chaise, not only avoid all these inconveniences – but suit their own convenience in point of time, and be at less expense – besides meeting with genteeler treatment at the inns on the road.

Early Days

Fig. 2 An extract from an anonymous Sussex map c1750 shewing Lavant (Author's collection)

Historically there have been two routes from Chichester to London, one, the subject of our interest, being due north via Midhurst and Haslemere, and the other heading north-east out of the city via Petworth, originally the Roman Stane Street. In Fig. 2 it can be seen that the present road running north from Mid Lavant up through the valley did not exist; boggy Lavant Marsh was in the way so the way north had to be over the Trundle via Chalkpit Lane.

Fig. 3 Owen & Bowen's 1720 route map for Chichester to London via Midhurst and Guildford with (left) a detail from it shewing Lavant. (Author's collection)

The map in Fig. 3 is a 1720s equivalent of an AA map shewing the route from Chichester to London via Midhurst and Guildford (drawn confusingly with north at the bottom of the page) and it can be seen that it passed through East Lavant and then climbed up over St Roche's Hill (more commonly known as The Trundle) to drop down into Singleton on the other side. This road was cut into the bare chalk and would have been quite treacherous, especially in winter. It still exists as Chalkpit Lane, an unmade highway, and its deep ruts in the slippery chalk make the wearing of stout boots essential to avoid twisted ankles – or worse.

I have been unable to ascertain when the road was built across Lavant Marsh, but it was obviously there by 1780 when Yeakell and Gardner were carrying out their magnum opus. The Chichester and Fernhurst Turnpike Trust had been set up in 1749[1] so it may well have been they who built the new road which

Fig. 4 A detail from Yeakell and Gardner's Sussex map of 1780 shewing the completed road north from Mid Lavant through the Lavant Valley (Author's collection)

would have provided welcome relief from the hazardous crossings of the Trundle.

In coaching days there were London services over both routes from Chichester, and in 1839, towards the end of the coaching era, one such, the *Duke of Richmond* went via Midhurst on Mondays, Wednesdays and Fridays, and via Petworth on Tuesdays, Thursdays & Saturdays.[2] The *Chichester, Medhurst and Hazelmere Original Post Coach* (see Fig. 5) served Lavant en route, so it would have been possible to board it there, either to go the whole way or, perhaps, just for a jaunt into Chichester. For the latter, as it was only three miles, most would probably have used their own horse, if they had one, or walked – Georgians were hardy folk and would have thought nothing of walking six miles for a social call.


Bolt-in-Tun Inn, Fleet-Street.

Chichester, Medhurst, and Hazelmere

Original Post Coach,

Tuesday, Thursday, and Saturday morning, at six o'clock.

Carriage,

Porterage,

Richard Miles, Robert Edwards, Porters.

Fig. 5 A ticket for a stagecoach journey from Chichester to London c1780 (Author's collection)

The coming of the railway

Fig. 6 Railway Map shewing the lines to Chichester as existing in 1923 (Author)

In 1846 the London, Brighton and South Coast Railway (LBSCR) arrived at Chichester and was extended on to Portsmouth in 1847. It was now possible to travel from Chichester to London by train, the best timing being 2hr 30m and worst 4hr 45m, both via Brighton, which was a considerable improvement over the 11½ hours by road.[3] Stagecoach services ceased shortly afterwards, leaving poor Lavant with no public transport, so horseless denizens had either to continue to walk or recourse to local carriers.

In 1881 the Chichester to Midhurst Railway opened: a major event for Lavant as it was now put firmly on the coveted railway map. The Chichester and Midhurst Railway was a failing private venture which the LBSCR reluctantly took over and completed as a blocking move to prevent the South Eastern Railway from using it to get to Hayling Island. Shareholders were not happy with an expensive commitment, especially as the LBSCR was on hard times. The Powers had lapsed so a new Bill had to be promoted in 1876.[4] Although Chichester Corporation welcomed the idea of a railway to Midhurst and supported the Bill in principle, they did petition against the proposals for the junction at Fishbourne and its effect upon the Fishbourne Road, wanting a new overbridge to replace the existing level crossing. In this they were unsuccessful as the petition was overruled.[5] The Act was passed and the line finally opened on 11 July 1881.[6]

The line had to cross the crest of the South Downs without the aid of a valley as the River Lavant had sprung too far south. It served only small settlements along the way and involved much heavy engineering with steep gradients, massive earthworks and three tunnels, and so entailed a big outlay for a low potential return; the final cost being £25k/mile rather than the usual £12-15k.[7] The one glimmer of hope for the directors was that the line passed relatively close (i.e., close by Victorian standards) to Goodwood bringing the potential of race traffic for which an elaborate and excessively-large station was provided in the parish of West Dean, but named —misleadingly — Singleton.[8] Of the three intermediate stations provided at Lavant, Singleton and Cocking only Lavant was near a settlement of the same name.

Lavant Station

The three stations on the line, plus the rebuilt Midhurst, were built to the elaborate designs of Thomas Harrison Myres of Preston and numbered among the 18 in the same style on the LBSCR's new lines in Sussex.[9] Myres' station building at Lavant is particularly impressive, being the usual two storeys high at the front but three storeys high on the platform side, the reason being that the line is in a cutting at this point. The photographs shew the elaborate detailing: pargetting, mock timbering, panelled chimneys, stained glass and an entrance porch – all rather extravagant for a line the LBSCR really didn't want to build!

Passengers entered the station building at first-floor level and, after purchasing a ticket, went down to the platform via the external (but covered!) timber staircase which can be seen in Fig. 7. A luggage chute was also provided down the side of the embankment at the country end which can be seen in Fig. 9.

Fig. 7 Lavant station on completion in 1881, as featured in an album of as-constructed photographs made for Frederick Bannister, the Engineer for the line (WSRO)

Fig. 8 The frontage of Lavant station from the same album. Although the station building has survived this view is unrecognisable today. (WSRO)

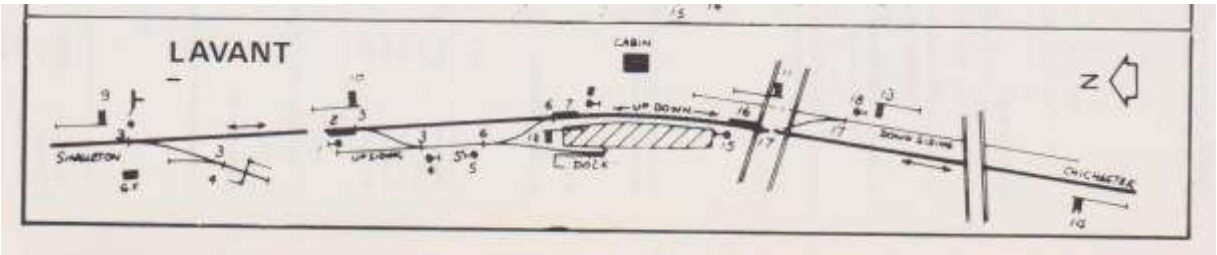
Fig. 9 A rare view of a passenger train on the C&MR. A 'D' class 0-4-2T waits at Lavant with a train for Chichester around the turn of the century. (Author's collection)

Lavant was a block post but having only one platform passenger trains could not cross, and there was only one siding and a dock for goods traffic. A Government siding was installed at the London end of the station in 1917, controlled via a ground frame, to serve a factory producing acetone from wood. The wood came from Eartham by an aerial ropeway which crossed over the line. The factory does not seem to have been commissioned, but W Pearce (Bentwood) Ltd took over the site to make bentwood furniture and the aerial ropeway supplied them until 1922.[10] Local boys regularly reserved their assumed right to hitch a perilous ride on the ropeway. At the country end of the station was another siding, this time heading south to a gravel pit beyond Snakes Lane bridge, and in view of the steep gradient (1 in 80) the special instruction required wagons to be propelled to the pit from Lavant.

London Brighton & South Coast Railway.

Barnham Junction to

LAVANT



Lavant: Gravel Pit Siding.—When propelling Trucks to the Gravel Pit Siding at Lavant, if a Brake Van is not the leading vehicle all Truck Brake Levers must be pinned down. If the number of Trucks provided with pins is insufficient to securely hold them, a Sprag must be used in the leading Truck, and when there are more than ten Trucks two Sprags must be used. Twenty-five Trucks must be the maximum number propelled.

Lavant: Government Siding.—This Siding is connected with the Single Line between Lavant and Singleton about ¼ mile north of Lavant Station. The points are worked from a ground frame controlled by Annett's Patent Lock, the key of which is fixed to the Electric Train Staff for the Section between Lavant and Singleton. The ground frame cannot be used unless the key is in the lock and the key cannot be withdrawn until the points are reset to their normal position. A gate is provided across the entrance to the siding, the key of which is kept in Lavant Signal Box. The Signals govern movements to and from the Siding.

The siding is under the control of the Station Master at Lavant Station. All Trucks for the siding must be invariably worked to Lavant Station, thence to the siding by Up Goods Trains as arranged by the Station Master.

Up Trains calling at the siding must run on from there to Singleton Station.

Fig. 10 The Lavant signal diagram shewing the Government siding at the London end and the gravel pit siding at the country end, along with extracts from the 1922 Appendix to the Working Timetable giving instructions for their operation. (Author's collection)

Fig. 11 An extract from the 1930 one-inch OS shewing that the siding passed under the A286 at Huntersrace to reach the gravel pit. Although the map implies a junction at Huntersrace this was not the case; instead the line was effectively double track from Lavant, and the independent track of the siding only diverged here. There is no trace of the overbridge today and there are no known photographs of it either. The pit was filled in and developed for housing in the 1970s.

The challenge of road transport

Around 1901 a Mr W G Doyle started the Summersdale Omnibus Co to provide a horse-bus service between Chichester station and the new, up-market Summersdale development to the north of the city. He quickly adopted the new-fangled motor buses (two Vulcans and a Ford) and metamorphosed into *Summersdale Motor Services*. He introduced a new service from Chichester to East Dean which also served Lavant. Road competition to the railway had begun.

Throughout the 1930s the Southern Railway was carrying out reviews of its less remunerative services and there were many casualties. As part of this review, negotiations took place in 1930 between Southdown Motor Services and the Southern Railway into ways of co-operating on certain routes in Sussex. The Southern had acquired about a third of the bus company's shares so this made perfect sense.[11] It should come as no great surprise that the Chichester to Midhurst line came under scrutiny as its passenger numbers, never impressive, were fast declining.

Fig. 12 A Summersdale Motor Services bus ticket, c1920 (Author's collection)

In 1924 Southdown bought out Summersdale Motor Services, taking over their East Dean service and adding a service to Midhurst, both serving Mid Lavant.[12] Between them they gave Lavant a weekday service of 13 buses a day each way to Chichester and nine to Midhurst.[13] Although slower, the bus service was much more frequent and by 1932 the service had improved with Lavant being served by 17 journeys each way on a weekday. The vehicles had also much improved with the new Leyland Titans on pneumatic tyres giving a more comfortable ride than the solid-tyred Tilling Stevens had done; it was difficult for the railway to compete.

Back on the railway, economies were at first effected. In 1932 the booking offices on the line closed and tickets were sold on the train by the guard. The following year all signalling was removed from intermediate stations and the line was operated as one long staff section from Chichester West box to Midhurst, the yards being worked by ground frames released by the train staff. At Lavant the stairs down to the platform were removed, as was the porch, so passengers now had had to enter the station via steps down the embankment.

The economies failed to satisfy the company's bean-counters and passenger services between Chichester and Midhurst were withdrawn on 8 July 1935, only 54 years, almost to the day, since the line opened. The closure was not reported by the *Chichester Observer* so it must all have been rather low-key, unlike the way the Beeching closures were to be marked some thirty years later. Lavant, Singleton & Cocking then became goods-only stations.

Southdown now provided the only service to Lavant, but with an hourly off-peak bus service to Midhurst and Chichester as opposed to five trains a day. Southdown had continued the stagecoach tradition with three express coach services to London per day which started at Bognor and ran via Chichester, Midhurst, Guildford and Kingston, taking 3hr 5min with a much-needed 'comfort stop' at Guildford.

Fig. 13 Harry Bleach proudly poses with his new 1937 Dennis Ace which appears to have bodywork by local builder Harrington of Hove. (Tony Bleach)

Fig. 14 One of Bleach's Duple-bodied Bedford OBs (Tony Bleach)

Bleach of Lavant

Around this time Lavant acquired its own road transport provider, Harry Bleach, who in 1921 had bought a second hand lorry and found work delivering milk to Portsmouth and bringing back coal. He established a garage opposite the station, and from 1936, the year after the railway closed, ran a taxi service with a vast American Chevrolet. In 1937 he bought a new Dennis Ace to run coach services. These distinctive vehicles were known as *flying pigs* as the front axle was set back to improve manoeuvrability, resulting in a distinct 'snout'.

However, Harry was prevented from running stage services by the mighty Southdown who successfully managed to oppose most independents when licences were applied for from the Traffic Commissioners, so he ran school trips and private hire instead.[14]

Harry Bleach's services were so much in demand that in the 1950s he acquired three new Bedford OBs with Duple bodies – a favourite vehicle with independents. These became a familiar sight around Chichester on school runs in their smart red livery. At weekends he provided transport to football and cricket matches in which he was able to undercut Southdown's hire rates quite considerably. For private hire work his only rivals were Everymans at Maudlin.[15]

Fig. 15 A Southdown Parcels Agent enamel sign (Author's collection)

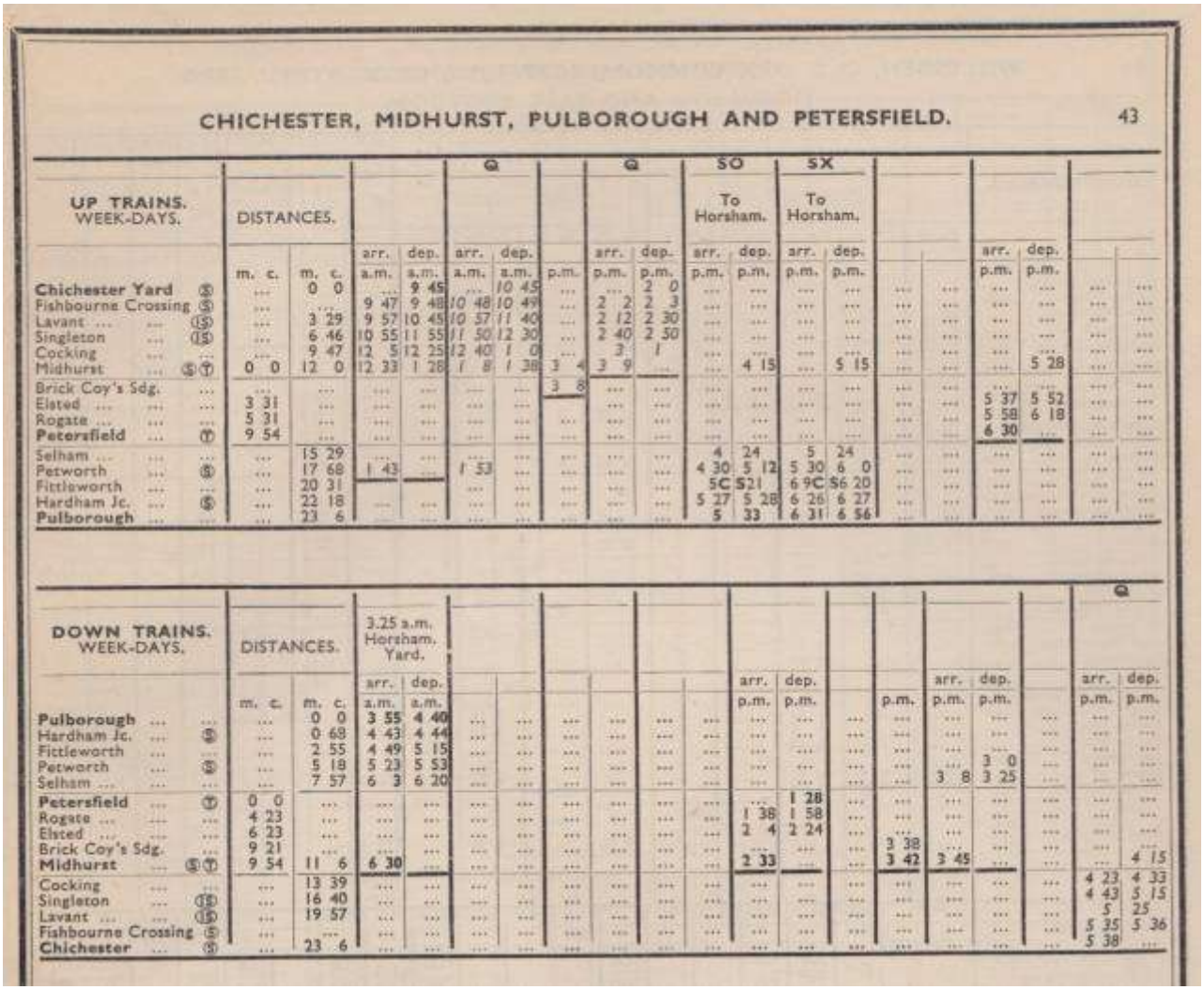
Although seen off as an operator by Southdown, Harry Bleach did forge an association with the company as a parcels agent. Southdown were classed as general carriers so were able to provide a parcels service in competition with the GPO. In virtually every town and village in Sussex there was a Southdown parcels agent, often the village shop, denoted by an enamel sign. There people could consign parcels to the bus company for delivery and in remote areas the conductor, if his service passed the door, would deliver the parcels personally whilst the bus waited. The Southdown timetables listed the Lavant agent as being 'Mr Bleach, Lavant Station'

Passengers no more

Fig. 16 Lavant station in 1955 in its freight-only days with C2X 0-6-0 32550 shunting. The goods office can be seen under the canopy. .(R K Blencowe)

Goods traffic had always been the mainstay of the line and this continued after the passenger services had ceased, and at Lavant a goods office was provided on the platform to serve this new role.

In 1948 the principal freight train of the day in the up direction left Chichester Yard at 0945 and stayed at



CHICHESTER, MIDHURST, PULBOROUGH AND PETERSFIELD. 43

UP TRAINS. WEEK-DAYS.

	DISTANCES.			Q			Q		SO To Horsham.		SX To Horsham.					
			arr.	dep.	arr.	dep.		arr.	dep.	arr.	dep.	arr.	dep.			arr.	dep.
	m. c.	m. c.	a.m.	a.m.	a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.	p.m.			p.m.	p.m.
Chichester Yard (S)	...	0 0	...	9 45	...	10 45	...	...	2 0	...	...	...	...	...	...	...	...
Fishbourne Crossing (S)	...	...	9 47	9 48	10 48	10 49	...	2 2	2 3	...	...	...	...	...	...	...	...
Lavant ... ... (LS)	...	3 29	9 57	10 45	10 57	11 40	...	2 12	2 30	...	...	...	...	...	...	...	...
Singleton ... (LS)	...	6 46	10 55	11 55	11 50	12 30	...	2 40	2 50	...	...	...	...	...	...	...	...
Cocking	...	9 47	12 5	12 25	12 40	1 0	...	3	1	...	...	...	...	...	...	...	...
Midhurst ... (S)(T)	0 0	12 0	12 33	1 28	1 8	1 38	3 4	3 9	...	...	4 15	...	5 15	...	...	...	5 28
Brick Coy's Sdg. ...	...	...	...	...	...	...	3 8	...	...	...	...	...	...	...	...	...	...
Elsted	3 31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5 37	5 52
Rogate	5 31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5 58	6 18
Petersfield ... (T)	9 54	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6 30	...
Selham	...	15 29	...	...	...	...	...	...	...	4	24	5	24	...	...	...	...
Petworth ... (S)	...	17 68	1 43	...	1 53	...	...	...	...	4 30	5 12	5 30	6 0	...	...	...	...
Fittleworth	...	20 31	...	...	...	...	...	...	...	5C	S21	6 9C	S6 20	...	...	...	...
Hardham Jc. ... (S)	...	22 18	...	...	...	...	...	...	...	5 27	5 28	6 26	6 27	...	...	...	...
Pulborough	...	23 6	...	...	...	...	...	...	...	5	33	6 31	6 56	...	...	...	...

DOWN TRAINS. WEEK-DAYS.

	DISTANCES.		3.25 a.m. Horsham. Yard.											Q					
			arr.	dep.							arr.	dep.				arr.	dep.	arr.	dep.
	m. c.	m. c.	a.m.	a.m.							p.m.	p.m.		p.m.		p.m.	p.m.	p.m.	p.m.
Pulborough	...	0 0	3 55	4 40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hardham Jc. ... (S)	...	0 68	4 43	4 44	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Fittleworth	...	2 55	4 49	5 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Petworth ... (S)	...	5 18	5 23	5 53	...	...	...	...	...	...	...	...	...	...	...	...	3 0	...	...
Selham	...	7 57	6 3	6 20	...	...	...	...	...	...	...	...	...	...	...	3 8	3 25	...	...
Petersfield ... (T)	0 0	...	...	...	...	...	...	...	...	...	...	1 28	...	...	...	...	...	...	...
Rogate	4 23	...	...	...	...	...	...	...	...	...	1 38	1 58	...	...	...	...	...	...	...
Elsted	6 23	...	...	...	...	...	...	...	...	...	2 4	2 24	...	...	...	...	...	...	...
Brick Coy's Sdg. ...	9 21	...	...	...	...	...	...	...	...	...	...	...	...	3 38	...	...	...	...	...
Midhurst ... (S)(T)	9 54	11 6	6 30	...	...	...	...	...	...	...	2 33	...	...	3 42	...	3 45	...	...	4 15
Cocking	...	13 39	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4 23	4 33
Singleton ... (LS)	...	16 40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4 43	5 15
Lavant ... ... (LS)	...	19 57	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	25
Fishbourne Crossing (S)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5 35	5 36
Chichester ... (S)	...	23 6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5 38	...

Fig. 17 An extract from the 1948 Freight Working Timetable (Author's collection)

Lavant for 48 minutes followed by a leisurely hour at Singleton before setting off for Cocking and Midhurst. By 1951 traffic had fallen off needing only one train a day which left Chichester at 0930 running through to Horsham.

Through working came to an abrupt end on 19 November 1951. During a storm the previous night a culvert on the sharp curve approaching Midhurst got washed away, as the crew of the daily freight discovered when their C2X, No 32522, plunged into the raging torrent. Although the engine was eventually recovered and returned to service, the line did not. The freight service was first cut back from Chichester to Cocking and then, in August 1953, to Lavant and the track beyond Lavant was lifted in 1955. Lavant was now the terminus of a short line from Chichester. The weekly general goods service was mainly coal, but horses came to Lavant in Goodwood Week and were stabled locally overnight.[16]

The Beet Years

The 1950s may be remembered by some as being the *Beat Years*, but Lavant was catering for a different type of 'beat'– sugar beet (*Beta Vulgaris*) which had been increasingly grown locally and for which Lavant was the railhead. Local farmers would take their crops to Lavant station during the season that ran from September to January. A run-round loop was installed, and at the London end of the station the platform was raised and extended by 500 feet to provide a stage from which the beet could be loaded into 16T mineral wagons.

During the 1960s enthusiasts' rail tours became popular, especially those that traversed freight-only lines and the Lavant line was frequently visited by such. In 1967 a tour hauled by preserved LNER K1 class 2-6-0 *The Great Marquess* called at Chichester and its coaches were hauled to Lavant and back by a diesel locomotive whilst the K1was being coaled and watered.

Fig. 18 A sugar beet train being shunted at Lavant by an unidentified loco in 1955. Mineral wagons are seen parked against the platform. (S C Nash)

Fig. 19 The *Great Marquess* tour at Lavant on 12 March 1967. The train, headed by 'Crompton' D6544, was unable to pull up alongside the platform as its increased height for the sugar beet traffic meant the doors of the train could not have been opened! (Author)

General freight traffic dwindled and was withdrawn in 1968, but sugar beet services continued until 1970 when that too was withdrawn – the end of Lavant's railway seemed imminent.

A New Lease of Life

In 1972 the Lavant Branch got a new lease of life when planning permission was granted to Francis Parker Ltd to extract gravel from a new pit south of Lavant, but consent was conditional upon the gravel being taken out by rail rather than road. So lucrative was the venture that Francis Parker willingly invested in diverting the railway into the pit and installing plant to load the gravel into specially-built bottom-discharge wagons. These wagons were then hauled to Drayton where they were unloaded into a below-track pit whence the mineral was recovered before continuing its way onward by road.

In July 1981 the enterprising Vic Mitchell and Keith Smith organised an action-packed weekend to mark the centenary of the opening of the Chichester and Midhurst Railway. On Saturday the 11th there were five return trips over the remains of the Lavant branch with a Hampshire DEMU as far as Brandy Hole Lane Bridge. Trains started in the former Midhurst bay with pilotmen working over No. 1 Goods Line as far as the junction at Fishbourne. On both Saturday and Sunday they had arranged for the rest of the line to be walked – including Cocking tunnel – and walkers were conveyed back to Chichester by the preserved Southdown Leyland TDI No 813 whose sedate and plodding ascents of

Fig. 20 Loading gravel at Lavant in June 1973. There is no landmark in this picture to locate this rather desolate quarrying scene, but it is in the vast new gravel pit south of Snakes Lane. The 'Crompton' is sitting below the loading plant and will slowly draw its wagons forward for charging. (Author)

Fig. 21 Hampshire 3H DEMU No 1126, standing in the former Midhurst bay at Chichester on 11 July 1981 during the Chichester to Midhurst Railway Centenary celebrations. It will shortly depart for a trip up to Lavant. This scene is much changed : the Midhurst bay and loading dock have been filled in and converted into a car park, the 3H and the 4 VEP in the background have gone to the happy depot in the sky and one can only guess what those young railway enthusiasts grew up to become! (Author)

Fig. 22 The preserved 1929 Southdown TD1 No 813 resting outside Chichester Garage after its final journey from Midhurst during the Centenary Weekend. Sadly it did not have a set of boards for the Midhurst route! (Author)

Cocking Hill caused spectacular tailbacks reliving those early days of bus travel from Midhurst to Chichester.

This most memorable of weekends was also notable for the launch of the first-ever Middleton Press title – *Branch Lines to Midhurst*. Vic could not possibly have foreseen that he had started his "Ultimate Rail Encyclopaedia"… or could he?

The Remembrance of Things Past

On the opening of the gravel pit, Lavant station closed completely and the track was lifted. The canopy was dismantled by Bluebell Railway volunteers and some of its components, including the cast-iron columns, were used at Horsted Keynes (another Myres station) in the reconstruction of its missing outer island platform buildings. The site was redeveloped by Warden Housing Association and Chichester District Council in 1991/2 and opened by Sir George Young in 1993.[17] As part of this development, the station building was converted into apartments, for which it was extended and much altered. It was not, perhaps, the most sympathetic of conversions, but at least they tried - and it's still with us!

Fig. 23 The frontage of Lavant Station today. Comparison with Fig. 8 reveals the wholesale alterations carried out on its conversion to apartments, but the porch had been removed back in the 1930s (Author)

Gravel traffic ceased in 1991 ending Lavant's 110 year association with the railway, the line was closed and lifted and in 1995 it was converted into cycle/footpath by West Sussex County Council and named – improbably - *Centurion Way*. To the best of my knowledge no centurion ever travelled up the Lavant Valley by train.

Envoi

In 1969 Southdown became part of the National Bus Company and its distinctive apple green gradually gave way to dull leaf green during the 1970s. At privatisation and deregulation in 1986 the company was first subject to a management buy-out which kept the Southdown brand going, and the apple green and cream returned briefly, but it was bought out by Stagecoach in 1989 when the Southdown identity was lost.[18]

In 1989 Basil Williams' Southern Motorways Services introduced a new service (62) from Lavant to Chichester but it only lasted until 1992, leaving Stagecoach service 60 as the only public transport in Lavant.[19] Stagecoach did, however, increase the frequency of the 60 to half-hourly as it is now. The London and south coast coach services were taken over by National Express but, incredibly, they now no longer serve Chichester.

Fig. 24 The platform side of Lavant Station today. The platform and canopy have been removed, increasing the apparent height of the lofty building, and extra doors and windows have been added. The least said about those plastic windows and the colour scheme the better! (Author)

Fig. 25 A Stagecoach Service 60 at Lavant, bound for Chichester in March 2023. Some Stagecoach vehicles have been painted green and specially branded for Service 60 to reflect the South Downs National Park, but this one is actually branded for the 700 coastal service. The use of branded vehicles on the wrong routes is a common feature around Chichester which helps keep the passengers, on their toes! (Author)

The railway has now gone from the Lavant Valley. Bleach's exist but are no longer into coaching, however their distinctive pale green lorries proudly branded *BLEACH OF LAVANT* are to be seen all over the country. Today, Lavant residents who have no car can cycle or walk down Centurion Way to Chichester, or failing that, can catch the 60. It runs even on a Sunday, which is better than many rural routes, even if the branding of the bus confusingly suggests it ought to be going from Portsmouth to Littlehampton!

References

1. Brian Austen *Turnpike Roads to Chichester, Midhurst and Petworth.* Sussex Industrial History no 35 (2005)
2. *Pigot & Co's Royal National & Commercial Directory – Kent , Surrey and Sussex*, 1839
3. LBSCR timetable 1853
4. J T Howard Turner *The London, Brighton and South Coast Railway* Vol 3, Batsford 1971
5. WSRO C/13 and C/14 Chichester Corporation minute books 1875-78 & 1879-81
6. It was enacted on 11 June 1877 – 40 Vic Cap28
7. Paul Clark *The Chichester & Midhurst Railway*, Turntable Publications 1979
8. Alan H J Green, *Singleton, The Station for Princes and Punters*. Sussex Industrial History No 49 (2019)
9. Alan H J Green, *The Railway Architecture of T H Myres for the LB&SCR.* Sussex Industrial History No 46 (2016)
10. Elizabeth Wood (Ed) *Lavant- a Century of Change*, Lavant History Group, 2000, plus additional information supplied to the author by James McCinnes from his Lavant researches..
11. Unattributed author *The Southdown Story 1915-1965*. Southdown Motor Services, 1965
12. Colin Morris, *Southdown Vol 2 – The Details*, Venture Publisihng 1994
13. Southdown Motor Services timetable, 1924
14. As told to the author by Tony Bleach, son of Harold Bleach.
15. *ibid*
16. *ibid*
17. Plaques recording the development are displayed on the first new house and on the station building.
18. Colin Morris *op cit*
19. Alan Lambert *Hants and Sussex – The Basil Williams Story* Bowden Publications 2017

THE SUSSEX WEEKLY ADVERTISER or LEWES JOURNAL 1804

Geoffrey Mead

Introduction

"Good wages and constant employ will be given…."

The 1804 *Sussex Weekly Advertiser* had been established in 1746 at Lewes, by Chichester-born William Lee. Lee was a supporter of republicanism and a member of the Headstrong Club, a political discussion group which Thomas Paine also frequented, and his views were reflected in the *Advertiser*. Lee was succeeded by his sons William and Arthur and the Lee family continued its association with the *Advertiser* into the 19th century. It supported a repeal of Corn Laws and the introduction of Free Trade. It also advocated a favourable extension of franchise and a voluntary principle on religion with no affiliation to any single creed.

19th century newspapers contain much of interest to students of IA as the notices contain information on local trades, industries, occupations and locations. A single issue can yield enough information to whet IA appetites. I have chosen the 1804 edition and searched for IA content in the notices and 'classified ads'.

1804 sees the county in limbo with change underway to its economic life. The Wealden iron industry is all but finished, agriculture and timber production is important, but the appalling state of roads and the limited access to water transport away from the coast made transport costs high and travel conditions challenging. The dramatic rise of population in the growing resorts saw a boom in work at brickfields, lime kilns and for construction timber, although much of this was imported from the Baltic, with Petersburgh oak, Memel timber and Christiana deal arriving at coastal wharfs like Copperas Gap. The growing leisure trade brought employment opportunities, not only in the production of building materials but in construction and provision of fixtures and fittings and once completed 19th century resort housing needed a raft of domestic staff in all sectors. With the Napoleonic war in full spate British troops were quartered in large barracks or in the newly-constructed Martello towers along the East Sussex coastline; all this activity providing work for hauliers, labourers and skilled hands in a range of occupations; the workforce increasingly drawn from former agricultural labourers, leaving the land for more lucrative employments.

With background from a number of sources, this article will illuminate the economy of an early 19th century county and the extent of its various employments. The Primary industries that provide basic raw materials can be discerned in the agricultural and forestry notices, especially in the huge numbers of '*oak timber trees'* advertised, while the Secondary industries, the manufacturing sector, are seen in the conversion of those materials into a usable product. These notices give us a glimpse of the extensive spread of manufacturing in the county at that time, from paper and pen makers to wheelwrights and tanners. The final phase of industrial activity, the Tertiary or service sector is shown in all its contrasts, the transport of coal from the Tyne to Brighton beach, but also the provision of seaside housing at coastal resorts with all the accompanying domestic and leisure-based trades. An important, but illegal aspect of the county economy, was smuggling; an activity that brought a deal of income to the county. Notable for the vast quantity of contraband alcohol; a single Preventive Service 'haul' at Shoreham secured 4,339½ gallons of assorted spirits and a great many Preventive personnel were needed to alleviate the problem. All this shows the rich complexity within the county economy, one that would diminish rapidly when the railways arrived across the county in the mid-19th century.

What is missing from the *Advertiser* are those that do not require sale ads or notices; no fishing trade, little on coastal shipping, no quarrying of cut stone or chalk, no digging of sand and gravel or collecting of flint. Little in the burgeoning retail sector or transport services. The following items that appeared in the paper have been edited for their use in this article, with supportive comment where that may clarify some historic terms.

Timber

This survey then, starts with the Primary industries, and one that was a staple of the Sussex economy, the felling of trees. Four notices are listed here as a sample; the 1804 *Advertiser* shows a total of 12,715 oak trees…and one beech!

> Six thousand and six hundred and ninety six oak trees, calculated for the Navy, and carpenter's use, lying in the several parishes of Upmarden, Stoughton and Westbourn [sic]; the greater part within three miles of the water. The timber may be viewed by applying to Mr Burton, Stanstead [sic] House; or to Mr Baker, Bere's Lodge, Forest Side.

> Oak timber…nearly five thousand trees… are now laying in Oliphant's Coppice and the Forest of Stanstead…or to be delivered at Emsworth…

> Timber to be sold. Three hundred and eighty-two oak trees growing on a farm in the occupation of Mr Chalcraft at Lugershall [sic], about two miles from the turnpike road leading to Petworth and ten from Godalming.

> To be sold at auction at The Star Inn Waldron…two hundred oak timber trees marked with a X standing in a wood on the White House farm in the parish of Waldron; Mr Holman at the White House will shew the timber.

The timber trade from the forest reserves of large timber were being utilised, mainly in shipbuilding for Nelson's fleet and the growing Empire mercantile trade. Large timber was required throughout the year in times of conflict, as indeed was the case in 1804, but the springtime was a key season for woodsmen as this was the prime time to cut and strip trees, the oaks in particular, of their bark; this could be removed more easily in spring when the sap was rising through the trunk. Bark was removed or 'hatched' from freshly-felled timber, then air-dried prior to its journey onwards to the tanyard. Woodlands were worked for a variety of end-uses, timber for shipwrights and house-builders, coppice wood for hop-poles and charcoal or 'coal'; smaller wood for lathe cleavers and firewood merchants, bark to tanners.

> Cross-in-Hand in the parish of Waldron. Forty waggon loads of posts and rails, 150 wattles and 140 bundles of laths.

> Three thousand 16-feet hop poles standing near Butchers-Cross turnpike gate, in the parish of Mayfield.

> Several bark hatchers are wanted. Apply to the Steward at Sheffield Place.

> Faggots to be sold…Lot 1 eighty-seven oak trees (large meetings) now lying on Gleenly [sic] farm. Lot II ninety-six oak trees (large meetings) now lying on Sheepham Farm. Lot III about 40 cord of top wood, and about 1000 top faggots, now lying on the aforesaid farms. The above trees are…well calculated for government service. Gleenly (sic) and Sheepham Farms are situate between Hailsham and Eastbourn (sic), about three miles from the water side, where the timber may be shipped. Apply to Mr Armatage of Gleenly (sic).

'Gleenly' is Glynleigh today, a farm on the Pevensey Levels. A cord of wood is generally defined as being a stack of wood that is 8ft long, 4ft deep and 4ft high or about 128 cubic feet. The term *'large meetings'* in the notice has eluded all attempts to define it!

> Beach [sic] and birch. To be disposed of in lots or altogether from 70 to 80.000 kiln faggots, from 800 to 1,000 cords of wood, either for coaling or for private use or on the stem. Also employment for 40 to 50 hands during the winter…enquires of Mr Joseph Willard, Bewbush, near Crawley.

> A considerable quantity of beach [sic] and birch to be disposed of, by lots, or the whole to any one person who may wish to purchase; it is well worth the attention of charcoal-burners, kiln-burners, timber–merchants and carpenters. Apply at Carter's Lodge, near Handcross.

Agriculture

Agriculture was a major employer, albeit much farm work was seasonal and part-time, especially in the Weald. The rural economy was an important facet of the wider county economy, but one which would change dramatically for the worse towards the end of the century, as changing transport technology and global imports impacted severely on local producers and suppliers.

> Eligible farm…a freehold estate comprising two farm houses; four barns, two oasthouses, stables… together with 521 acres of land, one hundred thereof are brook, one hundred and twenty eight wood, twenty two planted with hops and the remainder arable, meadow and pasture situate in Etchingham.

> To be sold at auction…on the premises…a quantity of building materials, a stack of clover hay, a stack of wheat, barley and oats the property of Mrs Jameson at Lower Lancing, near Worthing

> The Black Horse Inn, in Wilmington….about ¾ acre of land stocked with about 300 choice fruit trees.

> Wanted at Midsummer 1804. A shepherd. A steady sober man who understands the management of sheep (a married man will be preferred). Apply to John Newland jun. Broadwater Farm, Sussex.

At Aldingbourne in the fertile West Sussex Coastal

Plain the influence of the military on the local agricultural economy can be seen in the following notice:

> To be let the valuable tythes of corn and hay of the fertile and highly cultivated parish of Aldingbourne…surrounded by good markets and mills, near four principal barracks which will occasion a considerable consumption of hay and straw in that neighbourhood.

Pottery and brick-making

The raw materials of the county, both its geological deposits and its agricultural wealth, had value as unprocessed material, but by processing had value added, and this is the Secondary stage of industry, one of manufacturing; milling and tanning, weaving and brewing, limeburning and hop-drying. The following notices show the variety of the county production at that period.

> A very desirable freehold estate consisting of four cottages and gardens with an old established pottery, comprising pot, brick and stone kilns, warehouses, clay mill and other buildings and about ten acres of pasture land lying contiguous also a piece of wood land called Park Wood containing (by admeasurement) 106A.2R.36P more or less; situate near Brede Hill and now in the occupation of the proprietor, except the cottages. The pottery is in full trade and the soil of the wood land very favourable to timber and underwood… Mr Henry Richardson at Brede Hill.

There were 40 poles or perches to a rood or rod, 4 roods or rods to the acre.

Molly Beswick's *Brickmaking in Sussex* shows this site to be her Brede site #2 *'Brickyard and pottery on the south side of Pottery Lane'*. She states: *'the pottery was in existence by the mid-18th century and brick and tile kilns by the 1790s; closed in 1892'*. Although she goes on to state*: 'owned by Henry Richardson from the mid-1700s until his death in 1798'*. The advert above shows that name there in 1804, so possibly a son? The site is adjacent to Park Wood which lies to the south; SIAS readers will know the Brede Pumping Station which is on the south side of Park Wood. We encountered Henry Richardson earlier on in his advert for the pottery here.

> To potters and brickmakers…wants a place of work in Sussex or Kent, in the pottery, a married man with a family who wishes to engage with any person for a time in the pottery; he being perfectly qualified to carry on the manufactory in all its branches. Letters directed to John Siggery at Mr Richardson's pottery at Brede, near Northiam.

Mr Richardson was Henry Richardson who ran the joint enterprise of pottery and brickworks at the site on the appositely named… Pottery Lane.

> In the brick yard at Lower Lancing…white bricks, kiln bricks, clamp bricks and tiles of different sorts, to the amount of 350,000 or thereabouts.

Molly Beswick notes '*exact location not known'*; this sale was a result of the previous owner's partnership being

Fig. 1 Lime burners (W H Pyne)

Fig. 2 Coppersmiths (W H Pyne)

dissolved, but was sold again in 1810 to pay the new owner's creditors.

> A piece of exceedingly good marshland, containing about three acres and a half , situate in Icklesham… with a brick-kiln on it, well situated for carrying on an extensive business, either in the brick or lime trade, lying near the high road between Rye and Winchelsea. Coals and chalk may be brought by water immediately from the vessels side within ten yards of the kiln and bricks etc. may be conveyed from the kiln in the same manner….immediate possession may be had of the kiln with every requisite necessary for making bricks and the materials.

'Brickmaking in Sussex' records nine brickworks in Icklesham but the likely site is Icklesham #1 *'brickfield near Camber Castle'* close to the Royal Military Canal.

> At Northiam...called Common Wood with convenient outbuildings also a cottage and several pieces of arable, meadow pasture, hop and woodland containing altogether 130 acres more or less …in the possession of Mr Woodhams the proprietor. There is a limekiln on the land, and the farm adjoins the high road.

Metalworking

> Wanted immediately a journeyman whitesmith; he must be a good workman in the lock and bell hanging business. Messrs Molineux and Co, Lewes.

Whitesmiths dealt with non-ferrous metals e.g. tin and copper.

> Smiths wanted. Two good workmen may have constant employ to T. Farrenden, iron-founder and furnishing ironmonger Chichester. NB An apprentice wanted.

> Wadhurst. A house with a good garden and a good blacksmith's forge, with two fire hearths; situate in a good neighbourhood for farmers' work, at Best Beech Hill in the parish of Wadhurst…a steady and good workman will find encouragement. Enquire of Samuel Swift at Pennybridge Farm near the shop.

The other end of the metalworking spectrum of trades from blacksmiths and whitesmiths is a watchmaker and gun salesman.

> Brighton. James Wood, watch and clock-maker, silversmith etc.….has taken the house No 6 St. James Street, near the Steine, where he intends moving and opening his shop in several branches… a variety of guns and pistols for sale or hire; the best Dartford and Battle gunpowder, patent shot, belts, flasks, flints, cleaning rods, shot chargers, lock vices, turn screws and every other article requisite for sportsmen of the best quality and on the most reasonable terms.

This entry notes the location of sporting gunpowder producers; Dartford was providing gunpowder for the Navy and in 1724 Daniel Defoe had noted that- *'…this town of Battle is remarkable for little now, but for making the finest gun-powder, and the best perhaps in Europe."*

Clothing

> Wanted, in a sacking manufactory one or two Long Shade Spinners; they may have constant work and good wages; apply to John Curtis in the Cliff, Lewes.

> To Journeyman Taylors [sic]; wanted immediately from six to ten journeymen those who are well versed in regimentals, ladies habits etc. Good wages and constant employ will be given by

applying to G. Horton of Battle.

Two journeyman taylors: good workmen may have constant employ… Thomas Atwood, Boreham Street.

Wanted immediately a journeyman taylor; may have constant employ and good wages by applying go Edward Walder, Taylor, Battle.

A journeyman weaver, a sober steady man…may have constant employ both winter and summer, by applying to Mr Palmer, post-master and penmaker to His Majesty, East Grinstead.

Two journeyman weavers. Steady employment maybe had…Charles Hook, weaver at Dallington in Sussex.

Many farms in the Eastern High Weald grew hops and the oast houses were part of many farmyard complexes.

In the parish of Fletching…a farm containing about 177 acres of meadow, pasture, arable and woodland with a good farmhouse, two barns a hop kiln and all necessary buildings rent 85£ per year. The lands lye [sic] near the Navigation and extend within half a quarter of a mile of the turnpike road towards London at Dane-Hill.

Slaughter-yards provided skins and hides for tanners, also a range of by-products; for glue makers, hair for plasterers, bones, sinews, hoofs and horns to a range of manufacturers. Tanyards needed abundant supplies of water; the locations were either Wealden or if in the Downland, where the major rivers cut through the chalk, as at Lewes or Alfriston or as in Chichester where Downland springs opened out.

Valuable freehold and Copyhold Estates near Chichester to be sold by auction. A compact freehold tan-yard lately planted at a very considerable expense; consisting of 63 vats and handlers; beam-house, with two grainers; two lime pits; scouring house and four scouring pits; a large counting house with two bed chambers over; leather house; an excellent double drying shed; a large and substantial built barn; mill house and mill; drying - kiln, with cast iron plates; match-house; smoke house and two dwelling houses for workmen; the whole enclosed with a hefty fence; a constant stream of water runs through the center[sic] of the yard. The lot is situate at Nut-bourne [sic] in the parish of West-Bourne…and surrounded by good bark country. Immediate possession may be had and the purchaser accommodated with a sufficient quantity of bark for the use of the yard, at a fair market price.

Freehold tanyard and premises. A compact desirable freehold estate pleasantly situate near Horsham, consisting of a dwelling house and tan-yard, together with about two acres, with 90 vats, 3 barns, sheds, stabling, mill and leather houses, suitable outbuilding and valuable rights of common.

The hides when drawn from the tan-pits went off to curriers who prepared the leather for the market, whether that is for saddlers and harness-makers or shoemakers.

Wanted immediately a journeyman harness-maker. John Soper, Henfield.

Excellent house and shop in full trade in the saddle and collarmaking line. A spacious and complete house and an old established collarmaker and sadlers [sic] shop most desirably situated in the centre of the town of Battle.

Wanted, a journeyman collar-maker who understands his business; may have constant employ by applying to Thomas Bartley of Hurstpierpoint.

At Brighthelmston, a house and premises in which the business of a sadler [sic] and harness-maker has been advantageously carried on for several years….apply to Thomas Ruxton, Brighthelmston.

To breeches-makers. Wanted a journeyman; likewise a gloveress. Good hands may have constant employ. W.Farmer, Lewes.

These two trades were often linked; they are providing work-wear and protective clothing rather than more sophisticated garments.

Wanted immediately. Four journeyman cordwainers; all men's men. They will have constant seats of work and good wages. Mark Stanley, Bexhill.

Wanted immediately. A journeyman shoemaker… apply Henry Hall, Buxted.

Cordwainers were workers in the boot & shoe trade. The term originates from the historic use of Cordoba leather and, although by 1804 the shoe trade encompassed a range of tradesmen, cordwainers would always consider themselves a cut above mere boot & shoe makers.

Shipwrights, woodturning….

Throughout the county rope in all its formations was required, both for agricultural purposes and certainly in a maritime county, as a basic need of shipwrights.

Hastings. Wanted immediately, eight shipwrights

Fig. 3 Wheelwrights (W H Pyne)

and two ropemakers…and one blockmaker…who will meet with every encouragement by applying to Messrs Hamilton, Breeds and Co. Hastings.

At the Fountain Inn, New Shoreham…all that old-established rope-walk and premises, being 200 fathoms situate just without the town of New Shoreham and commanding an extensive trade…the same are now in the possession of the proprietor. Mr Joseph Tilstone who is going to retire from business.

A product of the 21st century service economy, the arts centre in New Shoreham is named The Ropetackle. Continuity and change.

Wood, other than in substantial growth for shipwrights and house builders was utilised in myriad forms; one was for the maintenance of carts and waggons in the difficult travelling conditions of the Weald, which required much demand on repairs for wheelwrights and wainwrights. These were often on main roads as part of a series of 'highway functions'; blacksmiths and farriers, taverns and coaching inns, that sprang up as roads gradually improved in the 19th century.

To wheelwrights and others…a copyhold estate…a wheelwright's yard, with a large and convenient workshop lately erected; a complete saw-house and shed for timber and materials; with four tenements thereunto adjoining and a large garden situate in the parish of Patcham and adjoin the turnpike road from Brighton to Cuckfield. William Stedman the proprietor on the premises.

A freehold messuage divided into two tenements or dwellings; a wheelwrights shop; yard, garden and premises; and two acres more or less, of rich meadow land, … the estate of John Terry wheel-wright deceased situate in the Town of Ditchling and now in the several occupations of Mrs Jane White, Mr John Borrer.

A freehold estate comprising a wheelwrights shop now in the occupation Mr Daniel Scotchford situate in Wisborough Green, now retiring from business; the extensive trade he now commands in the wheelwright business and which has been established upwards of fifty years…

Wanted immediately a journeyman turner and chairmaker. He may have constant work and good wages. James Reed, George Inn, Steyning.

Turnery in all its forms was undertaken across the county, but more specialised manufacturers such as papermakers needed water supplies for preparation, cleaning and power supply.

To papermakers. Wanted immediately, two or three journeyman papermakers. Men who are good hands and steady may have constant employ. A few women may also be employed in a paper-mill. Apply Arthur Lee, Lewes.

The damp climate and acidic soils of the High Weald favoured the growing of flax, an industry that survived until after WWII around Uckfield.

Wanted, three men, in the flax-dressing line, who

Fig. 4 Brewing (W H Pyne)

may have fifteen months employment…Mr William Fairbrother, at Coursley Wood, Wadhurst

Brewing

Brewing, utilising local supplies of hops, barley and malt extended across the county, rural and urban alike; the presence of large military encampments must have been a bonus to Sussex brewers.

Little Hampton [sic] Brewery. The substantial and spacious brewhouse erected within three years with good cellarage replete with every convenience for the conduct of the business… all the valuable brewing utensils consisting of a 200 gallon copper, excellent vats, backs, tun tubs, casks, two lead pumps, malt and barley mills, beer carriages a draft horse etc. with all the stages, wood, iron and brickwork, comprising the plant of the brewery.

To be sold at auction…all that large and valuable freehold estate, situate in the Cliff [sic] adjoining the bridge at Lewes (facing the Bear Inn) consisting of a large and capacious yard, wharf, 3 dwelling houses with brewhouse, coach house, stables and other convenient buildings with a large garden wall'd in now in the occupation of Messrs Goldsmith, Gwynne etc. The above estate is exceedingly well situated for the purpose of carrying on a very large and extensive trade where room is required, having a large yard bounded by the river and is particularly well adapted for a brewery on a large scale; having every advantage for such a business, many of the outbuildings being well calculated for that purpose.

This is probably the Bear Brewery 'newly erected' in 1787. Peter Holtham in SIH 36 gives the ownership 1801-17 as John Rickman II, a name not included in the notice above. This site is opposite the later location of Harveys Brewery; John Harvey was at the Bear Brewery in c1810.

Milling

Mills are a staple in the Sussex landscape, whether on wealden hilltops, downland ridges or as here at Copperas Gap (Portslade) on the edge of the Channel.

At the Sloop Inn Copperas Gap between Brighton and Shoreham… a windmill in full trade with sails, tackle etc. and also a messuage with warehouse, stables etc. by the water side at Copperas Gap… particulars may be had of Mr Charles Lelliott Copperas Gap or Mr J C Mitchell at Brighton

Copperas Gapp [sic]…the business lately carried on at the above Mill…will from the 3rd day of December be carried on under the firm of John Adhead, Ann Clark and Charles Lellyot

To Millers, William Sudds, Mill-Wright takes the liberty of informing his friends that he intends carrying on the business on his own account in all its various branches orders directed to him at Mr Packham's opposite Cliffe Church, Lewes. NB Thrashing machines upon the most approved principles. William Sudds flatters himself, that having been for the last five years constantly employed and having care and management of Barcombe Mill will be a sufficient recommendation.

To be sold by auction, a well-built freehold smock windmill, dwelling house and premises, extending over about 45 rod of ground enclosed by paling erected in the year 1798 in a very eligible and commanding situation for business in Portfield, near Chichester now in the occupation of Mr William Lambeth

To be sold by auction…Firle wind mill, now in full trade together with a round house, stable and store room, the whole new built since March 1801…apply Mr Edward Verrall the proprietor of Firle parish near Lewes.

Fig. 5 Millwright (W H Pyne)

> Water corn mill. To be disposed of a moiety of the concerns of a mill of the above description which is capable of grinding, upon the average, five loads of wheat per week…apply to the Grinder at the Town Mill of Lewes.

Services

The final stage of the industrial landscape is that of the Tertiary sector; these are trades that facilitate other industrial operations, providing a wide range of services; e.g. transport, storage, finance, retail, leisure and defence. The Napoleonic wars ensured the south coast was home to a vast collection of military personnel and structures and these provided work and income, as has been noted earlier.

> Camp & barrack contractors...All persons having demands on Messrs Cooper & co late camp & barrack contractors for the counties of Kent and Sussex…
>
> Wanted immediately six or seven journeymen carpenters to work in his Majesty's Barracks at Hastings and Popeep [sic] …
>
> At Westham Barracks…to be sold…a quantity of fir timber and deals for scantlings, deal boards of various thicknesses, bricks, tyles [sic] and building materials in general, work benches etc.

Scantlings are a set of standard dimensions for parts of a structure especially in shipbuilding.

Movement of bulky goods in this pre-railway era was either horse-drawn or carried on ships and barges, into and out of the county. Movement of coal was a year-round occupation; Sussex in 1804 had no coalfield nearer than Nuneaton, Warwickshire, so all coal was brought by sea, mainly from the Tyne. At Brighton the beach was used for landing coal cargoes, or heading west to the Adur creek at Copperas Gap. Coal companies had offices near the beach in Black Lion Street, Ship Street and Middle Street; indeed well into the second half of the 20th century coal companies offices were still located in these streets.

> The public are most respectfully informed that the coal trade which for several years carried on at the lower end of Middle Street, Brighthelmstone, by Mr Gregory is continued by me...W.Izard.
>
> To be let or sold, a very compact coal yard known by the name of the Union Coal company situated at the upper end of Middle-Street, Brighton and a very easy draught from where the coals are generally landed.

The resort building boom saw large quantities of building materials imported; although locally produced clay tiles were vernacular to Sussex buildings, increasingly structures were being roofed with slate.

> To be disposed of at Shoreham, a cargo of the best prime Welch [sic] slates, consisting of Dutchesses [sic], Countesses, and Ladies and about 32 tons of Welch [sic] Rags. The above are of the best quality and will come considerably cheaper than tiles. Any person disposed to save the expense of boarding, may have the same done on battens, including which, will come as cheap as plain tiling…NB not less than 1000 will be sold. Slating stript [sic] and relayed [sic] or repaired…

Welsh slates come in a variety of sizes and that 1804 terminology is still employed—Duchess 24″x12″; Countess 20″x10″; Ladies 16″x8″. Welsh Rags are large slates squared on three sides and leaving a ragged top. There were a great many slate sizes employed in the 19th century, with arcane terminology, some that would raise eyebrows today, Broad Countess, Wide Lady, Narrow Lady, being but three.

In spite of a naval blockade and the work of the Preventive Service, large quantities of illicitly imported liquor were being smuggled with some, but certainly not all, being seized; the amounts are staggering, especially those designated for personal use. The Napoleonic war saw increased taxation to pay for the conflict and the illegal movement into the nation of highly-taxed goods-smuggling, and its export counterpart — owling, brought a black economy of enormous proportions. This income,

albeit contraband, was part of the county economy, especially along the shoreline. These are only a sample:

> At the Custom House Shoreham, the following goods which have been seized and legally condemned viz for private use only, [*author's emphasis*] about 794 gallons Brandy, 288 of Rum, 4050 of Geneva, 1½ of Wine.
>
> At the Custom House Newhaven, for dealers and others, about 19½ gallons of Rum. For private use only 31½ gallons of Brandy, 298½ gallons of Geneva.
>
> At the Custom House, Arundel for Private Use only about 2400 gallons Geneva. 224 of Brandy, 23 of Rum. For dealers and others 123 gallons Rum.

In 1804 the contraband listed in the *Sussex Weekly Advertiser* amounted to these totals — Geneva 9898 gallons, Brandy 1484 gallons, Rum 493 gallons, Wine 83 gallons — a total of 11,958 gallons. Bear in mind very much more came ashore unrecorded!

Not all contraband was alcohol:

> Custom House Shoreham…the following goods… have been seized, 6 pounds of black tea, 88 pounds of chocolate, 720 pounds of pepper and 16 chaldrons of Culm.

A chaldron was an old measure for coal, being 32 bushels; a bushel was 8 gallons; culm was poor quality coal or coal fragments. Quite why anyone was smuggling in coal fragments is bizarre! At Shoreham and Arundel the smugglers' vessels were either broken up and the recycled materials sold or, on occasions, complete vessels were sold.

> Shoreham…the broken up hulls, sails, cordage, and other materials of one smack, one lugger and eleven large boats. To be sold by auction, the following boats which have been seized and legally condemned viz two hog-boats called the Speedwell and the Good Intent with all their tackle, apparel and furniture complete.
>
> Arundel…a small boat and the broken hulls of six boats and the materials of five.

A smack was an English sailing vessel that was used to bring fish to market; it was originally cutter-rigged. A lugger is a sailing vessel defined by its rig, using the four-cornered lug sail on all of its one or more masts. Hog boats, usually associated with Brighton, are clinker-built beach-launched boats with wider beams than was usual on fishing boats.

On a shore line stranded boats could also be up for sale:

> To be sold by auction on Bar Beach near Bexhill, a brig, about 90 tons admeasurement with all her materials thereunto belonging, which are nearly compleat [sic] …the Brig is called Alert from Aberdeen. J. Link, Master.

A brig is a type of sailing vessel defined by its rig—two masts which are both square rigged; they originated in the second half of the 18th century and were a common type of smaller merchant vessel. Along the coast at Shoreham shipping repairs were an important facet of the local economy, along with renewal of sails, cordage and rope.

> For sale by private contract. The Brig Symmetry built at Sunderland in 1797 for private use, has just undergone a great repair by Messrs Brown and Alliver, Shoreham, burthen, per register, 126 tons; sails remarkably fast, shifts without ballast and is suitable for any trade that her burthen would answer may be sent to sea without any expense, except provisions; now lying at Shoreham.

Services to the public, especially in the market towns and rapidly growing seaside resorts gave rise to some specialised trades.

> Jones, dyer and calender, Lewes…bed furniture, gowns etc. calendered at the shortest notice-silks, shags, cotton gowns, hangings etc. dyed of any colour; chip and straw bonnets dyed; scarlet cloaks new dipped; damask; morine and harrateen curtains dyed, hot-pressed and watered…cotton dyed black, so as the colour not to wear off; also gentlemen's cloathes[sic] cleaned and dyed.

Calendering is a finishing process used on cloth and fabrics. A calender is employed usually to smooth, coat or thin a material. Shag is a heavy long-piled worsted textile; damask is a reversible jacquard-patterned fabric used for table linen and upholstery; morine is a sturdy fabric of wool, cotton, or wool and cotton often with an embossed finish; harrateen was a linen or woollen material of the 18th and early 19th century used for curtains or bed-hangings.

Leisure and tourism

A boom in leisure-based trades came from the wealthy visitors unable to access Bonaparte's Europe; accommodation and transport was needed along with visitor services, all of which combined to create a range of Tertiary activities.

> Sea villa at Littlehampton…an extremely healthy spot, possessing in remarkable plenty, the finest spring water, an advantage in great request at the adjacent bathing places…a very commodious, new,

and substantially erected family mansion house, offices large garden and ice house.

Sea side, Eastbourne. A genteel cottage, with pleasure ground, garden and paddocks…situate upon a delightful eminence at Eastbourne a healthy and much esteemed part of the Sussex coast, commanding a full, uninterrupted view of the sea and a very extensive prospect of the county.

A new erected messuage or tenement, situate at the sea-side, in Eastbourne which has been used as a lodging house, and for which purpose it is exceedingly well calculated.

Seaford, Sussex, elegant marine villa. a modern-built freehold villa delightfully situate at Seaford a pleasant part of the county of Sussex…commanding an extensive view of the sea, and fine prospect of the adjacent country…the premises are well calculated for the residence of any respectable family wishing to unite the advantage of sea bathing, with a pleasant situation.

This is an indication that the rising tourist trade is radiating out from Brighton to other coastal communities, with entrepreneurs seeing the possibilities of new investments in the burgeoning British leisure trade. Across the county, especially in the coastal areas, the possibilities of leisure activities providing a new form of employment were grasped by those whose incomes from agriculture and fishing were in decline. A year after this in 1805 the Gentleman's Magazine noted that the village of Rottingdean was preferred by those who sought a quieter location than Brighton a few miles along the cliff line.

Rottingdean near Brighton. To be let for the term of eight years from May next two large well-built lodging houses situated in the principal part of Rottingdean each commanding a view of the sea. For particulars enquire of Mr Wilkes Marine Library, Brighton.

Public house to let. That old established inn known by the Sign of the Star, in New Shoreham with stables adjoining…apply to Mr John Boyce jun. of New Shoreham.

Old Ship tavern, Brighton, Leonard Shuken of the above tavern…since the last season his Tavern has undergone such considerable and valuable improvements as are calculated to render it more worth of…patronage and support.

The county in 1804 was undergoing change in its industrial and economic life — change that would develop throughout the century. Iron production would cease in the 1820s and, within a generation the coming of railways, would be a major factor in even greater change. Transport would improve with the development of the turnpike system, and the creation of the Southwick Canal created a large industrial complex along what had been the lower Adur. By the 1870s the collapse of Sussex agriculture was underway with American wheat, Antipodean frozen meat and Empire canned fruit, spelling collective disaster for South-East England's farmers. The rapid growth in resort development brought new industries and structures into the economy. This microcosm of one year of Sussex life has shown much that will be familiar to SIAS and will hopefully add to a wider understanding of the county's industrial and economic history.

References

1. *Age of Slate*, M Burn, 1976
2. 'Brewers of East Sussex' P J Holtham *Sussex Industrial History #36*, 2006
3. British Newspaper Archive
4. *Brickmaking in Sussex*, M Beswick, 2nd edition, 2001
5. *Enforcement… HM Customs & Excise*. R Brisley, 2005
6. *Microcosm, or A picturesque delineation if the arts, agriculture, manufactures, etc, of Great Britain*, W H Pyne, 1808 (1974 edition)
7. *Quarry tracks, village ways*, Holmes & Thomas, 1977
8. *Ships,* F O Bowen, nd 1930?
9. Stone Roofing Association website; accessed 2023
10. *Sussex beach trades: sea coal to trippers,* M Langley, 2010
11. *Sussex breweries,* G Holter, 2001

THE BUILDING OF NEWHAVEN'S BREAKWATER [1]

Will Pilfold

Introduction

Newhaven's breakwater has stood the ravages of storms and waves for over 130 years, and it is a major reason the port of Newhaven exists in the form it does today. Indeed, its construction, part of a major development of the harbour in the 1880s, has shaped the town and community of Newhaven from that time. It has been described by the late Peter Bailey MBE, the doyen of Newhaven historians, as 'wonderful and very necessary' and a 'kingpin of survival for Port Newhaven'.[2] It has also been referred to as 'certainly [Newhaven's] most photographed structure'.[3]

Whilst this article is focused on the breakwater, it is necessary to consider its construction in the context of the whole harbour improvement project of 1878-1892. Topics covered include the organisations and personalities involved in promoting the harbour's development and the engineers who led the work. It also looks at the construction techniques, some of which were pioneering, and details some of the specialised plant developed to build it. A further aspect considered is the workforce – who were the men who laboured, often in difficult and dangerous conditions, to make the plans a reality - where did they come from, where did they live, did they stay in the town after the harbour works were finished, what accidents occurred, how was their spiritual and physical welfare catered for?

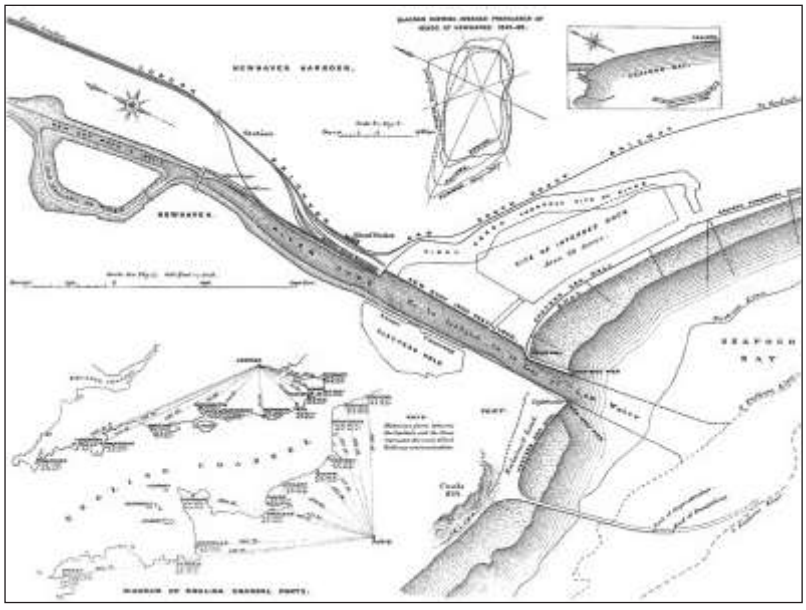


Fig. 1 Diagram of proposed Newhaven Harbour Works under the 1878 Act, from Carey 1887 (see endnote 5)

The ongoing story of the breakwater is briefly discussed. Over the years, it has needed major maintenance, and, along with the sandy beach that formed in the bight of the breakwater, was closed to public access by the owners, Newhaven Port and Properties Ltd, in 2008 on the grounds of health and safety. Newhaven Town Council and East Sussex County Council, with much public support, fought until 2015 for public access to the sandy beach. A legal case went all the way to the Supreme Court.[4] The breakwater has also been the source of artistic inspiration, becoming something of a local icon, and it is a place much loved and enjoyed by Newhaven's population past and present. Not just industrial but local, landscape, social, cultural, and even legal histories are all bound up in this monolithic concrete structure.

Location

The harbour of Newhaven, East Sussex, is located at the mouth of the river Ouse with the landward end of the breakwater at Ordnance Survey map reference TV448999. It is an important port located about half-way between Dover and Portsmouth on the English Channel. It is almost on a straight line drawn between London and Paris, making it the shortest route between them. A ferry service to Dieppe has existed since the early nineteenth century. The port has also had a coastal trade with other UK ports and wider links to France and around the world. It played important roles in both World Wars of the twentieth century.

Besides the breakwater, the other major parts of the harbour developed (or in some cases re-developed) between 1878 and 1892 as part of the same project were the west pier, east pier and east quay, which are all still extant in largely their original form, although major repair or replacement of the structures has been necessary. The harbour was also deepened by extensive dredging, and it has been necessary to regularly remove silt from the river ever since. A large basin entered by lock gates to the east of the present harbour, towards the area known as Tidemills, was planned but never executed.

Antecedents

There were several proposals to improve the harbour at Newhaven throughout the eighteenth and nineteenth centuries. The major problems needing attention were the bar of sand and shingle that repeatedly formed across the entrance to the harbour, caused by long-shore drift driven by the prevailing south-westerly winds, and the silting of the harbour due to the sluggish nature of the flow of the river Ouse. These two factors meant that harbour traffic, including the cross-channel ferry and mail service run by the London, Brighton & South Coast Railway Company Limited (LB&SCR), was dependent on the tides, and a regular timetable could not be adhered to. The railway from Lewes, connecting Newhaven to the wider rail network, had arrived in the town in 1847 and rapidly led to a major increase in harbour use. The railway company saw the ferry service as a way to increase traffic, both passenger and freight (including mail), on their rail network. The route from London to Paris via Newhaven was actively marketed as the shortest in terms of distance, but the delays caused by the tidal dependency of the shipping were an obvious drawback. The company built a large hotel, called the London and Paris, to coincide with the opening of the railway line. It was alongside the ferry berth and provided accommodation to travellers waiting to board a boat, a wait that could occasionally run to days in a spell of stormy weather.[5] A purpose-built railway station adjacent to the hotel provided a seamless interchange for the relatively wealthy clientele who, in its early days, comprised the majority of the passengers. It should be noted that Dieppe suffered similar problems of tidal dependency, and therefore it was necessary for the French authorities and the partners in the ferry service, the Western Railway of France, to effect parallel improvements to Dieppe harbour before a fixed timetable could be introduced on the route.

The complex history of the origins and development of the harbour at Newhaven has been recounted *inter alia* by John Farrant and by Alfred Carey (of whom we will hear more later), and in a Newhaven Harbour Company (NHC) publication of 1884.[6] It is not necessary for the purposes of this article to delve too deeply into this history. It is worth noting that on various occasions surveys were undertaken and plans drawn up to try and find solutions to the ongoing problems caused by silting and the bar at the harbour entrance. Several of these involved building piers or breakwaters on both the west and east sides of the harbour and some plans were carried out but never proved fully effective. Finance was always a limiting factor in what could be achieved, and some proposals were never acted on because of this. A Harbour Commission, set up by act of parliament in 1730, was empowered to build harbour works and levy dues on ships and their cargoes.[7] In 1872 an act was obtained by 'independent parties' led by John Bourne and William Henry Northcott, who were probably speculators, for 'improving communication with the continent'. This plan included the incorporation of a new limited liability company, the building of a 340 yard (311m) long breakwater 300 yards (274m) to the west of the harbour entrance, widening and extension of the entrance piers, and the construction of a new quay for steamers of a large tonnage at the southern end of the existing quay on the east side of the harbour. The plans depended on raising capital of £600,000 by way of shares and persuading the French authorities to carry out similar works at Dieppe, as it was necessary that both ports could operate at all states of the tide.[8] Neither of these prerequisites came to pass and the plans lapsed.

The sources relating to the breakwater's construction

Multiple sources have been utilised in the research for this article. Newhaven Historical Society's museum holds a collection of documents, many of which have been cited in the appended endnotes, as well as copies of many photographs relating to the breakwater's construction, ongoing maintenance, and its use as a leisure resource.[9] The National Archives (TNA) at Kew hold the minute books of the board meetings of the Newhaven Harbour Company (NHC) covering the period from its inception in 1878 to the creation of Southern Railways in 1923, as well as other relevant records. Also at Kew are the records of the LB&SCR concerning the running of the harbour, in conjunction with the NHC, which was effectively its subsidiary.[10] The LB&SCR held 15,000 of the original issue of 15,595 £10 shares, as recorded in the NHC Board minute book on 01/08/1878. The LB&SCR records include the minute books of the Engineering Committee which contain information not available in the NHC minute books. The volume of material available at TNA has meant that only a selection relating to key moments in the building of the breakwater have been examined in detail. There is scope to explore them further, which will undoubtedly result in new insights. UK National

Decennial Census returns and other relevant records have been accessed via Ancestry and local newspapers via Findmypast.[11]

The 1878 Act

The Bill leading to the Newhaven Harbour Improvement Act of 1878 (hereafter the 1878 Act) was promoted by the Trustees of the Newhaven Harbour and Ouse Lower Navigation and LB&SCR.[12]

Under the 1878 Act the NHC was incorporated on 16 August 1878. The plans set out in this Act were broadly similar to, but went further than, those in the 1872 Act. The newly-formed company was empowered to take over the rights, assets and liabilities of the Trustees of the Newhaven Harbour and Ouse Lower Navigation, who had up to this date been responsible for the maintenance and improvement of the harbour and its facilities.[13] A working agreement was entered into by the newly-formed NHC with the LB&SCR which gave the railway company effective control over the harbour in return for financing improvement works.[14]

The improvements included in the 1878 Act, were the construction of the following:

1. A western breakwater extending about 900 yards (822m), commencing 400 yards (365m) west of the existing entrance to the harbour.
2. A new east quay, 570 yards (520m) long, from the southern end of the existing railway quay.
3. A new eastern entrance pier, replacing the existing one.
4. A west seawall or pier opposite the east pier, varying from 200 to 300 feet (61-91m) therefrom and 300 yards (274m) long, replacing the existing west pier.
5. A sea wall, 450 yards (411m) long, curving from the southern end of the new west pier to the landward end of the breakwater.
6. A tramway from north of Newhaven Town Station, over the existing swing bridge and down the west side of the river to the landward end of the breakwater.
7. A dock of about 24 acres (9.7 ha), with quays and wharfs, on the eastern side of the river, between the new east quay and Bishopstone Tide Mill, accessed via a lock from the harbour.
8. A sea wall, 750 yards (686m) long, along the southern edge of the new dock.
9. Dredging, deepening, and improving the river Ouse and its creeks and inlets within the harbour limits. Improving and strengthening the river's banks, as necessary.
10. All necessary ancillary works such as cranes, warehouses, machinery, sidings, etc. were to be the responsibility of the LB&SCR.

The items listed above numbered 1-6 comprised the 'First Section of Works'; numbers 7-8 comprised the 'Second Section of Works', whilst number 9 was not included in either. The first section of works and items 8 and 9 were all completed, but the new dock (item 7) was not in fact constructed due to financial reasons and, as we shall see, the length of the breakwater was shortened. The works completed amounted to a radical expansion of the capabilities of the harbour and consequently of the trade it handled.

This 1878 Act had to be amended in 1882 and again in 1888 because of required changes to the proposed works and delays in executing them, which otherwise would have caused time limits in the original act to be breached. The 1882 act also authorised further capital raising, necessary due to cost overruns. [15]

Builders of the breakwater - the engineers

The were two principal civil engineers involved in the building of the breakwater. Frederick Dale Banister M.Inst.C.E. (1823-1897) was appointed as Engineer-in-Chief by the NHC in July 1878 (i.e. even before the formal incorporation of the Company on 16/08/1878), apparently in parallel with his appointment as Chief Resident Engineer of the LB&SCR. Alfred Edward Carey M.Inst.C.E.(1852-1922) was appointed as Assistant Engineer, resident on the site, on 6 May 1879 at a salary of £250 p.a., although he had been assisting for some time in the preliminary arrangements and in providing the necessary plant.[16]

Banister was associated with the LB&SCR and its predecessor, the London and Brighton Railway (LBR), for most of his career. A brief spell of employment with the LBR in 1846-9 was followed by working on his own account, when much of his work was preparing plans and carrying out engineering works for the LB&SCR. In 1860 he was re-employed and appointed Chief Resident Engineer to the company. In this post he oversaw many major projects including at London Bridge station, Brighton station and the building of the Newhaven to Seaford line. The harbour improvement work undertaken at Newhaven 'was one of the most important undertakings' in which he was involved. Banister retired in January 1896 at the age of 75 and died on 22 December 1897.[17]

Carey was relatively young at about 27 years old at the time of his appointment, and thanks to a paper

he gave at a meeting of the Institution of Civil Engineers (published in 1887) we have a detailed account of the harbour improvement works, including the building of the breakwater.[18] Although a resident engineer he was enumerated at the family home in Reigate Foreign, Surrey on the 3 April 1881 census night and again at the family home, now located at 79 Addiscombe Road, Croydon, Surrey, for the 5 April 1891 census.[19] He appears to have been a lifelong bachelor from a firmly middle-class family. His father, who was about 54 when Alfred was born, is recorded in the 1871 census as a retired solicitor. Alfred had two brothers, a surgeon, and a barrister. Throughout his life the census records show that the family had two live-in domestic servants.

Little has been found about Carey's career, either before or after his time working on the Newhaven harbour improvements from 1879-1893. He seems to have specialised in harbour and marine engineering, as after the Newhaven project he worked on plans relating to schemes in Sussex at Hastings, Eastbourne, and Shoreham-by-Sea.[20] He was also instrumental in setting up the Sussex Portland Cement Company Limited (SPCC) in 1884; this enterprise arose out of the use of large amounts of Portland cement in the harbour and breakwater works. The history of the SPCC and its works at South Heighton near Newhaven, including Carey's contribution, has been explored in earlier Sussex Industrial History articles. [21]

Builders of the breakwater – the workforce

An area that is often omitted from accounts of Victorian era civil engineering works is that concerning the stories of the men, and it was almost exclusively men, who did the hard and often dangerous work that put into effect the engineers' plans. Such people are rarely named or even acknowledged in contemporary accounts of such projects, and they tended to leave little in the way of documentary evidence that can be interrogated by today's researcher. In some photographs of the work in progress we get images of men hard at work, but they are, inevitably, anonymous.

At the start of the works there was 'considerable difficulty … in obtaining a sufficient number of men, owing to a want of lodging accommodation at Newhaven.' To help get round this problem 12 huts to house about 100 men were built at a cost of £70 each, with rent at 7/- (35p) per week and reported as completed on 3 December 1879. A further 12 huts were authorised on this date, although only 8 were

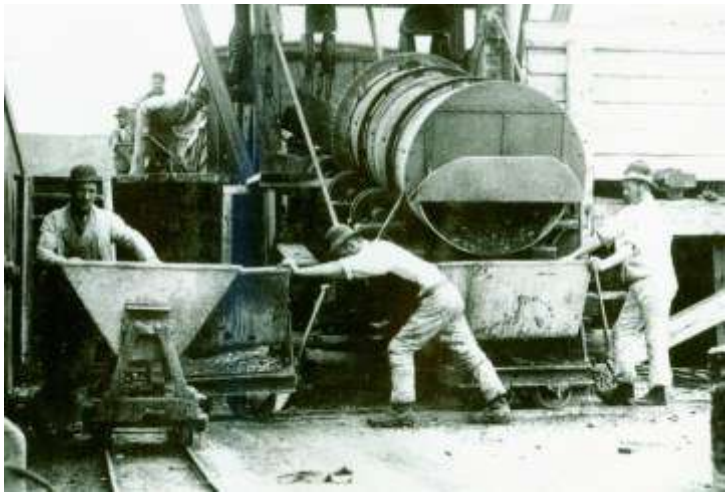


Fig. 2 Men working on the concrete mixer located on the breakwater

built, bringing the total to 20 huts. Each hut was intended for 8 men, although it is stated that they were to house 150 (not 160) men, and 'proper sanitary arrangements [were] provided'. The huts were located on land leased by the NHC from the War Department for £10 p.a., to the north of Newhaven Fort and adjacent to the works on the western side of the river. Other staff welfare facilities provided included a mess hut, which could also be used as a reading room and for entertainments, and a 'sick and hospital fund'. The appointment of a missionary from the Navvy Missionary Society to address the men's spiritual needs was discussed as early as 14 July 1879.[22] Banister reported to the board that endeavour was being made to appoint a missionary and he was instructed to communicate with the Rector of Newhaven who had proposed an iron church costing £700 to £800. The Company was willing to contribute £100.[23] In fact, a much more substantial brick-built building, Christ Church in South Road, was built in 1881 as a 'mission church for the harbour area' at a cost of £1,575. It is not known if the Harbour Company did contribute to this project.[24]

The national decennial census provides us with a timely snapshot of who was occupying the huts on census night, 3rd April 1881, in the second year of the project.[25] As we shall see, the huts had fewer than the anticipated 150 workers in them, with many men bringing their families to live there. Census data provides a rich vein to explore but it also has many frustrating drawbacks. Whilst place of birth is given, this does not tell us where the person lived in the intervening years. To some extent, the place of birth of children and entries in earlier census returns can fill in some of the story of a person's life but a full record of movements is not available from this

source. As many of those enumerated in the huts were single men there are no family ties to help with their biography and they are particularly hard to trace either in earlier or later censuses. The enumerator is reliant on the information given to them and there is no way of verifying it. With a transient workforce, such as that recorded here, the men may well have been wary of officialdom and deliberately given false information. Although not applying to the entries for the huts, some nearby properties have entries of 'name refused' with ages clearly estimated and occupation recorded as General Labourer or Ry [railway] labourer. To give one example, the property listed as 'Tavern and shed' has the Hillman family plus eight boarders, seven of whom refused to give a name.[26] In hut 11 there is no entry for place of birth for all four boarders. Many errors, especially in the spelling of names, are likely to occur where respondents have poor, or no, literacy. There are also potential sources of error in transcription as the records we have available were compiled from the enumerator's field books. Modern day digital sources such as the Ancestry website rely on another cycle of transcription to enable their search functions to operate. With all these caveats in mind the census returns are the best chance we have of finding out who the workforce was, where they came from, and where they lived later in life.

Analysis of who was living in the huts does not give a full picture of the workforce. In 1881 there would have been many more men employed than the 79 workers living in the huts. It was reported in 1879 that 'about 400 men are employed' and in 1883 that 'some 560 men are constantly employed'.[27] As the population of Newhaven is recorded as 4,009 in 1881, the workforce clearly made up a significant part of

	Total	Age >13 (adult)	Age < 14 (child)	Notes
Males	103	79	24	Children generally left school and started work at 14
Females	53	28	25	
Totals	156	107	49	
Heads of households	24			All male except two where wife is given with no husband present.
Boarders	52			All male except 1 female nurse, a widow.

Table 1: Analysis by sex and age of 1881 census returns for 'Newhaven harbour work's huts'

Occupation	Males	Females	Notes
General labourer	68	1	The female is the wife of a labourer with 6 children aged from 1 to 12. A probable error in transcription?
Excavator	4		All in hut 17. Unclear what differentiates them from general labourers
Railway related	3		Brakesman, wagon linesman and plate layer. Possibly connected to the tramway.
Bricklayer	1		
Carpenter's labourer	1		
Clerk harbour works	1		
Dressmaker		1	
Messenger	1		
Nurse (SMS)		1	
Servant (nurse)		1	
Servant (general)		1	
Total employed	79	5	Assumed all male workers employed on harbour project.
No occupation (adults)	0	23	22 wives, 1 daughter aged 20
Total adults	107		

Table 2: Analysis by occupation of 1881 census returns for 'Newhaven harbour work's huts'

Hut No.	1	2	3	4	5	6	7	8	9	10
Total occupants	10	8	5	13	15	7	4	6	6	7
Boarders	0	2	0	5	6	3	2	0	2	1
Total adults	4	6	3	7	9	4	4	4	4	5
Children	6	2	2	6	6	3	0	2	2	2

Hut No.	11	12	13	14	15	16	17	18	19	20	Totals, huts 1 to 20
Total occupants	7	6	5	9	8	7	7	8	7	11	156
Boarders	4	4	4	2	2	2	3	2	1	7	52
Total Adults	7	6	5	8	6	4	5	4	3	9	107
Children	0	0	0	1	2	3	2	4	4	2	49

Table 3: Analysis of individual hut occupancy by age and boarding status, 1881 census for 'Newhaven harbour work's huts'

the total.[28] Many workers must have found lodgings in the town or surrounding villages, and some were probably 'locals' resident there when the work started. The description of occupations rarely links directly to the harbour works, many workers resident throughout the town being described as labourers, who could be employed on the harbour works or elsewhere in the vicinity. The following tables and commentary relate only to the twenty work's huts, and it is possible they were occupied by a sub-set of workers not necessarily typical of the workforce. For example, they may be ones from further afield who did not have the knowledge or contacts available to local people to find other accommodation in the town. Taking all these potential drawbacks into account some interesting inferences can still be made from the data available.

From Tables 1 and 2 we can see that, far from accommodating 150 workmen, only 79 of the hut's residents worked on the harbour project, the balance being females and children. Occupation is given as labourer or excavator for 72 of the 79 working men, with only two, a clerk and a messenger, in a non-manual job. In four huts two families were living together, hence we have 24 'heads of household' in 20 huts, perhaps demonstrating the difficulty of finding lodgings in the area. Table 3 highlights the wide range of occupancy levels, with huts 4 and 5 having 13 and 15 residents respectively, whilst other huts have only four or five residents. The huts were designed to house eight workmen each, so although the total of 156 residents is about the expected number some must have been overcrowded and others had spare capacity. We do not know how the internal space of the huts was laid out but certainly in the crowded huts sleeping space and privacy must have been at a premium. All but three huts had lodgers living with couples or families. The most crowded huts had several young children in the family; presumably the income from several lodgers helped the family balance the budget.

It has proved harder than anticipated to uncover the stories of individuals included in the 1881 enumeration, as the majority of the 52 lodgers are single and it is therefore harder to trace them in earlier or later censuses than it is families, where multiple names are available to verify a family's identity. There is also the suspicion that false information may have been given. Only two men, both labourer boarders give Newhaven as their place of birth, but six children aged 1 or under have been born in the town. Only four labourers have Sussex (other than Newhaven) as a place of birth. It is difficult to detect any patterns in the place of birth given for the working men, but 25 (31%) of the labourers came originally from the West Country (the counties of Cornwall, Devon, Dorset, Gloucestershire, Somerset and Wiltshire). A wide range of other places are given, including Scotland and Wales, but none from Ireland.

Some families have multiple children born in one place, for example the Lamdens in hut 2 have four children (two working as labourers) aged 17 to 3, all born in Exeter, and the Scrivens in hut 5 have seven children (one working as a labourer) aged 15 to 2, all born in Middlesex (no town given), indicating some degree of stability in their location before arriving in Newhaven. Only three individual households have been traced as staying in the area in the 1891 census - the Pethorams in hut 1, the Browns in hut 8 and the Johns in hut 14. Henry Pethoram was a 25-year-old carpenter's labourer living in hut 1 in 1881. By 1891

he was living in the Grange, South Heighton, just north of Newhaven, as a foreman in the cement works there. In 1901 he was living in the Downs, South Heighton and still working in the same role. Obadiah Johns was a 42-year-old labourer living in hut 14 with his wife and four children aged 21-13 in 1881. In 1891 he was now a labourer living in hut 13 with his wife and two adult sons, also labourers. By 1901 he was living in South Heighton with his wife and his occupation was as a labourer and shop keeper. By 1911 he was a widower and an old age pensioner living in a 'cottage in field' with a boarder. William Brown was a 25-year-old labourer living in hut 8 with his wife and two young children in 1881. In 1891 he was employed as a horse keeper and they were living in hut 14 and had four additional children, three born in Newhaven and one in South Heighton. Six others have been traced in the 1891 census in various locations across England and Wales including Runcorn, Exmouth and Tredegar, indicating the highly mobile nature of the workforce. It may be possible that others stayed in the vicinity but the difficulties in tracing them have hidden them from sight.

Overall, the census information tends show that the huts were occupied by a transient community of families and single men, many with origins in the West Country but many others from around Britain, who moved on when the work stopped. Fuller detailed research may throw up other connections or trends not yet detected.

An indication of the lifestyle of at least some of the men working on the project is seen from an entry in the NHC minute books on 06/07/1880 reporting that passes were authorised to be given to the County Constables as they may be needed, to keep 'proper order' among the large number of men employed.

The human cost of building the breakwater

Much of the work involved in building the breakwater and other harbour works was carried out in dangerous conditions. It does not take much imagination to realise that working on the foundations to set up the shuttering for the superstructure of the breakwater, or at height to dig the material for infilling the promenade from the cliffs or using heavy machinery, was risky. Health and safety standards certainly were not what they are today. The minute books of the Directors' meetings of the NHC contain details of incidents as reported by Banister, the Chief Engineer. The following accounts all come from this source and can be found under the meeting dates given.[29] It should be noted that these events all occurred in the period for which the minute books were examined in detail, i.e. from the commencement of the works in late 1878 to October 1881, and January 1885 to May 1892. Undoubtedly, many further incidents occurred during the other years of work. It should also be noted that not necessarily all serious accidents were reported in this way and many less serious incidents were probably not mentioned at board level. Local press reports of inquests, death certificates and burial records have helped to build a picture of the people involved and of the accidents that occurred. Whilst none of the accidents noted here were directly related to building the breakwater, they give a vivid impression of the dangers of this type of work.

> 13/08/1879: The daughter of a company worker named Spinks was run over by a tip-wagon and her feet 'much crushed'. She was immediately sent on an engine to Brighton (presumably this means by train to the Sussex County Hospital).
>
> 08/10/1879: A labourer (unnamed) fell from the concrete wall on the 08/09/1879 and received a fractured skull. He died at the Sussex County Hospital, Brighton on the 13/09/1879. The Board recorded a note of sympathy.

This is presumably John Higgins, navvy at Newhaven. The inquest into his death was held on the 15/09/1879 and reported in the local press. He died, aged 34, from 'inflammation of membranes of the brain, the result of fracture of the frontal bone of the head caused by accidently falling'. He was buried on the 16/09/1879 at St Michael's Church, Newhaven. The burial register contains a note that is partly illegible but appears to say, 'buried under

Fig. 3 Trip hazards abound – health and safety was clearly not a priority

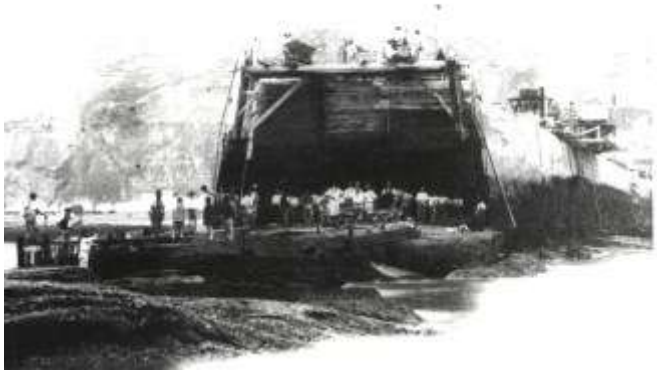


Fig. 4 In rougher weather working on the foundations would undoubtedly be dangerous.

Charities Board,' indicating it was a 'pauper' burial.[30]

16/03/1880: On 20/02/1880 in shifting a grindstone it fell and broke the leg 'near the thigh' of James Clifton, a labourer on the works. He was taken to Brighton hospital where he was progressing well.

16/03/1880: On 01/03/1880 George Love, a tip driver, fell under the wagon and died on the way to Brighton hospital. An inquest was held with a verdict of accidental death.

George Love was buried at St Michael's Church, Newhaven, aged 21, on the 4 March 1880. The death certificate states that he died 'on his way to the Sussex County Hospital just before arriving at the Brighton Railway Station.' The cause of death is given as 'shock and loss of blood, the result of his being accidentally run over by a wagon at the Newhaven Harbour works.' The inquest was held on the 3 March 1880.[31]

04/05/1880: Banister reported the death of Mr George Robinson, the Superintendent-in-Charge of the works, on 24/04/1880 due to pleurisy caught from exposure to the weather about a week before.

George Robinson was buried at St Michael's Church, Newhaven, aged 62, on the 28/04/1880..[32]

01/06/1880: On 08/05/1880 Nathen Harman had a hand severely crushed while working the pile engine.

Later entries continued to record accidents:

10/06/1885: A claim for compensation was received from Frederick Thomas Bearman re injuries sustained in a fall from the cliff on 05/09/1884 whilst employed as a labourer. Subsequently on 08/09/1885 it was reported that the solicitors had agreed settlement in the sum of £40 plus Bearman's solicitor's costs of £5-5-0 (£5.25).

07/10/1885: Banister was authorised to protect the sea wall between the west pier lighthouse and the breakwater at a cost of c.£40 as two fatal accidents had occurred with people falling over the wall into the sea.

An entry of 10/06/1885, at the time of the works being largely in abeyance, Banister reported that he and Carey held the sum of £83-14-3 as the balance of a fund raised by the workmen to meet casualties arising from accidents. He was authorised to continue holding it against any future accidents which may occur on the works. This fund appears to be a welfare initiative of the men rather than an official Company effort to ease the financial hardship caused by accidents.

Construction methods used for the breakwater

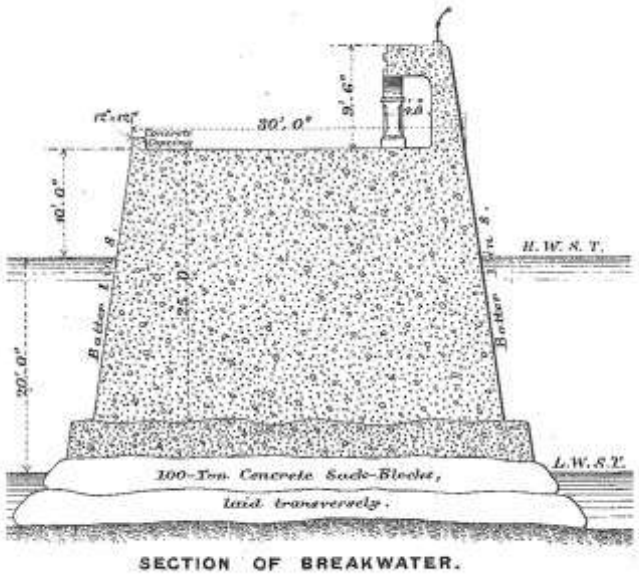
The design of the breakwater was masterminded by Frederick Banister in his role as Chief Resident Engineer of the LB&SCR.[33] Banister's design and proposed construction method was heavily influenced by work done at Aberdeen by W D Cay. Cay had used concrete deposited in jute sacks topped with large concrete blocks to build the foundations of the south breakwater at Aberdeen harbour and built the superstructure of the breakwater with liquid concrete deposited *in situ*. Problems arose with the use of the concrete blocks, and Cay stated that in extending the north breakwater he proposed using concrete in sacks deposited from a special boat for the whole of the foundations. It is probable that Banister was aware of this innovative method through the paper Cay gave to the Institution of Civil Engineers in December 1884.[34] Prior to Cay's new approach, the usual method of preparing the foundations for a breakwater was a process known as *pierre perdue* (literally 'lost stone'). This involved using divers to clear obstructions and forming a level surface on the seabed with loose stones. With the equipment available this was a dangerous and difficult task that incurred considerable costs. Once a stable foundation had been established, the breakwater was built using large blocks of durable stone, such as granite or concrete put in place by large cranes known as Titans. This is the method that was used to construct many large-scale works such as the harbours at Plymouth, Holyhead and Portland (Dorset).[35]

Banister's method consisted of depositing 100-ton blocks of freshly made concrete in jute sacks onto the seabed to form the foundations, building them up to about 2 feet (61cm) above the mean low water mark -

Carey called these 'sack-blocks'. The sack-blocks were roughly levelled where the timber formwork was to be erected. The formwork consisted of wrought-iron sockets 5 feet apart, holding timber profiles 'set with great nicety' and sockets for timbers for adjusting rods fixed inside. The profile framing required exact adjustment as horizontal boarding was spiked into it to create a box in which the superstructure was cast. A 40' (12.2m) length of timbering could be ready in two tides. Once the foundations and formwork were in place, the superstructure, consisting of a monolithic block of concrete, was built on top. No material was buried in the concrete, other than some pieces of timber 7 feet long where two lengths abutted. The proportion of cement to shingle and sand was 1:8. Carey stated that he believed this was 'the first instance in which this system [of construction] has been adopted throughout with such large masses of concrete.'

The paper that Carey gave to the Institution of Civil Engineers was one of several on the theme of using concrete in harbour works published in the 1887 edition of the Institute's *Minutes and Proceedings*. A lengthy account of the discussion session that followed these papers provides an interesting résumé of many projects and different approaches to the problems of building breakwaters in varying sea conditions across Britain and the Empire. Praise and criticism were levelled at Carey and Banister, but they spoke in defence of their work and of statements made in Carey's paper. Full analysis of this discussion session is beyond the scope of this article, but it should be noted that there was much discussion of alternative ways of building structures, the ratios of materials used in making concrete for marine environments, and of testing both the cement and the concrete produced. Clearly this area of civil engineering was a rapidly developing field with many active or recently completed projects and much being done in various innovative ways. As might be expected with a large gathering of experts, there was a wide range of opinions as to which was the best system in any specific situation.[36]

The dimensions of the breakwater (as proposed at this time) are impressive at 2,780 feet (853m) long, the first 1,000 feet being straight, and then it is curved, its extremity being almost in-line with the extended west pier. This gave an area of 38 acres (15.4 ha) embayed, but the total area of sheltered water was estimated as 90 acres (36.4 ha). The top of the covered gallery on the western side, provided to give sheltered access to the lighthouse at the end of the breakwater in rough weather, was 19 feet (5.8m) above mean high-water spring tides (MHWST), the main deck being 10 feet (3m) above MHWST and 30 feet (9.1m) above mean low water spring tides (MLWST). The main deck is 30 feet (9.1m) wide, including the covered walkway. The batter on the sides of the breakwater is 1 in 8. As an indication of the amount of concrete used in the construction, we have figures to *circa* June 1884 when the breakwater superstructure, including the covered way, was built to 1,300', and the foundations to 1,550' of 70,000 tons and 98,000 tons respectively.[37] By extrapolation, the total superstructure contains approximately 125,000 tons, and the foundations, which must have used more in deeper water, say 150,000 tons, making a grand total of 275,000 tons. It is surprising that there is more concrete in the foundations than in the superstructure.



SECTION OF BREAKWATER.

Fig. 5 Cross section of the breakwater

Sources of materials

The breakwater is constructed from concrete, the main constituents of which are shingle, sand, water, and Portland cement. The shingle 'washed and ready for use' was available locally from the accumulation to the west of the breakwater, and 'excellent' sand was available from the beach to the east of the harbour entrance. However, among the early purchases recorded in the minutes, on 15/01/1879, Banister reported the purchase of a 'Blakes Stone Crusher to use beach instead of sand which is expensive and difficult to obtain'. It appears, surprisingly, that water from the harbour, which must be brackish at best, was used rather than fresh

water. It was supplied by 'a No. 3 pulsometer pump, fixed on a pontoon rising and falling with the tide …'[38] Cement was initially bought from several sources. In the early days of the project, before the breakwater was commenced, the Board minutes record on 17/06/1879 purchases from J B White & Brothers and the West Kent Gault Brick Company. From 1885 the Sussex Portland Cement company became a major, and possibly the sole, supplier of cement, providing some 17,000 tons to the harbour works.[39]

Large amounts of timber for creating the formwork, hessian for the sack-blocks (see below) and sundry other materials were bought in, mostly from unknown sources. Plant and steel rails were sourced from specialist suppliers.

Specialist machinery used for the breakwater's construction

To provide sufficient concrete quickly enough to ensure that the sack-blocks used to form the foundations were deposited in position whilst the material was still plastic, i.e. not set, Carey worked with mechanical engineer, Ernest Latham, to design and build a large machine that automatically measured, mixed and delivered 100 tons of concrete in twenty minutes.[40] The mixer was built and located, with some difficulty, on the east quay, such that the prepared concrete could be discharged into a specially designed hopper-barge. In June 1880, shortly after installation, the foundations on which it was built, failed, holding up both the work on the breakwater and the extension of the east quay. It was not until 5 April 1881 that Banister was able to report that the mixer was in full work, saving £12 per sack-block over hand mixing.[41] The mixer consisted of measuring turntables, fed by hand, one for sand and one for shingle, divided into boxes of the proportionate sizes as required. The bottom of each turntable was hinged so it dropped at a given point in the revolution. The cement was driven in the required proportion through a screw creeper fed from a hopper. All three ingredients were fed into and mixed in a circular pan by scrapers on arms radiating from the centre of the pan. The radial arms also pushed the dry mixed materials to a delivery shoot where water was added, and thence into a large cylinder revolving on outside rollers on a cradle inclined at 8° to the horizontal. Longitudinal dashboards fixed inside the cylinder turned over the mixture as it revolved and finally discharged the material into the hopper barge moored below. The motive power was provided by a 20 horse-power static steam engine which, with appropriate gearing, was located on the ground floor of the machine. The first floor, 12 feet above, contained the measuring boxes, and a second floor, 8 feet above that, was also provided. The measuring boxes could be fed from the first or second floors, or both simultaneously. Shingle was brought from the west side of the emerging breakwater by steam locomotive, and sand from the east foreshore. Materials were delivered to the first and second floors with wagons drawn up by a wire rope. The mixer needed 25 labourers, a foreman and an engine driver to operate it. Even with this large labour force significant cost savings were made compared to the alternative of piece-work hand-mixing. The labour cost was one third at £1 15s (£1.75p) compared with £5 5s (£5.25p) per 100-ton sack-block.

The purpose-built iron twin-screw hopper-barge used to deposit the sack-blocks, was constructed by Messrs. Simons & Co. of Renfrew.[42] The well was 42 feet long, 6 feet deep and about 8 feet wide, slightly wider at the bottom than the top to ensure free discharge of the contents. Two hopper doors were held by steel catches connected to a trigger mechanism amidships. The vessel was manoeuvred into position without being moored and the trigger struck allowing the load to fall. The doors receded into side recesses in the well and, being buoyant, floated back into position.

Fig. 6 Cement mixer and hopper barge, East Quay

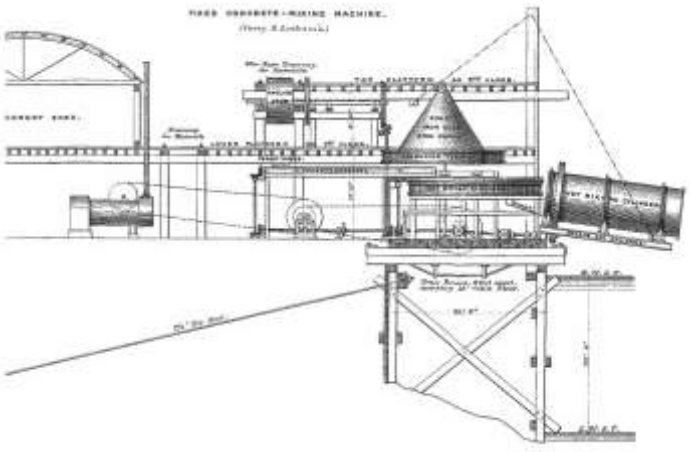


Fig. 7 Diagrammatic section of East Quay concrete mixer

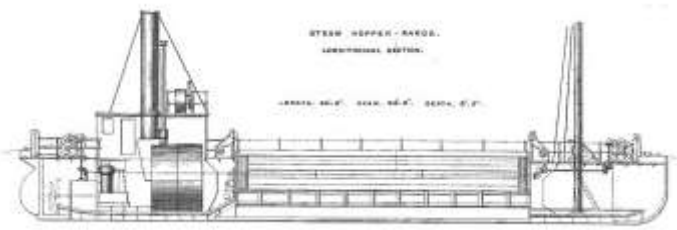


Fig. 8 Longitudinal section of hopper barge

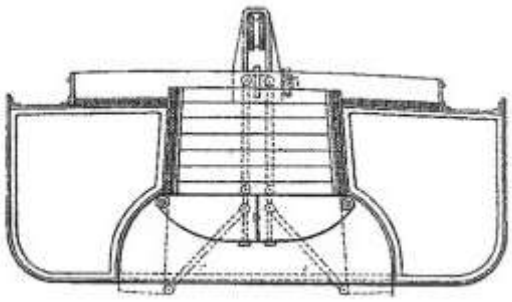


Fig. 9 Cross section of hopper barge

Concrete was contained in sacks made of jute canvas 27 inches wide with 400 yards (365 m) per sack – single thickness at the bottom and double thickness at the sides and top. On the 3 December 1879 the NHC Board approved the purchase of the first batch of sacks from Henry & Co of Dundee, at a cost of £3-16-9 (£3.83p) or £4-5-0 (£4.25p) each 'according to example'.[43]

From September 1882, a smaller mixing machine, again designed by Carey and Latham, was used on the breakwater. This replaced the practice of hand-mixing concrete at the landward end before it was transported along the breakwater in Decauville's 16-inch gauge tramway wagons and tipped into the formwork, involving a run of up to 300 yards (274m). The mixing machine was a light travelling mixer not dissimilar to the larger fixed machine on the east quay. Shingle and sand were measured by dredger buckets of appropriate size, and an inclined screw

Fig. 10 Mobile concrete mixer on the breakwater (see also fig. 2)

introduced the correct amount of cement, which was carried in a railway brake van. The revolving cylinder mixed and delivered concrete either direct into the framing or into tip wagons. A self-propelling travelling engine in the rear provided motive power to the mixer and ensured the apparatus could be moved back to the landward end in case of stormy weather. This mixer could deliver up to 70 cubic yards of concrete per hour, and this doubled the maximum working length from 20 feet, with one length of 40 feet taking three days to complete, after the sack-block foundations and timber framing were in place. It also significantly reduced the labour cost from 14½d to 5½d per cubic yard.

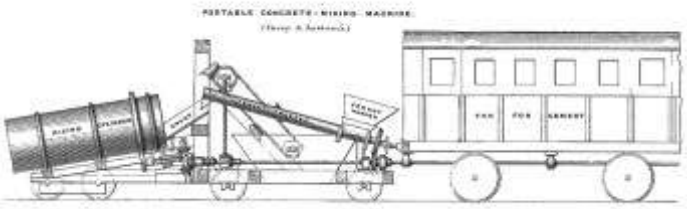


Fig. 11 Longitudinal section of mobile cement mixer used on the breakwater

The 1883 'Crisis'

In 1883 the Engineering Committee of the LB&SCR became concerned that the harbour project was running into difficulties and was likely to exceed the funding and time limits authorised by the Acts of 1878 and 1882. The breakwater only advanced by 40 feet in the whole of 1882 due to severe weather experienced throughout the year, with formwork repeatedly swept away by storms. No doubt men were re-deployed to other parts of the works, but probably these were also hindered by the adverse weather. In addition, some works were undertaken that were not in the original plans and funds were also expended on land purchases. Additional works included *inter alia* the filling up of the reclaimed land on the west foreshore, two new gridirons, the tramway on the east side of the harbour, the 20 workmen's living huts, and the erection of lighthouses and rooms for staff.[44] It is surprising that some of these costs were not anticipated and included in the original estimates. Land was purchased on both sides of the harbour including on the eastern side extending along the foreshore for about 2,666 yards (2,440 m) (eastwards towards Bishopstone) and comprising 228 acres (92 ha), the area being mostly available for future extensions of docks and quays.[45] A report, dated 17 April 1883, covering the whole project and not just the breakwater, was prepared for

the main board of the LB&SCR by the Engineering Committee, and also apparently sent to the NHC's board. It was very critical of the Harbour Company's board (which comprised six members nominated by the LB&SCR and three members from the Harbour Trustees) and of the choice of Banister, the LB&SCR Chief Engineer, to design and oversee the works. Criticism of the appointment of Carey as the engineer in day-to-day charge of the works was also implied. The Engineering Committee's report and Banister's reply to it were both printed and circulated to each director of the railway and harbour company boards, after the 6 May 1883.[46] A draft letter by Robert Jacomb Hood to the Chair of the Engineering Committee, responding to Banister's reply survives in the archive at Kew. Collectively these documents provide a vivid picture of the tensions between the LB&SCR, especially its Engineering Committee, and Banister at this time.[47] It should be noted that the Engineering Committee was small, often only two or three members attended its meetings; the Chair at this time was Ralph L Lopes.[48] It is also significant that on 01/05/1883 Jacomb Hood, recently appointed to the Engineering Committee, was appointed by the LB&SCR as one of their representatives on the Harbour Company's board in place of the Hon. J F Freemantle. This ensured a strong engineering overview of the project, which was possibly missing until now.[49] Jacomb Hood was a distinguished railway engineer who was the Chief Engineer of the LB&SCR 1846-1860, being Banister's immediate predecessor in that role. From 1860 he was in private practice but worked on many LB&SCR projects, presumably working closely with Banister. He also worked on many other projects in Britain and overseas. In March 1883 he was appointed as a Director of the LB&SCR and thereafter focused on that Company's affairs. Looking into the Newhaven harbour works appears to have been one of his first tasks in that role.[50]

The opening three paragraphs of the four-page report set the tone for whole document:

> …after reviewing the [financial] figures … and upon a careful inspection and personal examination of the works … a strong impression arises that a large sum of money has been spent prematurely, that a still larger sum has been spent extravagantly, and that the profit or benefit derived from a total expenditure of £320,000 has, thus far, been nearly inappreciable.
>
> …it becomes clear that, from the first, there has been not only an absence of skill and experience in the conception and design of important parts of so exceptional an undertaking, but a want of discretion in confiding the control of the execution to parties not practically conversant with the management of labour and the organization of public works on a large scale.
>
> …[even with unlimited funds] it is doubtful it would have been judicious [for the Board] to allow the employment of labour, and the purchase of plant, machinery, and materials of a costly character, to remain practically under the sole control of a Railway Engineer, without experience of Harbour and Dock Works, which … form a special branch of the profession.

With specific reference to the breakwater the report states that 920 feet (280m) of superstructure, less than one third of the planned whole, and a further 300 feet (91m) of foundations were completed. It acknowledges that the completed work had stood very well but questions whether the form and dimensions would be stable when deeper water and a more exposed position is reached. Only a special expert in this class of engineering could decide. The cost to date was £55,000 and it could fairly be assumed that at least a further £120,000 was required to complete it. This section concludes:

> The completion of the breakwater is essential to the success of the entire scheme, and, therefore, every penny that can be saved out of the balance of available capital should be devoted to that object.

The report's general conclusion reads:

> Upon a review of the whole of the circumstances, the Committee are of opinion that it will require skilful management, and constant personal attention on the part of the most experienced practical man who can be obtained, to secure the completion of the most essential portions of the Harbour and Dock Scheme within a reasonable time, and within the limits of the capital which can yet be raised on the credit of the Company.

Clearly the expectation was that Banister and possibly Carey would be removed from any involvement and replaced by a better qualified engineer. However, as we shall see, Banister put up a strong defence in reply to this report and both men continued in the roles until the eventual completion of all the works.

Banister's six-page reply was dated 26 April 1883 and addressed to the Chairman and Directors of the Newhaven Harbour Company. The LB&SCR Engineering Committee minutes of 5 May 1883 referred to this letter, so a copy must have been sent

to them as well. Banister starts by saying he regrets being unable to accompany the Committee due to pressure of work. If he had been there 'many of the conclusions embodied in the report would have been considerably modified or altogether dissipated.' He goes on to say, 'from want of proper information as a basis, the report generally is exaggerated, and many of its conclusions erroneous.' Banister rebuts the accusation that he is underqualified to do harbour work by pointing out that the board obtained a report from leading engineer Sir Henry Tyler CB, and Mr Cay, engineer to the Aberdeen Harbour Board, who approved the conception and design before the works commenced. He also points out, 'with regard to the competency of a *railway* engineer to carry out such work' [Banister's emphasis] that he was resident engineer under Mr Robert Jacomb Hood on the Deptford Dock and River Work in 1847-9 and, more recently, joint engineer with Jacomb Hood on the Portsmouth Harbour Extension and Ryde Pier Works. Jacomb Hood was a railway engineer and Banister's immediate predecessor as Chief Engineer of the LB&SCR. He was almost certainly one of the authors of the report of 17 April, so these comments are particularly barbed.

Addressing the points raised about the various elements of the harbour development, Banister notes (page 3) that no fault is found with the work completed on the breakwater. He then states that as the depth of water will increase only by five feet at the extreme end 'it does not appear to require a special expert to give an opinion upon a matter that has been absolutely established by experience.' He notes the difficulties caused by severe weather, which makes estimating the time and cost of completion difficult but 'given tolerably favourable conditions as to weather, this important work [i.e. the breakwater] can be finished for a sum not exceeding £80,800' [c.f. the £120,000 in the report]. He also points out (page 1) that 'notwithstanding the unfinished state of the works, the benefits experienced by the protection afforded by the breakwater, the widened entrance and the deepened channel, have been very considerably appreciated'. He notes (page 5) that 'it is very probable that the full benefit of the entrance to the harbour may be felt without extending the work to the entire length shown on the plan …[making] a considerable saving in expenditure…'. This is the first indication we have that the original plan for the breakwater may be deviated from.

Jacomb Hood's reply to Banister's comments comes in hand-written drafts of a seven-page letter dated 3 May 1883 addressed to Ralph Lopes as Chair of the Engineering Committee. The final version does not appear to have survived in the archive. He gives no quarter in his criticism of the points Banister has made. For example, Banister justified his plans by referring to the Report prepared by Tyler and Cay dated 16 November 1877, which has not been traced in the archive. Jacomb Hood uses this Report to undermine Banister's case, claiming that the Report was qualified and recommended changes that were not adopted. The Report gave qualified approval based on the assumption that 'the sea walls and the new entrance to the port would not be put in hand until the breakwater and wharf walls had been completed.' Jacomb Hood states that is 'an order of proceeding which commends itself as judicious and economical.' But Banister was doing all the works, except the new dock, simultaneously and this had led to the overspend situation they were now in. Concerning the charge of extravagance, Jacomb Hood draws attention to the discrepancy between the actual costs and the original and successive estimates. In the 1878 Act the capital powers were £426,600, which was to include the new dock and lock. In the Act of 1882, they were raised to £559,900. Only £117,750 remained and would not be sufficient, in his view, to complete even the works in progress, exclusive of the dock and lock. Banister had estimated (page 6 of his letter) that the total cost of finishing the works (excluding the dock & lock) would be £113,668, with £80,800 of this amount being for the breakwater. Jacomb Hood's calculations come to £186,000 (of which £120,000 is for the breakwater) plus a margin for error, so say £200,000. The two engineers have clearly reached widely different sums.

Fig. 12 The part-finished breakwater about the time of the 1883 'crisis'

Despite the amount of criticism heaped on Banister, against which, in Jacomb Hood's view, he had not successfully defended himself, both he and Carey kept their jobs. There must have been some form of mediation from within the LB&SCR, perhaps taking into account Banister's extensive portfolio of work and service for the Company. Now he was a Director of the Harbour Company Jacomb Hood was able to keep matters under close scrutiny.

In response to the Committee's resolution of 05/05/1883 that he should reduce the labour expenditure as much as possible and concentrate efforts on completion of works to render traffic facilities as soon as possible, Banister submitted a letter to the Engineering Committee about the possibility of reducing costs on the harbour works. After long discussion, his proposal to reduce at once the number of hands, currently 550, by 25 of those excavating for the dock to provide fill for the eastern sea wall, plus as many more as could be spared consequent on a diminished use of the concrete mixing machine was adopted. On 04/06/1883, replies to the advert ordered by the Engineering Committee for a 'contractors' agent or manager' were submitted. Banister concurred in the selection of a Mr Waters, and subject to a satisfactory interview with Banister it was resolved to recommend him to the Newhaven Board as Clerk of the Works under Mr Carey. The Engineering Committee were taking a much greater involvement in the day-to-day affairs of the project and effectively taking matters away from the Newhaven board.

Shortly after this exchange of reports and letters the Board of Trade formally asked questions of the Harbour Authority. A document was prepared 'in compliance with the Orders of the House of Commons, dated 14th June and 9th July 1883'.[51] Whilst this report was probably prepared in connection with the possibility of Newhaven port and Seaford Bay becoming a 'harbour of refuge,' it would doubtlessly have alerted Whitehall to the problems being experienced with Newhaven's development works. This report includes a brief history of the port, details of the current position regarding the work being carried out under the 1878 and 1882 Acts, as well as details of the finances of works under the 1862, 1878 and 1882 Acts. There are also statements and tables concerning the nature of vessels using the harbour, and volumes of imports and exports, harbour dues, charges, etc. No response to this document from the Board of Trade has been found in the archive. An interesting summary of the financial position is included, and shows why the LB&SCR board were asking questions about the harbour works:

> The works now under construction have cost up to the present time £350,000, and when the works now in hand are completed, the cost is estimated to be £500,000, The original estimate for the works contemplated by the Acts of 1878 and 1882 [i.e. including the dock and lock], was £308,553, but a very large extent of land and property has been acquired and works executed not originally contemplated or included in these estimates. (section 8, p5)

This was not to be last of the financial problems to hit the completion of the breakwater and other harbour works; matters again came to a head in 1885.

The 1885 'Crisis'

The Harbour Minutes for 14/01/1885 include a finance report showing that £21,000 of debenture stock had been sold at a premium, raising £25,200, but the bank balance was only £10,280.[52] Also included is a statement showing the approximate financial position of the Company at 31/12/1884. This includes a statement of potential capital that can be raised in the short term, existing liabilities and the potential sale values of plant and stores on hand. Banister commented on this statement, noting that the foundations of the breakwater were 570 feet beyond the end of the superstructure and were a danger to navigation. If the works were stopped it would be necessary to moor a light ship at the end of the foundations; an alternative was spending circa £10,000 to extend the superstructure (to cover the foundations). He also suggested carrying the tramway around Sleepers Hole to avoid the need to maintain the western river-wall.

The Board resolved to continue dredging and only provide for limited other outstanding costs set out in the statement. All other expenditure on the breakwater or other capital works was to be suspended as soon as possible. Existing engagements were to be terminated; proper notices having been given. A report was requested from Banister and the General Manager [of the port] about how best, with the approval of Trinity House, to protect against risk from the unfinished portion of the breakwater.

On 11/02/1885 Banister reported limited works had been carried out and that Trinity House had declined to help with the breakwater warnings. He asked the board to reconsider the decision to stop work and that they spend a portion of the available money on

extending the breakwater over the summer. The board asked him to prepare a detailed plan of how the remaining balance of £6,000 be appropriated to the structure of the breakwater and what he would do to avoid the immediate and complete stoppage of the works by a greatly reduced operation over the summer.

On 11/03/1885 Banister submitted the plan previously requested. After much consideration it was resolved unanimously that the:

> Directors adhere to the resolution of 14/01/1885, suspending as soon as possible all expenditure, this with great regret due to the financial impossibility of continuing the breakwater. [They] hoped that as soon as an improvement in the money market and the position of railways generally made it possible work [could] resume and complete the original scheme.

Banister had clearly fought to get the breakwater works to continue but the financial realities and the difficulties in raising the further capital required forced the board to shut down the works. Although some minor works were reported to the board on 22/04/1885, he reported on 10/06/1885 that work had stopped on 30/04/1885. Most of the works had been completed except for the breakwater, the east quay, and some dredging. At a cost of £89,005, 1,482 feet of superstructure (i.e. approximately half of the total planned) and a further 300 feet of foundations of the breakwater were complete.[53] A total of 26 staff were retained for dredging and current repairs. This compares to 550 staff reported in May 1883 to the Engineering committee of LB&SCR (see above). It is not known how many men were on the payroll immediately prior to the cessation of work but the ongoing financial problems and the completion of other parts of the harbour project may have already led to reductions in the workforce. The effect on the economy of the town must have been enormous. Presumably, many of the men moved on to other projects outside of the local area but many may have found employment in the building of the South Heighton Cement Works, which began in late 1884. A large amount of chalk was dug out to form a level area for the construction of the works, and an embankment carrying a tramway linked to the mainline was built.[54]

Completion of the breakwater

At a Board meeting on 18/05/1887, and in anticipation of the raising of additional capital in July, Banister submitted estimates of the costs to complete the project and recommended that work recommence on the breakwater, dredging and east quay. The breakwater was estimated at £67,062 and the lighthouse at £3,000. The immediate cash required for the breakwater was £500 to £1,000 per week. Other works would cost £21,427, bringing the total to £91,490. He was authorised to start at once, after a break of two years, but only on the breakwater, so as not to lose the months of June and July. However, strict conditions, including laying the men off if work was not possible, and weekly returns of numbers employed and expenditure, were to be made. A tight rein was to be kept on all expenditure.

By 19/07/1887 Banister was able to report that 40′ of superstructure had been completed and another 40′ was approaching completion. 27 bags for the foundations, containing 1,600 cubic yards of concrete had been deposited.

It was not until mid-1887 that the financial conditions were right for the LB&SCR to raise the final tranche of capital funding under the 1878 Act. An Extraordinary and Special General Meeting was held on 19 July to authorise the issue of £70,000 in £10 shares, being the residue of the £320,000 share capital authorised under the 1878 Act. The directors were empowered to raise the remaining borrowing of £40,000 which was dependent on the issue of the shares. A total of £110,000 would now be available to complete the works.

On the 11/07/1888 the NHC board minutes recorded that:

> The length of the breakwater as originally proposed be curtailed by 300′ as the extension of the eastern pier renders the extreme length of the breakwater as designed unnecessary. Such curtailment effecting a saving of about £20,000.

This goes some way to explaining discrepancies in the length of the breakwater in various reports. As well as the 2,700 feet (900 yards) quoted in the 1878 Act, 3,000 feet (1,000 yards) was quoted at a meeting of the Harbour Trustees reported in the *Sussex Agricultural Express* of 09/10/1877 and in *Modern history ... (1884) op. cit.*, and 2,800 feet (933 yards) is frequently quoted e.g. Carey *Harbour Improvements* …. (1887) *op. c*it. A document held at Newhaven Museum, dated 1961, quotes 2,400 feet, and the current figure given on the official harbour website states it is 2,313 feet (705m). Measurements taken from a 2016 marine chart of the harbour confirm that the length is indeed about 705m or 2,313 feet.[55]

Fig. 13 The breakwater shortly after completion

Work on the breakwater was confined to the summer months as adverse winter weather made progress slow and inefficient. It was not until 10/07/1891 that Banister could report that only the lighthouse remained to be built – the superstructure of the breakwater, including the head, having been completed. The lighthouse was turned on for the first time on 1 February 1892, fully 12 years after the commencement of work on the breakwater. A fog horn was also installed, but on 03/04/1895. Banister was asked to submit a report to 'the Railway board' with regard to obtaining a more effective foghorn.[56] The final cost of the breakwater is not stated, but the cost for the harbour works up to their effective completion is given as £595,131 at 31/12/1892, although this includes the cost of land purchases.[57] It is very difficult to arrive at realistic comparisons of the value of money over time due to the complexities of calculating inflation. However, by one estimate the 2024 equivalent cost is £62 million.[58]

The protection provided by the breakwater and the completion of dredging (beyond regular work to maintain the required depth of water) meant that the long desired fixed timetable for a regular Newhaven-Dieppe service was possible from December 1888, as far as the Newhaven end of the service was concerned. Arrangements were made at a special board meeting on 24/10/1888, attended by the President and the Engineer of Western Railways of France, for a fixed timetable to commence on 01/01/1889. The French advised on 12/12/1888 that their works were not sufficiently advanced to start as planned. It was pointedly noted that the French should be told Newhaven was ready. On 29/05/1889 Captain White reported on his inspection of work at Dieppe saying that little improvement had been made in the depth of water, and that without more dredging steamers would suffer detention on arrival on three or four days each fortnight. Despite this, the fixed service was commenced on 1 June 1889.[59] However, there were ongoing problems in Dieppe. Banister reported on 09/10/1889 that he had inspected work at Dieppe and there was only 1.5 to 3 feet of water at low tide and there was no immediate prospect of improvement. Despite these problems there was clearly benefit from the Newhaven harbour works and the introduction of the fixed timetable, as passenger numbers for the five months to 30/11/1889 were 130,676, compared with 46,727 for the same period in 1888, a 280% increase. No doubt the Paris Exposition, held from 5 May to 31 October 1889 played a large part in this increase, but it would not have been possible without the protection provided by the unfinished breakwater.

No reports of any celebrations such as a 'topping-out ceremony' have been found although there must have been a sense of relief all round that at last the project was over.

Maintaining the breakwater

There has been an ongoing need for maintenance work on the fabric of the superstructure, the lighthouse and the foundations, as the effects of sea and weather have taken their toll over the past 130 plus years. The tramway tracks laid along the length of the breakwater during its building were left in place to facilitate the movement of plant and materials for maintenance. The tracks were lifted in the 1960s and future works carried out using lorries and self-propelling cranes. In the early 1980s circa 5,000 large concrete modules, nicknamed locally as 'Bonios' for their resemblance in shape to popular dog biscuits of that name, were fabricated on the promenade area. They were deposited along the western edge of the southern end and round the head of the breakwater to protect it from wave action.[60] Other examples of ongoing work include the lighthouse exterior refurbishment in 2009 by sandblasting and re-decorating,[61] and cracks on the seaward side filled by specialist mastic in 2023.[62] A full catalogue of maintenance issues over the years would no doubt run to a lengthy list.

Fig. 14 'Bonios' stored west of the breakwater. Note the crane used to put them into position.

Fig. 15 Close up of a 'Bonio'

The breakwater becomes both artistic inspiration and much-loved local emblem

An objective view of the breakwater might be that it is an example of a common type of structure, built of drab and now somewhat aged and wave-battered concrete with nothing intrinsically attractive about it. And yet it has been included (often with much artistic licence) in artworks produced by some of the twentieth century's leading British artists including Eric Ravilious, Edward Bawden and John Piper.

Many local amateur artists have also painted it. It has been included in countless postcards and features prominently in work by local photographers. It has been frequently used by the BBC to illustrate stormy weather on national weather forecasts, with an image of waves breaking over it and overtopping the lighthouse – a common occurrence. The local historical society has incorporated it into its logo, and in support of Newhaven Mayor's charity work the Town Council were selling tea towels featuring the breakwater at Christmas 2023. On changing its status, a local primary school has been renamed Breakwater Academy, recognising the structure's importance to the town.

The breakwater's appeal lies, perhaps, in the paradox of its gentle curving elegance and cloister-like arches combined with its rugged strength and role in resisting the powerful seas of the English Channel.

For both locals and visitors, the breakwater became a place of leisure, with free and unrestricted access for fishing, strolling and even sunbathing.

To experience the visceral boom of waves hitting the structure from the relative safety of the covered walkway was something of a rite of passage for Newhaven's teenagers. The sandy beach that formed inside the breakwater's bight was much loved and heavily used when tide and weather permitted, the wash from ferries entering the port providing great sport to the locals as it caught out the unwary visitors sunbathing on the sands. As discussed in the introduction, the beach and breakwater were closed to the public in 2008. This caused much anger and resentment from local people who still talk in terms of 'our beach' and 'our breakwater'.[63] Having lost legal attempts to get the beach reopened there is still strong feeling many years later. Despite heavy duty fences and barriers, occasional fishermen make it onto the breakwater and several 'mass trespass' events have happened on the sandy beach.[64] The accumulation of shingle on the western side of the breakwater has formed a large beach that protects

Fig. 16 Eric Ravilious *Newhaven Harbour* auto-lithograph 1936

Fig. 18 John Piper *Newhaven harbour and cliff* collage and ink 1936

Fig. 17 Edward Bawden *Ferryboat entering Newhaven harbour* watercolour 1935

Fig. 19 Postcard showing a busy breakwater, late summer 1956

the cliffs from erosion by the waves and has also become a place of resort for locals and visitors. The mournful sound of the foghorn has been part of Newhaven residents' lives over the years.

The breakwater seems destined to continue protecting Newhaven harbour for the foreseeable future and stands today as a monument to Victorian engineering and the men who built it. The financial problems and the difficulties in building it are all but forgotten; the cost of maintaining it, should the ferry and other harbour traffic cease, is perhaps the biggest threat to its future.

Conclusion

It must be acknowledged that, although an important piece of industrial history, Newhaven's breakwater is not the most spectacular, largest, or technically most innovative piece of Victorian engineering that survives today. Nor were its engineers famous. But in a local context it stands out as a significant monument to Victorian enterprise and ingenuity, and its importance to the port and town of Newhaven is immense.

A series of plans including groynes to protect Newhaven's harbour entrance were put forward throughout the 1800s, but it was not until the final quarter of the century that a scheme of sufficient scale was put into effect to make possible non-tide dependent use of the harbour. The breakwater was the largest single element of a wide-ranging project to improve the harbour facilities and it proved problematic in its execution. Novel construction methods were used, and although most of the reports we have are from the engineers involved in the work, it does appear that they were effective. But the difficulties of working in adverse weather were underestimated, causing delays and costs in excess of the estimates. Coupled with other problems, such as the difficulties incurred in building the east quay, and 'mission creep' that led to additional works and costs being incurred across the harbour improvement

scheme, work had to be suspended for two years when the breakwater was only half built as the money had run out. However, eventually the breakwater was completed and stands to this day, doing the job for which it was designed.

Some insight into the stories of the working men who built the breakwater and the dangers they faced, has put an additional layer of interest into the story, as has the examination of tensions between the engineers and the commissioners of the work, the LB&SCR.

The breakwater has become part of Newhaven's identity, and it is difficult to imagine the town without it. There is, undoubtedly, more to be learnt from further examination of the records at the National Archives and from further 'family history' research into the men who built it. Newspaper articles could also be further interrogated for stories related to the breakwater, both at the time of its building and over the intervening years. An oral history project collecting stories from those who have maintained it and those who have used it for leisure would pay dividends. Comparison with the development of other local ports such as Shoreham would also be helpful. We should hope that sufficient use is made of the harbour in the foreseeable future to warrant the continuing maintenance of this venerable structure.

References

1. This paper was inspired by an article which, whilst being much shorter, covered some of the same ground. See Eager D 2018 The Breakwater *Newhaven Times*, April pp 11-17
2. Bailey, P. 1986 *Newhaven in old picture postcards volume 2* 2nd edition (1st edition 1984), unpaginated but comment on picture 35. European Library, Zaltbommel, Netherlands.
3. Eager D. *op. cit*. p11
4. For a summary of this sad tale see www.newhaventowncouncil.gov.uk/about-the-town-council/the-west-beach-green-village/ Accessed 31/07/2023.
5. Bailey, P. 1988 *Newhaven in old picture postcards, volume 4* unpaginated but caption to photograph 54.
6. Farrant, J. H. *The Harbours of Sussex 1700-1914* pp 36-43 privately published, ISBN: 0 9505265 09; Carey, A.E. 1887 *Harbour improvements at Newhaven, Sussex* Minutes of the Proceedings of the Institute of Civil Engineers 87, (paper number 1915) pp 92-113; Anon 1884 *The modern history and future prospects of Newhaven harbour, Sussex* Compiled and issued under the authority of the Newhaven Harbour Company's Board of Directors. (This document may well have been principally written by Carey, who provided the drawings attached to it).
7. 4 George II, c. xvii (1730) *An act for repairing and keeping in repair the pier or piers and harbour of Newhaven in the County of Sussex.*
8. 35 & 36 Victoria 1, c. clxxvii *The continental communication (Newhaven to Dieppe) Act 1872.*
9. Relevant papers can be found in Newhaven Museum Folders 9.3 and 9.3A. Digitised copies of the photographs are available to view in the museum. See: www.newhavenhistoricalsociety.org.uk
10. The National Archives (hereafter TNA) RAIL 853/1. Note this meeting took place 2 weeks before the Company was formally incorporated.
11. Ancestry www.ancestry.co.uk. Findmypast: www.findmypast.co.uk.
12. 41 &42 Victoria 1, c.lxxi (1878) *The Newhaven Harbour Improvement Act* n.b. This Act has not been available to consult during this research; details from it are from secondary sources.
13. Notes on East Sussex Record Office (hereafter ESRO) item R/L 50/1/1 at The Keep, Falmer, Brighton. [n.b. the Working Agreement (noted below) gives the date of transfer of assets as 15 August 1878.]
14. *The Newhaven Harbour Company and London, Brighton and South Coast Railway Company – Working Agreement.* A copy of this document, dated November 1878, is available at Newhaven Museum, Ref Folder 9.3A
15. 45&46 Victoria 1, c. lxxviii 1882 *The Newhaven Harbour Amendment Act*; 51 & 52 Victoria 1, c. xii 1888 *Newhaven Harbour Act*
16. TNA RAIL 853/1 06/05/1879 minute 4; *The modern history* (1884) *op. cit.* p21
17. *Frederick Dale Banister* Grace's Guide www.gracesguide.co.uk/Frederick_Dale_Banister. Accessed 10/11/2023.
18. Carey, A.E. 1887 *op. cit*. and Anon The *modern history...* 1884 *op. cit.*
19. The main records accessed for biographical details in this section are from www.ancestry.co.uk
20. For Hastings see ESRO Acc 7026/127; DH/b/157/549; QDP/570/1. For Eastbourne (Langney Point) see ESRO QDP/694/1; for Shoreham-by-Sea see West Sussex Record Office (WSRO) QDP/W214B
21. Pilfold W 2021 The history of the Newhaven (South Heighton) cement works *Sussex Industrial History* 51, 2-9 and Pilfold W 2022 A Sussex industrial village: the story of South Heighton *Sussex Industrial History* 52, 38-43
22. For the Navvy Missionary Society see: www.railwayarchive.org.uk/misson-impossible-the-navvies-an
23. Anon *The modern history… op. cit.* p21; TNA RAIL 853/1 p36 14/07/1879 and p47 03/12/1879
24. www.sussexparishchurches.org/church/newhaven-christ-church/ Accessed 13/02/2024

25. Census returns examined from copies on Ancestry www.ancestry.co.uk/. Newhaven, East Sussex, St. Michaels parish, enumeration district 2. For the huts the schedule numbers are 306-328 inclusive.
26. Census return Newhaven, East Sussex, St. Michaels parish, enumeration district 2 schedule 305
27. TNA RAIL 853/1 p36 minute 4 14/07/1879; TNA RAIL 414/237 p1
28. *A History of the county of Sussex Volume 7, the Rape of Lewes.* Originally published by Victoria County History, London, 1940. Available on: www.british-history.ac.uk/vch/sussex/vol7/pp62-52. Accessed 02/02/2024
29. TNA RAIL 853/1 and 853/2
30. *Sussex Agricultural Express,* 20/09/1879, p11; ESRO PAR 426/1/5/3 p22 (accessed via Ancestry); death certificate (digital image).
31. ESRO PAR 426/1/5/3 p26(accessed via Ancestry); death certificate (digital image).
32. ESRO PAR 426/1/5/3 p27 (accessed via Ancestry)
33. Unless otherwise stated the information in this section comes from Carey 1887 *op. cit.* and *Modern History… op. cit.* 1884.
34. Institute of Civil Engineers Panel for Historical Engineering Works *Aberdeen Harbour;* Cay, W.D. 1875 *The new South Breakwater at Aberdeen* Minutes of the Proceedings of the Institution of Civil Engineers 39, pp 126-141 and discussion thereon pp 147-159; Paxton, R. 2015 *William Dyce Cay (1838-1925), Civil engineer* Newsletter of the James Clerk Maxwell Foundation Issue 5 available at: www.clerkmaxwellfoundation.org/html/newsletter_archive
35. Anon *The Modern History… op. cit.* p17
36. *Discussion on concrete-work for harbours* Minutes and Proceedings of the Institute of Civil Engineers, 87, 138-196
37. Anon *The Modern History … op. cit.* p31
38. Carey *Newhaven Harbour …. op. cit*. p102
39. Pilfold W 2021, *op. cit*., p3
40. *Ernest Latham* Grace's Guide www.gracesguide.co.uk/ernest_latham Accessed 23/11/23.
41. TNA RAIL 853/1 p64 01/06/1880 and p92 05/04/1881.
42. Carey 1887 *op. cit*. p100-101. *William Simons and Co* www.gracesguide.co.uk/William_Simons_and_Co Accessed 28/02/24
43. TNA RAIL853/1 p 47 03/12/1879.
44. Anon *The Modern history … op. cit*. p31-2
45. TNA RAIL 853/11 *Particulars of Works at Newhaven Harbour (Sussex) executed subsequent to the year 1862, prepared in compliance with the Orders of the House of commons, dated 14th June and 9 July 1883: answers to questions prepared by the Board of Trade.*
46. TNA RAIL 414/153, page 58-9 minute 7
47. TNA RAIL 414/237; RAIL 414/239; RAIL 414/240.
48. TNA Rail 414/153
49. TNA RAIL 853/1 p179
50. *Robert Jacomb-Hood (1822-1900)* obituary www.gracesguide.co.uk/Robert_Jacomb-Hood Accessed 05/02/2024
51. TNA RAIL 853/11 *Particulars of works … op. cit*. p2.
52. TNA RAIL 853/1 p262
53. Carey A.E. 1887 *op. cit*. p107
54. Pilfold 2021 *op cit.* p3
55. *The Newhaven Harbour Improvement Act* 1878; *Sussex Agricultural Express* 09/10/1887; Anon *Modern History …* p16; Carey, 1887 p98; Anon, April 1961 *Newhaven Harbour, its history and the function of the harbour master* p2 Memorandum held at Newhaven Museum folder 9.3; Newhaven Harbour Authority website *Port Control and Details* www.newhavenportauthority.co.uk/newhaven-port-menu-header/port-control-details. Accessed 01/03/2024; *England, South Coast, Newhaven Harbour Chart*, Edition. 8, 26/11/2015, scale 1:5,000. United Kingdom, Hydrographic Office.
56. *A Saunders timeline*, held at Newhaven Museum. This is probably a note taken from the NHC Directors' minutes.
57. TNA RAIL 853/2 Calculated from figures to 30 June 1892 in the Directors' report presented at the Thirty-First. Ordinary Meeting 27 September 1893
58. www.bankofengland.co.uk/monetary-policy/inflation/inflation-calculator Figure rounded to nearest £million. Accessed 19/02/2024.
59. TNA RAIL 853/2 The Directors' report to the Twenty-Third Ordinary Meeting 9th October 1889 of the Newhaven Harbour Company
60. Newhaven Museum, note to photo A022P036. See also A022P056 and A028P055
61. www.sussexblastcleaning.co.uk/newhaven-lighthouse/ Accessed 28/02/2024.
62. www.uk.weber/technical-mortars/turning-tide-newhaven-sea-wall. Accessed 28/02/2024. Note that some of the historical and construction information in this article is incorrect. Wire reinforcement on the outer skin of the breakwater presumably comes from previous repairs; it was not part of the original structure. See a video showing damage to the breakwater at www.youtube.com/watch?v=BA2HmdAf2Fk Accessed 28/02/2024.
63. See for example www.facebook.com/groups/savenewhavenbeach Accessed 28/02/2024.
64. *Newhaven campaigners carry out 'mass trespass' on beach* 23/08/2014.www.bbc.co.uk/news/uk-england-sussex-28913712 Accessed 28/02/2024.

Acknowledgement

The author wishes to thank the Trustees of Newhaven Historical Society for allowing the use of Newhaven Museum's archives and photographs in this article.

PUBLICATIONS

Previous numbers of *Sussex Industrial History* still available:-

No. 2 (1971)	Dolphin Motors of Shoreham; Lime Kilns in Central Sussex.
No. 5 (1972/3)	East Sussex Milestones; West Brighton Estate; A Bridge for Littlehampton 1821-2.
No. 20 (1990)	William Cooper, Millwright; Foredown Hospital; Ford Trimotor & Aerodrome.
No. 22 (1992)	Swiss Gardens, Shoreham; Seven Brighton Brewers; Mill Bibliography; Beddingham Kiln.
No. 24 (1994)	Pullinger's Mouse Trap Manufactory; Ice Houses; Forest Row Mills; Lewes Old Bank; Lumley Mill; Estate Industry at the Hyde; Slindon Bread Ovens.
No. 27 (1997)	Sheffield Park Garden Hydraulic Works; Brighton Tunbridge Ware Industry; Railway Cutting Excavation; Eastbourne Mills; Tunnels of South Heighton; Sussex Lime Kilns.
No. 32 (2002)	Henry Turner, Brickmaker; Crawley Water Company; Tamplins, Brewers; Ifield Steam Mill; Burgess Hill Pug Mill
No. 33 (2003)	H.A. Waller & Sons; Electrical Generation at High Salvington; C.V.A./Kearney & Trecker; Cocking Lime Works; Nutley Windmill; Longleys at Christs Hospital.
No. 34 (2004)	West Sussex Brewers; Swanbourne Pumphouse; Hammond Family and Mills; Shoreham Cement Works; Pullinger's Registered Designs; Balcombe Road Forge, Crawley.
No. 35 (2005)	Halsted & Sons of Chichester; Swanbourne Pump House, Arundel; Concrete Shipbuilding at Shoreham; Turnpike Roads to Chichester, Petworth and Midhurst.
No. 36 (2006)	The British Syphon Company; Turnpike Roads to Arundel, Worthing and Littlehampton; Brewers of East Sussex; West Hill Cliff Railway, Hastings—Engine Room; The Lamp Posts of Ditchling.
No. 37 (2007)	Poynings Mills; Lavington Park Pump House; Tollhouse and Milestone Survey; A Colonel Stephens 'Find'; CVA Eaton Road, Hove; Cowfold and Henfield Turnpike (Part 1).
No. 38 (2008)	Brighton Brewers; Rottingdean Mill; Turnpikes to Horsham; Cowfold and Henfield Turnpike (Part 2); CVA at Coombe Road Brighton.
No. 45 (2015)	Supplement—Phoenix Ironworks.
No. 46 (2016)	T H Myres Railway Architecture; Bedfordwell Pumping Station, Eastbourne; Brighton Tram Shelters; Turnpikes to Battle and Hastings; Hempstead Early Fulling Mill.
No. 47 (2017)	The Beginnings of SIAS; Fifty Years of SIAS; Railway Architecture in Sussex; Southdown Bus Garages and Bus Stations; Manor Royal, Crawley; Fifty Years of Mill Restoration; Coultershaw Beam Pump.
No. 48 (2018)	The Boys on the Plaque; Brighton Power Stations; The Pepper Pot; Brighton Tram & Bus Shelters; Turnpikes to Rye
No. 49 (2019)	Sussex Building Materials; Lime Burning at Amberley; West Blatchingdon Mill; Singleton Station; Malting in East Sussex; Turnpike Survey.
No. 50 (2020)	The Railway Architecture of James Robb Scott; The Demise of Vernacular Housing Materials; Malting in West Sussex; Turnpike Survey - Part Two; Southerham Cement Works
No. 51 (2021)	Newhaven Cement Works; Chichester Gasworks; Bond Street, Brighton; Reconstructing the Past; Bishopstone Tidemills
No. 52 (2022)	Tivoli Mill, St Leonards; Post-medieval Minepits in Horam; Photographic Portrait Studios in Victorian Brighton; The Chalk Pit Furlong, Brighton; Barrow Mills; A Sussex Industrial Village—South Heighton
No. 53 (2023)	Brighton Photographic Portrait Studios (Part 2); The Selsey Tram Way; Barnham Windmill; The Chalk Pit Furlong (Part 2); The Original Southdown Bus Garage at Lewes; A Bus Station and New Bus Garage for Lewes

Copies are available at £1 plus post and packing. For a list of articles in issues no longer available see *Sussex Industrial History* No. 25; photocopies of these articles can be supplied at cost. The full content of back issues of SIH can be accessed from the Society's website.

Also available: M. Beswick, *Brickmaking in Sussex* (revised edition 2010) £5 (plus post & packing)
F. Gregory, *A Sussex Water Mill Sketchbook* £1 (plus post & packing)
Alan H. J. Green *The History of Chichester's Canal* £10 (plus post & packing)

Orders with remittance (payable to SIAS) to:-
Dr. Geoffrey Mead, 47 Hartfield Avenue, Hollingbury, Brighton BN1 8AD, tel. 01273 501590,
email g.mead@sussex.ac.uk

Bolney Toll house (*photo: Brian Austen*)

Newhaven Swing Bridge, looking east (*photo: John Hoar*)