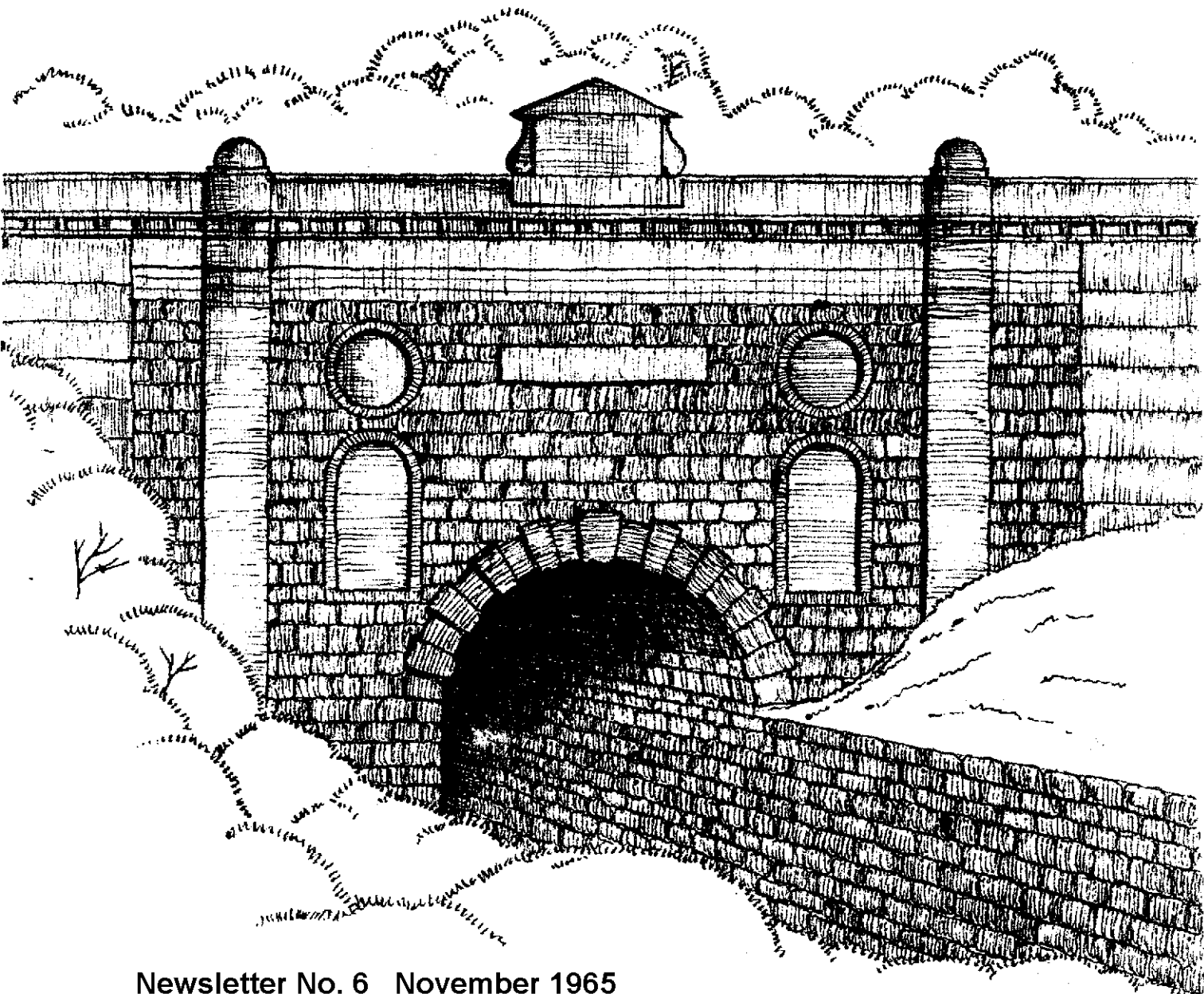


THE NEWSLETTER OF
THE GLOUCESTERSHIRE
SOCIETY FOR
INDUSTRIAL ARCHAEOLOGY



Newsletter No. 6 November 1965

NEWSLETTER

Number 6

NOVEMBER 1965

GLOUCESTERSHIRE SOCIETY FOR INDUSTRIAL ARCHAEOLOGY

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EDITORIAL

Your Society is greatly indebted to Mr. Lewis and the Local History Committee for allowing it to publish in full the article which appears in this issue. This description of the Stroudwater Canal was chosen initially in preference to other equally meritorious essays only because in the Newsletter less has been written on this particular subject.

Research and fieldwork are the key words for next year's programme. If members can plan their fieldwork now for next Spring, then the coming winter months can be used for the necessary research for references in books, documents, deeds, maps, auction notices etc.

Although some of the larger sites and buildings have to be surveyed by small teams, much useful work can be carried out by the individual member using a little initiative. Interesting looking sites can be found by careful map reading or reading in the local library or County Records Office, and then the afternoon car drive can have a definite objective, or perhaps a slight diversion can be made on the way to somewhere else. Always remember to keep a few C.B.A. cards in the car. For those without cars it is suggested that they concentrate on everything of interest to the Society within a radius of a mile or two of their houses.

I should like to emphasise again that you do not have to be an expert to fill in a C.B.A. record card. Just fill in as much detail as possible and, if necessary, other members can complete the cards at a later date. Members will find Dr. Green's book titled "The Industrial Archaeology of County Down" helpful in its descriptions of sites.

Lectures and excursions have provided you with the background knowledge of many branches of Industrial Archaeology, but if you are carrying out fieldwork on your own I feel it would be preferable to concentrate on one particular subject for the year. If told in advance we could then publish that one of our members is studying the sites of, say, quays on the Severn or windmills, to name two subjects that require fieldwork. A list of subjects being covered could be drawn up so that if in the course of your research and fieldwork you discovered items relating to another aspect of Industrial Archaeology, you could then inform the individual concerned.

For those working in teams I consider that normally it would be preferable if the results were recorded in the form of neat sketches with dimensions shown. Unfortunately people are not always available

for drawing board work and we have already a backlog of site measurements waiting to be transferred into scale drawings. Many of the members having the equipment and knowledge to be able to undertake this drawing already do this type of work all day, and interest rather wanes when continuing the same thing in the evenings and at weekends.

In the lectures given by members in the New Year it is hoped to include some advice on surveying sites and buildings, so that everyone can take turns in reading off dimensions and not just always holding the end of the tape. It seems that very few objects of interest to us are entirely free from the threat of demolition so it is imperative that our fieldwork programme is increased as quickly as possible.

THE KENNET AND AVON CANAL

There was a full coach for the outing to the Kennet and Avon canal on 24th July. Running from Bath to Newbury, the canal is 57 miles long so six points of main interest had been chosen for inspection, starting at Crofton about 15 miles from Newbury, and working westwards as far as Claverton just a few miles east of Bath. Together with the River Kennet Navigation and the River Avon Navigation, the Kennet and Avon Canal formed one of the three waterways to cross England from west to east. The limiting dimensions were those of the canal, which permitted barges of up to 73 feet length, 13 feet 10 inches beam and 3 feet 6 inches draught. The navigation has 106 locks, 193 bridges and a tunnel at Savernake which is 502 yards long.

The summit level is $3\frac{1}{4}$ miles long, stretching along the northern slopes of the Vale of Pewsey and a feed of water is provided from Witton pool by means of the famous 150 year old pair of James Watt condensing beam engines at Crofton. In later years the engines were powered by Swindon built boilers, with which the Great Western Railway replaced the original fire boilers. The beam engines were in daily use until May 1959, their work being done now by an electric pump housed in a shed a little distance away from the old engine house. It is still necessary to pump daily to maintain the canal water level, for although the canal is no longer useful for carrying freight, it is not abandoned and is in use for pleasure purposes. The Crofton pumps have been surveyed and well documented, for example in

reference 1. The location of the pumping station is determined by the source of water which is the river Dun dammed to form Witton pool. However, the summit level does not start for another mile or so to the west and so the outfall from the pumps is carried this distance by an open channel above the canal.

From Crofton we travelled to Ladies Bridge, noticing on the way Wolf Hall where Henry VIII met Jane Seymour. Ladies Bridge crosses the 15 mile level between the summit and Devizes and is an example of the influence of local land owners on the construction of the canal. The bridge is an elegant Bath stone structure planned to terminate the view from Wilcot Manor, whose lord is also thought to have required a widening in the canal to give the impression of a lake adjoining his estate. Although it has been attributed to Rennie Ladies Bridge is probably the work of a Bath architect: it was erected in 1808. It has built-in provision for rollers on which the tow ropes could bear and on the west side there are grooves in the canal walls for stop boards; when not in use the boards lie in a rack nearby made of old fish belly rails. Close to Ladies Bridge is Swanborough Tump where legend has it that Alfred the Great made his will.

In some ways the highlight of the day came after lunch at the Barge Inn at Honey Street. At Honey Street wharf was the headquarters of the canal; here are the Manager's house, canal workers' cottages, a boat building shed, warehouses, a sawmill and a clock tower dated 1854 from which the barge men took their time: a whole village devoted to the business of water traffic. The boats were launched sideways into the canal and were still being built up to the 1914 war. The wharf has the remains of a wooden crane similar to one dated 1811 which still stands at Burbage Wharf. As if to match all of this there is a fine VR letter box in the wall near the canal bridge.

The next point at which we met the canal was at Devizes where it descends a flight of 29 locks. This is the second longest flight of locks in the country and the middle 17 locks have regularly laid out side ponds. Tenders for the construction were advertised for in 1805 and the flight was opened in 1810. It took more than a day to work a boat through the flight so night working became necessary. This led to the installation of gas lighting which was in operation by 1829.

To avoid having to cross the Midford Valley below Monkton Combe the Kennet and Avon canal crosses to the north east side of the River Avon for two or three miles. This was done by the Avon-cliff and Dundas aqueducts and it was the Dundas aqueduct that we

looked at next. This is another fine Bath stone structure completed in 1804, making the crossing with one central and two side spans. It was named after Charles Dundas, the principal promoter of the canal, and is still full of water and apparently in good condition. On the Bath side is a small wharf, with one or two buildings and an iron crane bearing the words ~~ACRAMANS~~ BRISTOL. This basin was the junction with the Somerset Coal Canal which contributed a good proportion of the Kennet and Avon coal traffic. The bed of the Somerset Coal Canal is now planted with roses where it passes a nearby house.

Another water supply to the canal is provided by the Claverton pumping station. This is a twin beam engine driven by a very broad undershot water wheel and driving two water pumps. Water is tapped off the Avon a quarter of a mile upstream to drive the wheel and feed the pumps, whose outlet runs up the hill side, across the railway and spills into the canal above. The pumps were built in 1810 and worked at 16 strokes a minute and 100,000 gallons per hour until 1952 when a small diesel pump took over. Again the new pump is in a small shed alongside the original engine house. The old building bears numerous marks recording flood levels, the highest of which was in 1960 when all but the beams and pump tops were submerged. Railway regulations are displayed on G.W.R. notices dated 1924. An interesting point is that the iron beams were cast on the site.

The day finished with tea by the river at Bathampton toll bridge. We were much indebted to Mr. R. Willoughby who was our guide.

Reference 1.: The Crofton Pumps.

Published by the Railway Enthusiasts Club,
Farnborough. 1958.

G.S.A.

continued from next page.

bins on the attic or third floor. A considerable amount of grain cleaning and sifting equipment is preserved in situ and much interest was shown in the ingenious devices used to obtain power from the main shaft.

The meeting closed at a late hour with thanks to Mr. Pagan for his kindness in allowing us to visit the Manor.

L. Walrond

EXCURSION TO OWLPEN MANOR, ULEY

A well attended evening excursion to Owlpen Manor took place on Friday, 11th June by kind permission of the owner, Mr. F. E. Pagan. The organiser, Mr. Robert Hodges, being unavoidably called away at the last moment, the premises were described by Mr. Lionel Welrond. After a detailed examination of the Church, barn and mill, Mr. Pagan led the party over the Manor House.

The name Owlpen means the head of a watered valley, and the prefix Owl or Oule is repeated both in Uley and the River Ewelme. Land here is mentioned in a 12th century grant, but no structural remains appear to be earlier than the 14th century. The Manor gave its name to the family of Owlpen, the sole heiress marrying John Daunt who died c. 1522. The property remained in the Daunt family till 1815, when the sole heiress married Thomas A. Stoughton.

Of the Manor House, the east range appears to date from the 14th century with modernisations through the centuries. The great hall was added probably upon the marriage to John Daunt, and in 1616 the west wing by Thomas Daunt. In 1720 another Thomas Daunt drastically altered part of the east wing and inserted 18th century panelling and sash windows of early type. He is likely also to have built (c.1690) the court room cum market house in the garden, and a tripartite heating device in the kitchen believed to be for the heating of size in the preparation of warp for weaving in the cottages. If this is so, he was probably a clothier though not describing himself thus on any documents etc. Other features of note were the roof timbers of the hall and east wing, the painted panelling (probably late 16th century), the wooden newel stair of 1616, the very fine doorways and fireplaces throughout the house, the 17th century spit rack and the German water work 'tapestries' in one of the bedrooms.

The BARN is of 14th century date, stone with a cruck roof and arch braces set on small brackets. The original porch type of entry has been blocked, but was formerly large enough to take loads of corn. Inside, are the remains of a cider mill (similar to a mill at Hammond's Farm described in Newsletter No. 5) and a very fine 18th century cider press with a single wooden screw.

The CORN MILL retains its external water wheel and probably dates from the very end of the 18th century. A false chimney on one gable perfectly balances the facade which has central doorways and a particularly attractive cupola recently restored. The water wheel, 19th century, has been reversed converting it from pitch-back to overshot. Pitchback wheels are rare locally. Inside, the main shaft and two pairs of millstones have been removed, also
the corn

1. Industrial Archaeology in Wales - Morgan Rees

The new series of lectures started well both in the number of Members present and in the quality of the lecture itself. The Keeper of Industry in the National Museum of Wales began by saying that though the counties of Glamorgan and Monmouth spring to mind as having the greatest number of industrial remains, other counties had industries which lasted for shorter periods.

In the 16th century ironmasters came from Sussex and remains of their early small furnaces can be seen at Cwmaman (004992), near Aberdare, and Blaencanaid (042048) between Aberdare and Merthyr. Water power was necessary to turn the wheels working the bellows.

With competition from the Midlands, the iron industry slackened but there are some remains of the 17th century, for instance in Monmouthshire at Llandogo, Woolpitch Wood (487048) and Coed Ithel (527027).

Towards the end of the 18th century there was an eruption of ironworks at the edge of the Glamorgan coalfield. Here there was ironstone, coking coal, limestone and stone for building, and furnaces were built at places like Dowlais, Nant-y-Glo and Blaenaven.

In south-east Breconshire there was a forge at Gilwern and a furnace at nearby Clydach (235142). Near the latter are Ynys-y-Garth Cottages (213128) of three storeys; the top two are the house and the rear of the ground floor was probably used for stabling horses for the tramroad. Also near the Clydach works is a fine cast-iron bridge dated 1824.

The remains of the 1757 ironworks at Hirwaun are typical and sale particulars of 1813 indicated there were both Bolton & Watts and Trevethick's engines at this works. In the mid 1800's the iron industry decayed, steel coming into its own.

Tinplate was made mostly in the hinterland of Swansea and, established in the first half of the 19th century, this industry lasted fifty years. Twelve to fifteen steel works were built for the trade but all are now silent. In Carmarthen the remains of the tinplate works have the typical dividing wall with arched openings.

A good example of a remote site is Rhandirmwyn where lead ore was mined and crushed, using water-wheels for power, before being taken away for smelting.

Cardiganshire was famous for lead and silver mining but other industries existed and at Aberaeron there was a small forge with the last water driven tilt-hammer. Further north are the remains of an ironworks at Furnace (685952) which used ore imported from Lancashire.

In Caernarvonshire near Llanwrst is the Cyffty lead mine where still stands a timber head frame to the shaft and the water wheel remains. Near the Pennant Valley an isolated copper working at Brynceir has interesting remains of a pump driven by a water wheel.

Finally several slides were shown of the Britannia Foundry at Pontymister in Monmouthshire, built in 1854 and demolished last year after records had been made.

THE FUNCTIONAL TRADITION

An exhibition under this title, and arranged by the Arts Council of Great Britain, was held at Washington House, Great George Street, Bristol, from the 7th to the 22nd October. On view were photographs by Eric de Mare, with a commentary by J. M. Richards, author of "The functional tradition in early industrial buildings". The theme of the exhibition was the inherent beauty of many of those early structures which are currently receiving the attention of industrial archaeologists, and which, through the purposeful and unpretentious use of available building materials, often harmonised more pleasingly with their surroundings than do many of the self-conscious buildings of today. This was convincingly demonstrated by the examples chosen, which included windmills, watermills, bridges, textile mills, maltings, docks, and warehouses. Coverage was also given to railways and waterways, while the final section suggested that evidence of the survival of the functional tradition may be seen, for example, in the futuristic sky-line of an oil refinery or the bold simplicity of a motorway flyover.

Of particular interest to local visitors were views of mills at Nailsworth, Stonehouse, and Ebley.

M. N. Bussell.

CHRISTMAS CARDS

The Society will again be producing its own Christmas Card. This year the print shows Avening Church with two packhorses laden with wool passing in front. The price will be 7d. each, including envelope.

MILESTONES

by

Donald Cross

To confuse any German parachutists who might have landed in Britain in 1940 the authorities removed every roadside direction sign which might have helped them to locate their whereabouts. (Confusion among native British motorists was greater and more effective, as few seemed to be able to read a map, and the loss of guideposts to the traveller in a strange country led to situations best imagined !)

Among the direction signs removed then were most of the traditional milestones, first put up under the Turnpike Roads Acts of 1744 and 1766, and augmented by others during the nineteenth century. After the war, many milestones were replaced, though often not in their original sites. Others had vanished for ever, and those which had had the mileages fitted to them on removable cast-iron plates often had never had them replaced. They stand, mute and useless, by the side of many busy roads.

Many milestones mark original trunk routes of coaching days now bypassed by more modern roads, like those on the A4141 at Eynsham the old Oxford-Cheltenham road bypassed in the 1920s by the present A40. Others have survived road-widening schemes, and have been replaced and re-painted by enlightened county authorities, like the old Devizes-Salisbury stones on the A360 near Stonehenge junction.

Few motorists realise the interest of these remaining milestones, often half-hidden in roadside herbago. Few realise that their shapes and lettering are so distinctive that a coach driver of the old days could tell from the shape and inscription of the stone which route he was on, and frequently exactly where he was, on the darkest night. Observant car-drivers may have spotted that the triangular stone pillars of the main Exeter-Barnstaple road are different from the rounded milestones on the Cheltenham-Gloucester road, or the flat-faced and pointed stone on the A346 at Burbage, Wiltshire. Some roads had metal-plates with inscriptions mounted on posts as in the New Forest, or the A361 in Wiltshire. Others, in the North of England, were simple low painted blocks of stone or slate, especially over the moorland roads.

The lettering was often done by local craftsmen, who frequently used local abbreviations, which must have puzzled the traveller

from afar in the early days as much as it does today. Sarum for Salisbury was fairly well-known, but Exon, Barum, Oxon, and Shaston, for Exeter, Barnstaple, Oxford, and Shaftesbury seem to have presumed some ecclesiastical knowledge. On the other hand it may have been just lack of space (or, more likely, the prospect of an earlier lunch for the stonemason.)

Few of the signs put up before and after the First World War by private motoring organisations now survive, having been almost entirely replaced by standard Ministry and local authority signs. However, I spotted one original AA warning sign in yellow and black while on holiday in Devon - on the Exeter Hill out of Teignmouth. No doubt many more still serve a useful purpose, though their enamel surface suffers greatly from young stone-throwers. And visitors to London are always interested in the well-preserved Motor Union plate on Westminster Bridge giving mileages to Dover and Folkestone.

Last year the AA announced that it was planning to establish its own museum of early motoring relics, and there was an enthusiastic response from members. The many new roads and road-improvement schemes planned and in progress make such a rescue of early road signs and street furniture of early motoring days an urgent matter. Where still well-preserved and serving a useful purpose the road surveyors might be persuaded to leave it as near as possible on the spot. If not, a local or national museum would be happy to save it from destruction.

"The Guardian"
13th September 1965.

Mr. Christopher Cox followed up this article with a letter, published in "The Guardian" on the 13th September, in which he gave welcome publicity to our Society.

INDUSTRIAL ARCHAEOLOGY IN THE BRISTOL REGION: BULLETIN NO. 3.

The foreword admits that the survey will take much longer than originally expected due to new material turning up and also to the fact that volunteers can only spend a limited amount of time on surveys etc.

Report on work undertaken

- (1) Survey of equipment in the Port workshop and Carsons Chocolate

factory. Also of the tramway and boiler at Westerleigh.

- (2) Survey of coal-mining, chemicals, pottery and other sites at Crews Holo.
- (3) School parties have surveyed the Great Western Cotton Factory, Canons Marsh Gas Works and the Keynsham area.
- (4) Report on the Avon and Gloucester Tramway.
- (5) Report on brickyards in Somerset and notes on British sugar industry.
- (6) Account of Bristol glass industry.
- (7) Report on a coalmine winding house at Kingswood.
- (8) Cards on street furniture - lamp-posts, shop signs etc.
- (9) Survey of watermill sites in Bristol area.
- (10) Report on iron-workings and other sites around Frampton Cotterell.
- (11) Report on steam engines at Pountneys Pottery in Fishponds.

News

- a. The future of the Redcliffe Shot Tower remains uncertain.
- b. The "Safety" sank near St. Philip's Bridge recently, but was refloated. It is estimated that £10,000 would be required for the restoration of this Severn barge.
- c. British Rail propose turning Brunel's Old Temple Meads Station into a car park, pending their ultimate redevelopment of the site. The Office block forming the original frontage on Temple Gate is to be pulled down for road widening. The Centre for the Study of the History of Technology suggests that Bristol Corporation should purchase the whole site and possibly turn the Station into part of the City Museum. It is most important that this outstanding building be preserved.
- d. A conference on "The Study of Industrial Archaeology" will be held at the Bristol College of Science and Technology on the 6th November.

G. N. C.

THE RELIC

Among the many good causes we have publicised, none has given us more quiet satisfaction than the saving of the Medway Queen.

This was no world-shaking event. But it was a link with an heroic episode in our history which we hoped would not be broken.

To say, as some have done, that the preservation of such a relic impedes progress is nonsense. The old paddle-steamer will not ply the waters. She is to be a yacht clubroom and museum, and what could be more appropriate?

The Americans have preserved many more old sailing ships than we have because they happen to be sentimental in these matters. It has not interfered with their go-ahead modernisation.

'DAILY MAIL' leader
24th August 1965.

THE JOURNAL OF INDUSTRIAL ARCHAEOLOGY

The publishing of the Journal has now been taken over by Messrs. David & Charles and will in future consist of three issues annually with an extra Notes and News Supplement in the summer. This supplement has just been issued and includes a page devoted to the activities of the Gloucestershire Society for Industrial Archaeology.

In the first number of Volume 2, Turnpike Roads of the Stroud District are fully described by one of our Members, Christopher Cox.

CORRECTIONS

Newsletter 3 page 11 Mr. Gordon Rattenbury has pointed out to me that the Marshfield mentioned is in fact the one between Newport and Cardiff.

Newsletter 4 page 12 Mr. Household states in a letter that the date of the first canal Act, given as 1780, should be 1783.

Newsletter 4 page 27 Mr. Household's address should read:
1 Marten Road, Folkestone, Kent.

CORRESPONDENCE

1, Marten Road,
Folkestone,
Kent.

9th August 1965.

Dear Mr. Crawford,

I read on page 8 of Newsletter No. 5 a note amending the dates given for the period when Sapperton Tunnel was open - 1789 to 1913 on the cover, 1789 to 1927 in the text. All depends on the definition of the word "open", but I myself would hesitate to use the word in connection with either of the final dates quoted.

In April 1910 the Gloucestershire County Council adopted a report of their Canal Special Committee recommending "cessation of further expenditure on that part of the Canal east of Chalford Valley" (Gloucester Journal, 23rd April 1910).

On 11th May 1911 the "last boat passed over the Summit level . . . with 20 tons of stone", and all but two of the men employed east of Chalford were discharged soon after (Fact Book, T. & S. Records).

On 4th January and 4th April 1916 the Minutes of the Canal Committee of the County Council recorded roof falls in the tunnel, in the Fullers Earth and the Inferior Oolite, and noted that arrangements had been made to strut the affected parts. Nevertheless, I have always understood that these falls effectively - and permanently - closed the tunnel to navigation.

From the latter part of 1923 onwards, the Clerk of the County Council was in communication with the Ministry of Transport regarding closure and abandonment of the Canal, and the Ministry Warrant authorising abandonment between Lechlade and Whitehall Bridge above Chalford was dated 31st January 1927.

When, therefore, was the tunnel "open"? Was it between 1789 and 1916? Would it perhaps be wiser to say that the tunnel was in use between 1789 and 1911, or alternatively that the tunnel was opened in 1789 and abandoned in 1927?

Yours sincerely,

H. G. W. Household.

BOOK REVIEW

BRITISH REGIONAL GEOLOGY - BRISTOL & GLOUCESTER DISTRICT

Kollaway & Welch. Pub. H.M.S.O. Ninth impression 1964.
88 p.p. 12 plates and folder 6/-.

Although this book is not exactly light reading, much valuable information can be obtained if one is prepared to persevere and the numerous maps and sections are most useful, especially when studying quarrying, coal mining or the extraction of various ores. A short article on water supply is also interesting.

Many times have I seen Celestine being dug in the Yate region and I can now answer those who queried its use; it is a 'filler' in special paints and also produces the crimson flames in pyrotechnics. A book by the Department of Scientific and Industrial Research could hardly say 'fireworks' !

G.N.C.

RELIC OF A WATERWORKS

Interest in old industrial buildings is shown by an official protection order made for the most ancient part of the waterworks at Hampton-on-Thames, built about a century ago. A member of the Metropolitan Water Board suggests that concern for our industrial relics has come "20 years too late," but at least this Victorian remnant, with its tall towers hiding chimney-stacks, has been saved. It was an attempt to apply Italian styles, popular at the time, to industrial building - not an idea that would be appreciated today.

This building followed an Act of 1852 which forbade the taking of water from the dirty tidal area of the river below Teddington Lock. Little filtering was done in those days. The buildings have been changed, and turbines now make the chimney-stacks unnecessary. But the task of providing water goes on. The old buildings are used to house pumps and stores.

from "The Guardian"
28th September 1965.

INDUSTRIAL ARCHITECTS OF THE 19TH CENTURY

RICHARD GANE AND THE DEVELOPMENT OF THE MILL

Now that industrial archaeology is becoming almost a fashionable subject one can foresee an increasing interest in industrial architecture. There can be little doubt that in the past the buildings of the industrial revolution in this country have not been treated as seriously as they deserve.

This is understandable, in many places they are ugly, yet even in Lancashire and in Yorkshire they have a certain distinction, and in other areas where they are not so concentrated they can be most attractive. One need only recall the buildings of the Derwent Valley and of the Stroud Valley. The former have been little studied but the latter have been comparatively well described and the ironwork at Stanley Mill is almost famous. The purpose of this article is to draw attention to another west of England group centred around Trowbridge and Bradford-on-Avon, and in particular to the work of the architect Richard Gane.

Names Unknown

In many cases these industrial architects are not even known by name, for example Prof. Pevsner in his well known guide to the architecture of the West Riding does not mention a single name. The designer of Bean Ing, perhaps, historically speaking, the most significant mill in Yorkshire, is not known. In many cases the clothier or cloth merchant may have acted as his own architect but more probably he left it to the local builder, perhaps giving him a few instructions such as 'a mill like A's,' or 'not like B's'.

It is therefore particularly interesting to have at least the name: Richard Gane appears to have been a comparatively important figure and he may well have been responsible for a quite distinctive change in the way in which textile mills in the West of England were built. As in Yorkshire the tradition at the beginning of the century was to build long rectangular buildings, the reason being simply that these buildings were built to take spinning machinery, which is long one way and comparatively short the other.

The Power Loom

It was not until 1830 to 1840 that the power loom replaced the handloom in the woollen trade, and consequently it became necessary

to have buildings suitable for weaving. Weaving called for a completely different type of building to spinning. Some years seems to have elapsed before the obvious answer of having a single-storey building was reached. At first it was more usual to put the machinery into a multi-storey building as was for example done at the well known Stanley Mill at Stroud.

This new development meant that a square building had many advantages. One can see the change throughout any textile area. In Bradford-on-Avon and Trowbridge early mills are oblong and the first square mill may well have been the one that Mr. James built at Staverton. He had so-called shop-looms, i.e., hand-looms working in a factory, in 1805 well before the time of Richard Gane. In Trowbridge, however, buildings erected during the first years of the century continued in the old tradition, and it was the middle of the century before the new square buildings, often of stone, began to be erected.

Richard Gane's main work was at Bradford, where the mill that is now a rubber factory clearly illustrates his distinctive methods of working. He was particularly fond of adding a layer of stone and giving it a pointed top. This same motif appears in his main work at Trowbridge, the mill that until recently was operated by Messrs. Palmer and Mackay. Pevsner, in his work on the architecture of Wiltshire comments on the Bradford buildings 'the five-storeyed dominant part with the giant pointed arches up the facade and the pointed gorballed frieze dates from 1875 and is by Richard Gane.' This is a good description of the building, but there is a mistake regarding dates for the architect was dead by that time.

Richard Gane's distinctive contribution to architecture is in its industrial aspect, but in addition he built a school at Melksham and made at least one flight into ecclesiastical architecture, namely the small church at East Kennett.

K. G. Ponting
(Article in "The Builder" 27th Aug. 1965)

THE SOUTH EAST WALES INDUSTRIAL ARCHAEOLOGY SOCIETY

Our Society has strong ties with South Wales and it is pleasant to record the formation of a new Society in this area. Lectures are held on the first Thursday of every month in the C.A.T. Cardiff and further details can be obtained from Dr. W.G. Thomas, Department of Industry, National Museum of Wales, Cardiff.

As usual this bulletin is full of useful information, much of it of industrial archaeological interest. * In a list of the prize winners for the Schools Essay Competition, it augurs well for the future that many of the subjects chosen are of local canals or railways. These pupils could well be the future field-workers of our Society.

After a report on our activities there is a plea from the Gloucester Museum for old picture postcards and photographs. It mentions that a photograph of a funeral at Brimscombe which was brought to the Museum recently shows in the background a dockside crane. A postcard just seen of a Sunday School outing shows the children crammed into two farm waggons being hauled by a magnificent Ransome's traction engine.

Nearly four pages of the Bulletin are devoted to the prize-winning entry in the schools competition of S. N. Adam, on the Stonehouse and Nailsworth Railway. It is interesting to read that there was once a vision of eventually reaching Southampton via the Nailsworth valley !

Gloucester City Museums acquisitions include one of the head-boards of the "Cheltenham Spa Express" in steam-hauled days, and stone sleepers and an iron tramway plate from the Cheltenham- Gloucester Tramroad. On loan are two apprentice-made models of mid 19th century railway carriages built by the Gloucester Carriage and Wagon Works.

Mr. J. M. Strange located a guillotine type chaff-cutter at Damsell's Farm, Painswick, and it has now been given by the farmer, Mr. H. O. Houldey. Mr. Strange also found an early Massey-Harris muck spreader at Brookthorpe and this also has been given to the Museums.

The pin-making section of the Museum was featured in the B.B.C. programme for children "Treasure House".

The Bristol Technology Department has renovated a 1910 carrier's cart from Bibury. Some of the faded paint tints were chemically analysed so that the exact shade of the original could be ascertained.

Stroud Museum has acquired old metal working tools from the demolished Messrs. Bruton's forge at Nailsworth, including tin-smithing equipment and anvil tools. Some of the larger pieces of

equipment have been retained by the firm in their new premises. With the closure of the stick and umbrella works at Bourne Mills, Brimscombe, a selection of their products and equipment was taken to the Museum.

Among the acquisitions of the Gloucestershire Records Office were:-

Deeds etc. of the Austin family of Wotton-under-Edge, clothiers, 1641-1872, including account book and partnership deeds, 1805-1820;

Purnell family 1591-1847 including partnership deeds of Fromebridge Iron Mills, Frampton-on-Severn 1759-1778;

Hale family of Alderley 1669-1872;

Dursley charities and fire engine 19th century;

Deeds and papers deposited by Vizard & Son, mainly Forest of Dean including Ducarol family of Newland and David Mushet of Coleford, including Forest of Dean Collieries, 17th - 20th century;

Plan and specifications for building turnpike house, c. 1780, Stinchcombe; Tewkesbury, map of turnpike roads, 1866 and Survey of cloth industry in Gloucestershire 1950.

G.N.C.

BIBLIOGRAPHY

The County Technical Librarian has produced a valuable forty-eight page booklet giving the titles of books on Industrial and Transport History available on loan to Members from the County Technical Library, or through any branch of the County Library.

Mr. Rogerson states that booksellers' catalogues are continually searched for rare items of scientific and technical interest, and that suggestions regarding acquisitions will be gladly received by him at the North Gloucestershire Technical College, The Park, Cheltenham, telephone Cheltenham 57160.

B. B. C. TELEVISION SERIES

As most Members know a series of ten programmes on Industrial Archaeology is at present being televised on Sunday mornings, with repeats on Thursday evenings. Of especial local interest is the film on the 14th November in which Mr. W. G. H. Robins appears.

In connection with the programmes, a 36 page booklet called "Industrial Archaeology" has been prepared by the B.B.C. and can be obtained from booksellers, price 3/6d. Quite a number of Gloucestershire photographs are included and on page 2 it mentions that societies have been formed in Gloucestershire, Manchester and Liverpool. Information of interest to those filling up C.B.A. cards is contained in Rex Wailes' article in this booklet. He states that a water wheel is described by the point on its circumference where it receives the water and it is simplest to think of this in terms of a clock face. Thus:-

12 o'clock is 'overshot' and the wheel turns away from the source of water

1 o'clock is 'pitch back' because the wheel turns back towards the water

2 o'clock is 'high breast'

3 o'clock is 'breast'

4 o'clock is 'low breast'

5 o'clock is 'undershot' if the water is seen to come from the right.

Many people seemed to consider the first programme rather dull and I personally think the Introduction should have been much more lively if its object was to attract the layman to the remaining nine programmes.

Several times the fact was mentioned that Industrial Archaeology is closely linked with other studies, such as economic history, but this theme was never developed as it could well have been in an introductory talk.

It was a good idea to bring the younger generation into the programme and Steven Weekes did very well, but his subject, Henry Cort's ironworks near Gosport, Hampshire, was mainly of interest to those already keen on Industrial Archaeology. Similarly, the

shots of Port Carlisle proved very dismal and although the idea of linking Industrial Archaeology with the future was excellent I consider it was not illustrated in an interesting manner. I am sure some less static subject would have kept people more awake, particularly bearing in mind that the repeat programme went on until nearly midnight.

G.N.C.

LECTURES IN STROUD, AUTUMN 1965

The following have been arranged in conjunction with the University of Bristol Department of Extra-Mural Studies and will be held in the Stroud College of Art at 7.30 p.m.:

<u>Date</u>	<u>Lecturer</u>	<u>Subject</u>
24th September	Annual General Meeting	
1st October	D. Morgan Rees	Industrial Archaeology in Wales.
8th October	F. Atkinson	Coal Mining and Transport in the North East in the 18th and 19th centuries.
15th October	L. F. J. Walrond	Some Aspects of Power in the Stroud Valley
22nd October	Dr. R. A. Buchanan	The Bristol Survey of Industrial Monuments
29th October	R. Bowon	The Industrial Development of the Gwendraeth Valley
5th November	J. B. Lyall	The Tram in Gloucestershire.
12th November	R. D. Abbott	The Port of Gloucester
19th November	P. Mathias	The Brewing Industry
26th November	F. W. Rowbotham	The History of Organ Building
3rd December	M. M. Rix	Decorative Cast-iron Work & Street Furniture.
10th December	A. Jewell	The Work of the Museum in English Rural Life.

MINUTES OF FIRST ANNUAL GENERAL MEETING

held at Stroud College of Art
on Friday 24th September 1965.

The following 1964/1965 Officers and Committee members were present together with 20 other members:

N. P. Newman (President)
W. G. H. Robins (Chairman)
Warren Marsh (Secretary)
R. H. Pullan (Treasurer)
G. N. Crawford (Editor) (co-opted)
J. M. Strange
W. R. Taylor
C. H. A. Townley
L. F. J. Walrond
G. S. Annis (co-opted)
D. E. Bick (co-opted)

1. Technical book display

Prior to the main business of the meeting Mr. Rogerson, the County Technical Librarian, spoke of the comprehensive book display he had set out in the next room and encouraged members to borrow any books they wanted from his library at the North Gloucestershire Technical College, Cheltenham.

2. Minutes of the inaugural meeting (6th March 1964)

These were read out, and signed by Mr. Robins after being found correct.

3. Chairman's Report

Mr. Robins reviewed the activities of the past 18 months. He referred to the many activities of the Society which had kept the Committee and particularly the Secretary very busy. A brief list of our excursions was read out, together with references to fieldwork and record cards. Our great indebtedness to the University of Bristol Extra-Mural Department is here recorded and Mr. Robins went on to recall the happy links which existed between Mr. W. R. Taylor and the Society. Mention was made of our Newsletter, the success of which was due to the very worthy

efforts of the Editor, Mr. Crawford, who launched the first journal and had maintained the high standard ever since. The future of the Newsletter is governed by our finances and we were reminded of the high costs of production which might be involved if each issue was printed commercially. At present much original material was being published and we were in the happy position of having a good flow of contributions. Mr. Robins referred to our excellent relationship with local firms and public authorities and the vast amount of correspondence which had been dealt with by the Secretary. Members were informed of the forthcoming "Tidying of the Stroud Valleys" exhibition, the series of ten D.B.C. TV programmes on Industrial Archaeology and the intention to produce another Christmas card after the success of last year. A list of the Society's possessions was read out and these include colour slides, photocopies of early 1" O.S. maps, collapsible ranging rod etc. Mr. Robins concluded his report by reminding the assembly that subscriptions were now due and that a parallel series of lectures was being sponsored by the University of Bristol in Cheltenham this autumn.

4. Election of new officers and committee

Mr. Robins had expressed his wish to retire from the Chair after the Society became firmly established and the following nominations were received:-

Chairman: C. H. A. Townley
Secretary: Warren Marsh
Treasurer: R. H. Pullan
Committee: D. E. Bick
 G. N. Crawford
 W. G. H. Robins
 J. M. Strange
 W. R. Taylor
 L. F. J. Walrond

These people were proposed for re-election en bloc by Miss E. T. Reinhold and seconded by Mr. I. Rogerson. The motion was carried by a large majority. Mr. Robins took Mr. Townley's place for the remainder of the business at the latter's request.

5. Treasurer's report

Mr. Pullan reported that our membership stood at 122 of which 7 were juniors. Most of the subscription money was used in producing the Newsletter but we had made profits on the coach excursions (£9) and the Christmas cards (£11). The balance

remaining was a very satisfactory £54.14s.5d. Mr. Robins thanked Mr. Pullan for his great assistance as Treasurer during the past year and Mr. J. Clayton proposed that the accounts be adopted. Dr. G. S. Annis seconded this and there was majority assent.

6. Secretary's report

Mr. W. Marsh put forward some suggestions for excursions in 1966 and then spoke at length about the field work programme. A list of sites where investigations have already been made was read out together with those scheduled for attention in the near future. Stress was laid upon the importance of research work into documents and early records as well as work in the field. It was suggested that many sites were on members' back doorsteps and if everyone concentrated on completing record cards for items within a one mile radius of their houses or places of work the C.B.A. would benefit by several hundred record cards. Speaking on behalf of Mr. Townley and others Mr. Marsh asked for more assistance in working up sketches and notes into drawings; in this connection and also in the field, students and school children could also be most usefully employed. The report was concluded with the remarks that 1965-66 would see a greater priority given to research work compared to lectures and excursions; it was to be hoped that the volume of survey work and record searching would show a marked increase over that of 1964-65. Mr. Robins proposed a vote of thanks to Mr. Marsh for his work since the Society's inception.

7. Family membership - Change of Rules

It was proposed by Mr. C. H. A. Townley that husbands and wives should be able to take out a family membership for 15/-; this would entitle them to only one copy of the Newsletter between them. This motion was seconded by Mr. J. Strange and carried unanimously.

8. Annual dinner

Mr. Robins mentioned that it had been suggested that the Society hold an annual dinner. He asked for members' approval to this in principle but no support at all was forthcoming and the idea was dropped.

9. Any other business

Members were pleased when Mr. N. P. Newman rose to speak of the

good leadership and assistance given by our retiring Chairman by which the Society had greatly benefited. Mr. Newman proposed a hearty vote of thanks to Mr. W. G. H. Robins.

The business of the meeting ceased at 2025 to allow members to see three films and visit the display of technical books. The films were entitled "The Story of the Ross Spur Motorway", "The History of Iron and Steel" and "The Story of the Oil Engine".

There were 30 people present.

INDUSTRIAL RECORDS

Several accessions of industrial and commercial interest have recently been received by the County Records Office: three Thames & Severn Canal Minute Books (noted elsewhere); some deeds (an instalment only) which show the development of the late 17th Century copper works at Lower Redbrook into an 18th Century ironworks and a 19th Century tin-plate works; and some records of an old established wood-turners' business, Messrs. Constance & Son of Longhope.

Irvine Gray
County Records Officer.

VALLEY FACELIFT

Exhibition at the Subscription Rooms, Stroud
November 6th, 8th - 11th. 10 a.m.-6 p.m.

This close look at features in the Chalford and Nailsworth Valleys has been sponsored by the Stroud Branch of the C.P.R.E., the County Planning Department and our own Society. The photographs have been taken during the last few months with an eye to seeing what is good and what might be better. All the pictures are merely intended to make us all look around and open our eyes; they are in no way meant to pick on individual properties.

Although the local economy has inevitably changed, the valleys

are still very much alive with progressive industrial concerns. Often these are situated in the original mill buildings which, because of their intrinsically functional architectural character, sometimes create difficulties for the present day industrialists. Some have taken up the challenge and have restored the derelict mills to house modern manufacturing processes efficiently. Others have not been so enterprising. Congenial surroundings give people the feeling that life is worthwhile, and this applies as much in their homes and gardens as at their work. When the Cotswolds are declared an Area of Outstanding Natural Beauty, the Stroud Valleys will be excluded, but they too could be just as fine.

THE THAMES & SEVERN CANAL COMPANY MINUTES

Three Thames & Severn Canal Minute Books have recently been received by the County Records Office. These minutes of the Committee of Proprietors, 1783-1833 fill a serious gap in the fine series of the Canal Company's records already held at the Shire Hall. These books must have been separated from the main body of records for at least a century. They were evidently left in the custody of a Mr. Prideaux who was London solicitor to the Canal Company in the mid 19th century, and have now been received, through the British Records Association, from his descendant, Mr. W. A. Prideaux, Clerk to the Goldsmiths' Company.

Irvine Gray
County Records Officer.

The inaugural meeting of the proprietors was held at the London Tavern on 24th June 1783, in which year a total of 546 £100 shares was taken up. A second general meeting at the George Inn, Stroud followed on 7th October 1783 when the following committee was elected:- Earl of Radnor, Edward Loveden, William Capel, Sir Edward Littleton, Thomas Hayes, Robert Bayard, Christopher Chambers, James Croft, Lowbridge Bright, John Bowdler, Sir Herbert Mackworth, James Perry and Thomas Lane. Of these, William Capel would seem to be the only local member.

Further meetings were held at other taverns such as the Swan Inn, Stroud; King's Head, Cirencester; London Tavern in Bishops' Gate Street, London; Crown & Anchor Tavern in the Strand; Bull Inn, Fairford; Globe Tavern, Fleet Street and Freemasons' Tavern, Queen Street, Lincolns Inn Fields. It was not until October 1791 that the Brimscombe Port House was used for such gatherings.

It had taken six years to build Sapperton Tunnel and it was on 20th April 1789 that a boat made the first passage. Boats were propelled by feet upon the side walls of the tunnel and the "leggers" were paid five shillings for a loaded boat and half that amount for an empty one.

By 1789 eleven boats had been built at the Bourne and supplied from Brimscombe Port and they comprised The Kempsford, Union, Experiment, Triumph, Success, Sapperton, Brimscombe, Bourne, Cricklade, Cirencester and Pattern, costing between £100 and £160 each. There were in addition 19 boats built on the Thames.

The Company paid no dividend until 1810, but by the half-year ending 5th April 1801 trade was encouraging. There was balance on the six months of £3,981 and receipts from Brimscombe totalled £3,727, Wallbridge £999, Siddington £117, Cricklade £48 and Lechlade £63.

Edited notes on the minutes from the
Stroud News & Journal, 22nd Oct. 1965.

EXCURSION TO COALBROOKDALE

Saturday, 19th June 1965.

Luckily the weather did not let us down on this excursion, our longest day trip by coach so far, and those present spent an interesting few hours in the Ironbridge Gorge, the Mecca of all industrial archaeologists.

Our guide, Mr. Michael Rix, met us by the famous Iron Bridge, and we spent some time examining details of Abraham Darby the Third's cast iron structure, completed in three months in 1779 after the castings had been made at the Coalbrookdale Works. It was interesting to see that the members were held together entirely by tenon-and-mortise joints, strengthened by iron pegs and keys, as though the material was timber rather than iron. The few bolts and nuts which could be seen were the results of later repairs.

Closed to vehicular traffic for the last few years the future of this most important monument is unfortunately in doubt.

On by coach to nearby Coalport where the site of William Reynolds inclined plane can still clearly be seen, though it was abandoned in 1902. The coal-barges were carried 350 yards down to the river from the end of the canal 207 feet above.

Also at Coalport we saw the buildings and kilns of the famous china works where fine porcelain was made until 1926, when the works were removed to Staffordshire. It is interesting to note that the Willow Pattern design was first introduced in Coalport.

Most of the party enjoyed a picnic lunch in a field with a fine extensive view, sitting in the welcome sunshine.

Back again in the wooded Gorge, we visited the fascinating museum at the Coalbrookdale works which Allied Ironfounders Ltd. opened in 1959. In the outdoor museum there was much to see including of course the furnace where the first iron ever to be made with coke was smelted, as well as examples of the first cast iron rails in the world. A fountain cast for the Great Exhibition of 1851 was prominent and one of the younger members made herself popular by climbing into a large missionary pot for the benefit of photographers.

The indoor part of the museum was equally interesting and time was all too short to examine the details of iron manufacture and the many articles made from cast iron.

Outside again, the clock tower of 1843 on the old warehouse excited attention before we went by coach past Buildwas, following the winding Severn to Loughton Church where Mr. Rix showed us cast iron tombs.

Our excursion ended at Broseley where some of our members were able to buy clay pipes which apparently have been made here since the early years of the 17th century. Here too we said au revoir to Mr. Rix with many thanks for giving us a glimpse of a region where industrial monuments can be found at every turning.

G.S.I.A. CHAIRMAN AND SECRETARY

Many Members will already know that both Mr. W. G. H. Robins and Mr. Warren Marsh have recently resigned after giving your Society such a wonderful start during their eighteen months in office. Luckily we shall still have the benefit of Mr. Robins' advice as a member of your Committee, but Mr. Marsh's work takes him to Bristol and London and we shall greatly miss the untiring energy which did so much to make your Society one of the foremost in its field. We do hope that Warren will be able to join us on some of our summer excursions and perhaps still find time to write an article or two for the Newsletter.

For the future, we must give our new Chairman and Secretary the backing that they deserve so that the Society goes from strength to strength.

Neville Crawford.

G.S.I.A. EXCURSION TO SOUTH WALES

25th and 26th September 1965

On the above dates twelve members of the Society and eight friends were conducted on a tour of some of the industrial remains in the Taff and Aberdare valleys. We were met at Cardiff Station by our guides Ray Bowen and Gordon Rattenbury. Some half hour later our transport arrived in the shape of a most delightful Regal coach, almost worth a study in itself.

En route out of Cardiff we passed the site of the old docks and noted where the River Taff had been diverted in order to construct Cardiff General railway station. The site of the Glamorganshire Canal where it passed by the walls of Cardiff castle was pointed out to us; the first of many encounters.

The first stop was to view the Melingriffith beam pump constructed about 1830. This was driven by an undershot water wheel from the tail race of the Melingriffith Tin Works and pumped water by two pumps into the Glamorganshire Canal which near this point still held water. There were some queries as to why a beam engine of that date, a comparatively late date, should have a wooden beam. After inspecting

Dowlais

. HIRWAUN

Penydarren

Llwydcoed

MERTHYR
TYDFIL

Ironworks, Abernant

Aberdare
(Canal Head)

Pentrebach
(Blast Furnace
Remains)

Troedyrhiw

Quakers Yard
(Tramway
Junc. Bridge)

ABERCYNON Site
of incline.

PONTYPRIDD

TAFFS
WELL

Walnut Tree
Viaduct

Melingriffith
(Beam Pump)

G.S.I.A.

Excursion to
South Wales.

CARDIFF

Sketch Map of some of
the sites visited.

28.

a rather decorative cast iron foot bridge on the towpath we then proceeded up the valley of the River Taff following the course of the canal which was officially abandoned in 1948 although the upper sections had been closed much earlier.

A brief stop was made under Walnut Tree Viaduct near Taff's Well, which carried the Barry Railway over the Taff Valley. It was pointed out how the various lines of communication had utilised the valley over the past 150 years. Here was a history of transport in kaleidoscope for side by side at this narrow point can be seen the remains of the former Cardiff Railway, the turnpike road, the Glamorganshire Canal, the present railway (formerly the Taff Vale Railway main line) and the site of an early tramway.

After inspecting the derelict flight of three locks on the canal at Nantgarw we proceeded through Treforest passing the remains of the Cardiff Railway viaduct which due to the unco-operative attitude of the Taff Vale Railway was very little used. (The rivalry between the various railway companies in South Wales is a study in itself.)

A brief stop was made near Abercynon to view the site of the incline on the original route of the Taff Vale Railways' branch to Llancaiach. We then continued past the 'Navigation House' to the canal basin at Abercynon which was the southern terminus of the Penydarren Tramway, completed 1802. This tramway was built by the Dowlais, Plymouth and Penydarren Ironworks companies because of their dissatisfaction with the canal in transporting their goods.

We proceeded up the Cynon Valley following the course of the Aberdare Canal, opened 1812, closed 1900, and officially abandoned in 1924 and part of which now forms the present road. After solid (and liquid) refreshment we inspected the site of the Abernant ironworks above Aberdare. These were operating by 1802 but all that remains are the furnaces dating from about 1850. Tappenden of Abernant Ironworks was the instigator of the tram road to Glyn Neath from Abernant in 1805 to connect with the Neath Canal.

At Robertstown we observed a practical example of fieldwork by Messrs. Bowen and Rattenbury plus their 'maternity kit' as they unearthed a section of tramway plate on the branch which served the Gadlys Iron Company. About 1/4 mile from this site we inspected a cast iron tramway bridge dated 1811 and which was cast at Abernant; this was on a tramway which connected the canal head at Aberdare to Tappenden's tramway at Llwydcoed.

Our next visit was to the site of Scales' Ironworks at Llwydcoed. These were closed in 1875; but there were slight remains of furnaces visible behind the present brickworks. We then walked along the

Merthyr
Tydfil

Canal open to
Pontypridd
April 1792

Aberdare

Opened
August 1812

ABERDARE CANAL
6 $\frac{1}{2}$
Miles

Closed
1900

Merthyr -
Abercynon
closed
1898

GLAMORGANSHIRE
CANAL
25 Miles

Abercynon

Closed 1915

Pontypridd

Canal opened
Throughout
February 1794

G.S.I.A.

Excursion

to South Wales.

Details of
Canals visited.

from notes

by G. Rattenbury.

Closed
May
1942

Cardiff

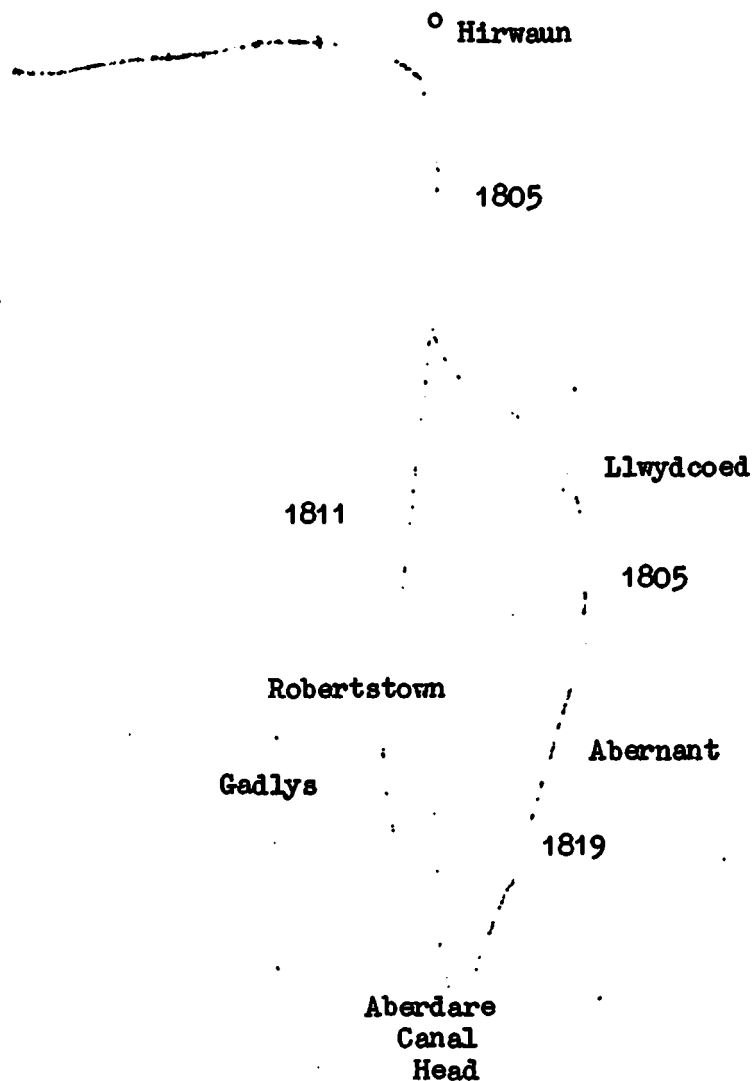
route of Tappenden's tramway for about $\frac{1}{4}$ mile to its junction with the Aberdare Canal section. Several cast iron tramway chairs were unearthed by enthusiastic members.

Our final visit of the day was to Hirwaun to inspect the remains of Crawshay's extensive ironworks and its associated plateways with fine examples of stone sleepers. The return to Cardiff, via the picturesque route through the Rhigos, ended an intensive but very rewarding day.

After some of us had enjoyed a sound night's sleep we re-assembled on the Sunday and retraced our route of the previous day as far as Abercynon. We then followed the Merthyr road alongside the site of the Penydarren Tramway to Quakers Yard, so called after the nearby Friends Burial Ground of 1667. We walked along part of the Penydarren Tramroad to the remains of an aqueduct over the River Taff which supplied water to a feeder of the Glamorganshire Canal. This aqueduct was originally of timber but it collapsed and was rebuilt on stone piers about 1837 hence its name Victoria Bridge. Alongside this the Penydarren Tramway was carried over the river by a fine single stone span bridge.

Quakers Yard Junction is an interesting example of the competitive spirit of the railways in the mid nineteenth century. It possesses a High Level and Low Level station adjacent to each other. The former was owned by the Taff Vale Railway, which opened its line between Abercynon and Merthyr in 1841, and which was also used by the Newport, Abergavenny and Hereford Railway (Taff Vale Extension) which completed its through route between Pontypool and Quakers Yard and Merthyr Joint Railway (G.W.R. & Rhymney Railway) when this line was opened in 1886. This line was an attempt to destroy the monopoly which the Taff Vale Railway had previously held of the very remunerative Merthyr and Dowlais traffic. The High Level station, with its fine example in cast iron of a more necessary item of station furniture, was closed to passengers in 1962 when the Pontypool Road to Neath line closed and the track is now being lifted. The low Level station still retains its passenger service to Merthyr and Cardiff.

Continuing along the Taff valley we left the main road to inspect the site of the Glamorganshire Canal in its upper reaches near Troedyrhiw; this section was abandoned in 1898. Walking along this for $\frac{1}{2}$ mile we came to the remains of a colliery with a fine example of an engine house on which was inscribed 'W. CRAWSHAY 1848'. The other quite extensive remains included the structure which housed the ventilating fan and the shaft head. We were informed that many spoil heaps of these old collieries are being bought and the material sold to power stations.



G.S.I.A.
Excursion
to South
Wales

Sept. 1965

Sketch Map
of Tramways
visited near
Aberdare.

by Permission of
G. Rattenbury.

This area of the Principality compensated for the dry state of the canal by providing a convenient hostelry with a most suitable atmosphere in the form of ex railway carriage seats....First Class!

We rejoined the main road and proceeded to Pentrebach. Here we inspected the remains of blast furnaces which were being rapidly obliterated by a coal tip; a vivid reminder of the urgency of our work.

Entering Merthyr we passed the Taff Vale Railway's former passenger terminus, abandoned for passengers in 1878, the Company using the Vale of Neath Railways' station in High Street. Having negotiated the traffic congestion caused by a parade of elephants, we debussed by the monument to Richard Trevithick erected on the site of the Penydarren Tramway. This commemorated the working of the first practical locomotive in the world on this tramway.

After viewing the remains of a bridge traversed by the above tramway we proceeded northwards past the site of the Penydarren Iron Works, closed in 1859, the only visible remains being the backs of the furnaces. We were shown the culvert in which the Morlais Brook passed to serve the Penydarren works and in which an old bridge casting dated 1815 was used as a support.

After inspecting some remains of coke ovens we finished our tour by viewing the site of Guest's Dowlais Ironworks which finished smelting iron in 1898. We returned to Cardiff via Llancaiach, the Rhymney Valley and Caerphilly.

Although some members viewed with trepidation the prospect of two full days on the move, everybody agreed that the experiment had been a success. This was due in no small measure to the organising ability and enthusiasm of our leaders who carefully selected a wide cross section of the industrial remains from the complex network which exists. We look forward to future similar ventures.

John Strange.

Above account aided by notes of Gordon Rattenbury.

INDUSTRIAL HISTORY COMPETITION

THE NAVIGATION TO STROUD

R. A. LEWIS

I - THE EARLIEST ATTEMPTS

By the end of the seventeenth century industrial expansion was transforming certain parts of England. Only where water power was constant, easy to come by and unhampered by the need to keep a river open for navigation did this expansion take place. The upper Severn valley, the Worcestershire Stour and the Stroudwater valleys are all areas where industrial growth took place because of the water power available.

In the Stroudwater valleys water power was used to the full with mill crowding upon mill as closely as the need for a head of water permitted. By the early eighteenth century an annual production of over 30,000 cloths demanded a population which was dense by eighteenth century standards and brought serious problems of supplying food, fuel and raw materials. Coal from the Forest of Dean to heat houses and dye-vats was brought by water to Gloucester or Framilode and thence carried expensively to the Stroudwater valleys over roads notoriously impassable for wheeled traffic in winter. Grain was brought in by pack horse over roads deep in mud: corn was said to be more expensive in Stroud than anywhere else in England. Wool and dyestuffs also had to be carried over these roads, and finished cloth taken off to the London markets by the same costly means.

Elsewhere in England similar problems had been solved by making rivers navigable and the clothiers in the Stroudwater valleys saw cheap water transport as the only answer to their problems. However, the only stream that would provide a water communication with the Severn was the Frome or Stroudwater. This was a small stream that worked numerous mills as it wound its tortuous way to the Severn at Framilode. For some miles below Stroud its channel was divided making it even smaller. The difficulties in the way of navigation are described by John Taylor who tried to paddle his small sculler's boat along it in the 1640's as "haling over high banks at fulling mills (where there are many), plucking over sunk trees, over and under strange bridges of stone and wood, and in some places the brook was scarce as broad

as my boat⁽²⁾". In the eighteenth century one of the millowners wrote " it is really but a brook so shallow in some places, so narrow in others, and winding and turning in many, that Nature never designed it for Navigation ⁽³⁾."

Nevertheless in the closing years of the seventeenth century the clothiers in the Stroudwater valleys introduced a Bill into Parliament allowing them to make the Frome navigable up to Stroud. Owners of mills on this stretch of river, fearing that their mill dams would be destroyed, vigorously opposed the project with the result that the Bill was defeated ⁽⁴⁾ and no further attempt made until 1729.

By 1729 the cost of transport was still hampering the business of the clothiers. Dyestuffs and Spanish wool cost 4d a cwt to carry by water from Bristol to Gloucester but 8d from Gloucester to Stroud by land in summer and even more in winter. Coal carried in carts over the turnpike road from Framilode had to pay a toll of 6/6 a ton in summer and 9/- a ton in winter when tolls were raised to discourage wheeled vehicles that might damage the road.

A group of clothiers from Stroud, Minchinhampton, Bisley and Rodborough decided to investigate the possibilities of providing water communication with the Severn. John Horro, who had made the River Kennet navigable, was appointed Engineer and Surveyor and asked to produce a workable scheme. He soon realised that to make the Frome navigable from Stroud to the Severn would meet insuperable opposition from the owners of the fourteen mills on the main stream below Stroud, whose mill dams would be destroyed, and of five mills on lesser branches of the river who would lose water. He therefore produced a scheme for a new cut 33 feet wide and 5 feet deep alongside the Frome and supplied with water by a four inch diameter pipe from the Frome at Wallbridge where the cut ended ⁽⁵⁾. The cut was to be separate from the river everywhere except where it crossed the river and changed from the North to the South bank. This ambitious scheme would have produced a canal capable of taking boats of 60 tons and up to 7½ ft. wide up to Wallbridge a quarter of a century before Brindley's canals.

The canal was planned to have twelve locks. The 1730 Act speaks of opening locks to provide flashes or flows of water which suggests a flash lock: on the other hand if a four inch pipe was sufficient to keep the top level full this suggests that the loss of water was limited by a pound lock.

As soon as it was known that an Act of Parliament was being sought to authorise this scheme, argument broke out fiercely. The promoters stated that by opening water trade with Bristol "the poor may be better employed, the highways greatly preserved, and the

woollen manufacture much improved and increased⁽⁶⁾." Petitions in favour of the scheme were obtained from the clothiers, gentlemen and traders of Stroud, Woodchester, Bisley, Malmesbury, Cirencester, Bristol and Tetbury. Objections were raised by the millowners on the lower part of the Frome who said that the canal would allow water to bypass their mills and leave them without sufficient water to keep their mills working in summer. Landowners along the route also objected that the canal would cut through valuable meadows and might, since the banks would have to be raised to contain the water, cause "the meadows on each side of the canal to be turned into bogs or morasses by the water overflowing the banks, or weeping through them"⁽⁷⁾."

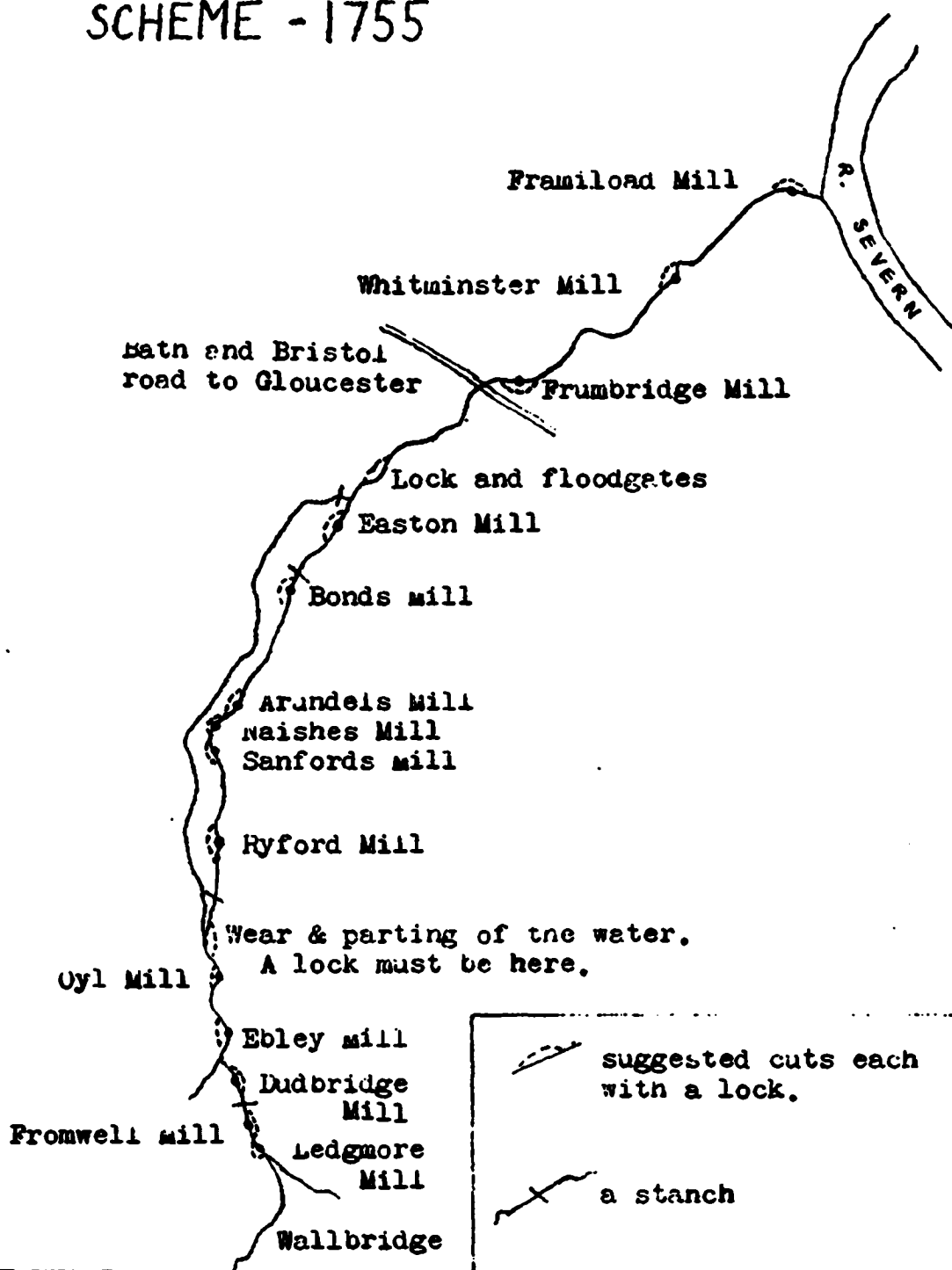
Faced with this opposition either Hore or the clothiers who had engaged him made concessions. To placate the owners of meadow land along the canal the line of the cut was changed. Hore himself wrote "in order to prevent such damages I humbly conceive the intended new cut may be made from Wallbridge on the North of the Old River to below Dond Mill and to be continued therein (widening the same to the proper width for navigation) near unto the head of Easton Mill and by making a short cut and erecting a turnpike or lock to pass by the last said mill and to fall again into the old river at a convenient distance below the said mill tail and to be continued therein unto near Fromebridge and from thence a new cut to be made on the south side of the Old River directing its course towards the rising ground so as to fall into a large ditch that parts the parishes of Whitminster and Frampton and so fall into the Severn"⁽⁸⁾."

The length on either side of Easton Mill, where the old river was to be used, had to be straightened and widened. Hore reported of his new scheme that Mr. Small, of Wheatenhurst, one of the meadow owners was "well satisfied of the method proposed for laying down the new intended cuts to be made through his estate"⁽⁹⁾", but Small insisted that a clause be inserted in the Bill to prevent certain parts of his estate being cut through if the line of the cut was changed. Another clause offered as bait to the owners of land within five miles of the canal was the right to carry dung and manure on the canal without payment of toll.

A clause was also inserted in the Bill that no barges should be used on the canal in the dry season from 14 August to 15 October without the permission of the major part of the millowners concerned. This was a small concession in reality since at that time there was rarely enough water in the Severn for trows to reach Framilode and there would be no cargoes to carry up the canal.

With these concessions the Bill was passed in 1730. Although it proclaims itself to be an Act for making navigable the River Stroudwater (or Frome) and has misled many later historians and even a special jury at Gloucester Assizes, it gave permission to dig

JOHN DALLOWAY'S SCHEME - 1755



what would have been one of the earliest canals in Britain. Thomas Bond and the other undertakers were to complete the project within eight years of 24 June 1732. They would then be able to levy a toll of 3/6 a ton on coal, corn, malt or meal, and of 5/6 a ton on all other goods carried on the navigation.

The Act also created a body of River Commissioners who included almost every local inhabitant within an estate worth more than £50 a year or a personal and real estate valued at over £2,000. The Commissioners were to settle any disputes which might arise over the value of land taken for the canal. If the undertakers failed to complete the work by 1740 any land acquired would be forfeited to the Commissioners who might appoint other undertakers in their place. No record of what happened has survived. In 1774 William Dallaway, then aged but still interested in the canal, stated that "the Undertakers did not begin to make the river navigable ... nor was there any public meeting of the Commissioners⁽¹⁰⁾." There is no reason to doubt his word but the reason for the inactivity remains unknown. Perhaps £20,000, Hore's estimate of the cost, could not be raised; perhaps the owners of the mills on the lower part of the Frome succeeded in stopping the project.

II - 1755 to 1761

Before giving an account of later public efforts to make a Stroudwater navigation, a private venture should be noted. About 1740 Richard Cambridge of Whitminster House, an ingenious amateur boat builder, poet and gentleman who had a pleasure barge designed like a Venetian gondola built for navigating the Severn, obtained permission from his neighbours to make the lower part of the Frome navigable. The roads round his house were so impassable that he determined to solve his own transport problems by making the river navigable from Framilode Mill a few hundred yards from the Severn to Fromebridge Mill near the Bristol road. How he passed the mill at Whitminster is unknown. By this route, however, he transported both the Prince of Wales when he came to dine on the Severn gondola in 1750 and also stone for his building operations at Whitminster⁽¹¹⁾.

In 1751 Cambridge left Whitminster for more fashionable Twickenham and thus had no interest in the next attempt to provide a waterway from Stroud to the Severn which was dominated by the idea that whatever was done must not deprive the millowners of water.

In 1755 John Dallaway of Brimscombe⁽¹²⁾ revived interest in the possibility of a navigation. In the early part of that year he raised a small subscription to finance a new survey of the river by Thomas Yeomans. He worked out a scheme which would cost only £8,145 and suggested that if £10,000 was subscribed this would cover any unexpected extra expense⁽¹³⁾.

The Frome was to be deepened and widened to allow trows and other boats up to 70 tons burden to be hauled up to Fromebridge, while smaller boats of half this size would be able to pass up the Stonehouse branch of the Frome to Wallbridge. Each of the fourteen mills was to be by-passed with a lock from the millpond into a short cut which led into the river again a short distance below the mill dam. In this way only a lockful of water from the mill's supply was taken for every vessel. The locks must therefore have been pound locks. Even this slight loss of water through the locks was to be compensated for by a two acre reservoir to be dug in a field at Wallbridge. This was to be filled every Sunday when unwanted water passed the idle mills and "a proper bore" would let the water out continually from 1 a.m. Monday to 12 p.m. Sunday. If Dallaway's estimate of the traffic to be expected was correct, the mills would receive more water from the reservoir than they would lose by the locks. He estimated that a toll of a shilling a ton up to Fromebridge and a further shilling a ton up to Wallbridge would enable the undertakers to pay 5% on the capital cost and also establish a sinking fund to pay off the capital in 17 years.

On 13 August 1756 Dallaway, himself a Commissioner, called a meeting at the George Inn, Stroud to appoint new Commissioners in place of some 160 who had died since the Act of 1730. Only ten Commissioners were present and, as these were insufficient to make new nominations, the meeting was adjourned until 3 September when the new appointments were made. However, a prolonged dispute between the clothiers and their weavers prevented the clothiers from the mills in the upper Stroudwater valleys from showing the enthusiasm with which they had supported previous schemes. Few Commissioners attended meetings and when they did they could agree upon nothing so that five successive meetings were adjourned with no business transacted. At last, on 2 March 1758, the Commissioners adopted John Dallaway's plan and appointed a committee of twelve to draw up articles for a subscription of £10,000. By the end of May £6,900 of this had been promised⁽¹⁴⁾.

About this time some of the subscribers began to consider the merits of a rival scheme that was less objectionable to the mill owners because no locks would be needed and therefore no water wasted. The inventor, Thomas Bridges of Towkesbury, was considered by some to be a "chimerical crack-brained fellow"⁽¹⁵⁾ but three local men, John Kenmett, Arthur Wynde, and James Pinnock were sufficiently persuaded of the practicality of the invention to offer to undertake the navigation with Bridges as their partner.

Bridges idea was that "he cuts a little canal from the water below the mill to approach towards the canal or pond above the mill; but keeps these upper and lower canals entirely asunder by means of a strong bank or wall about twelve feet thick. On this bank he erects a crane or rather a double crane (for it has two

necks or levers) and he causes them to operate either singly or jointly at his pleasure. These necks are made to turn either to the upper or lower canal as they are wanted ... His next process is to construct a boat on the lower canal exactly of the same dimensions with a boat on the upper and in both boats he places six, seven, eight, or more frames, capable of holding about one ton weight of goods each and of being lifted up by means of strong hooks with all the goods upon them⁽¹⁶⁾." The boatmen would operate the cranes so that using both cranes the loads would be interchanged and proceed to the next mill with no loss of water.

On 4 August 1758 the Commissioners appointed Kemmett, Wynde, Pincock and Bridges as undertakers with the same powers as those given to the undertakers in 1730 and with the same condition as to forfeiture if the work was not completed by Ladyday 1761. When the work was completed, the machines and navigation were to be sold to the Commissioners for £10,000 and any improvements in the machines introduced on any other river were to be put into practice on the Frome at the undertakers' expense⁽¹⁷⁾.

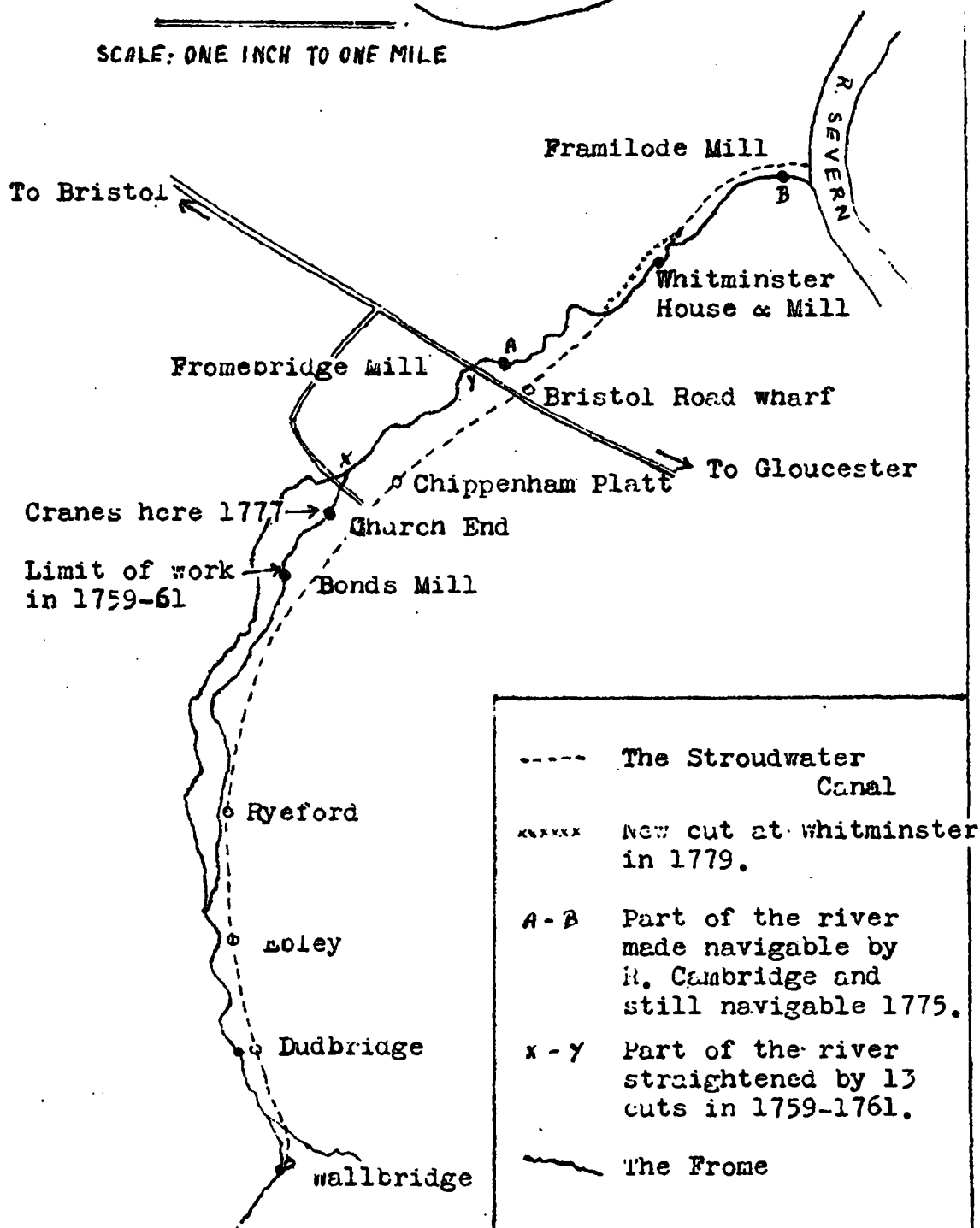
As soon as negotiations to acquire sites for the cuts and cranes began, hostile millowners were found to be questioning the authority of the undertakers to erect their machines at the mills on the lower part of the Frome. In January 1759, therefore, the Commissioners agreed to apply for a new Act to amend that passed in 1730 and to contribute £150 towards the cost. This payment was to be deferred until the work was completed. The Act was obtained quickly and with surprisingly little opposition.

Work began in the summer of 1759. By April 1761 the undertakers, realising that the work would not be finished by Ladyday, pleaded for more time by reason of the delays in obtaining an Act of Parliament. The Commissioners extended the time allowed from two to eight years, the time allowed the undertakers in 1730. However, the undertakers ran short of money, work halted, and in August the Commissioners gave permission for the machines and works already executed to be sold to anyone willing to complete the navigation. No offers were received.

There is no detailed account of the extent to which the undertakers completed their scheme. Dean Tucker of Gloucester wrote in April 1760 "As far as they have hitherto proceeded, the success has answered their utmost wishes and the river is made navigable this second year of their undertaking for some miles at the expense of one fourth of what had been thought necessary for such work. They now carry goods at so cheap a rate as to induce the ignorant to believe they are losers⁽¹⁸⁾" This leaves no doubt that the scheme was actually operated on part of the Frome. As late as 1775 Purnell & Co., who owned mills at both Framilode and Fromebridge, were said to avail themselves of Kemmett and

THE FROME AND STROUDWATER CANAL

SCALE: ONE INCH TO ONE MILE



Company's improvements of the river and reap the benefits of navigation to their own works." (19) Statements made by mill owners in 1775 suggest that the undertakers had raised the mill dams to give greater depth of water. This would have entailed raising the banks of the stream as well in places and in 1776 John Taylor, a local farmer, stated that "the water being raised above the level of the land by banks oozed out at the foot of the banks and made thirty or forty acres a morass." (20)

Assuming that the undertakers would commence work at Framilode on the Severn so that each section of the work could be used as soon as it was completed, there would have been only four mills to pass in nearly five miles, so that the scheme would have been easier to operate there than nearer Stroud where the mills were more closely spaced. To the East of the Bristol Road the stream was straightened by a series of cuts, a sketch map of which was made in 1775 from information supplied by Kemmett himself. (21) Today these cuts can still be partially traced in the fields or seen more clearly by comparing the course of the Frome with the Frampton-on-Severn parish boundary which followed the old course of the river.

In 1775 John Dimmock, a Stonehouse clothier, stated that work had proceeded as far as Bonds Mill and there stopped. (22) This is confirmed by the existence of two cranes belonging to the Commissioners in 1777 at Church End and Common Platt. (23) These are difficult to account for unless they are cranes erected by the undertakers and forfeited to the Commissioners when the work was not completed. There is no evidence that any work was done upstream from Bond's Mill.

The undertakers continued to work boats up the Frome as far as Bond's Mill until the spring of 1763 when the undertaking was abandoned and trade on the Frome ceased. (24)

III - THE STROUDWATER CANAL

In 1774, seven years after the rights of the undertakers had expired, William Dallaway had the Frome resurveyed by the same Thomas Yeomans who had carried out a survey for William's father, John Dallaway in 1755. He suggested a canal which would run alongside the Frome and thus avoid interference with the mill dams on the lower Frome. At this time there was no canal in southern England yet Dallaway planned to bring trows of seventy tons burden right up to Wallbridge by a canal 42 feet wide and six feet deep. The River Commissioners were assembled, new men appointed in place of those deceased, and permission obtained to initiate a subscription to make a canal as far as Wallbridge. Messrs. Priday and Dadford made a survey and estimated the cost at £16,750. To

allow for unexpected expenses subscribers were asked to promise £20,000 in £100 shares. (25)

Before further steps were taken the legal authority under which a canal could be built needed clarification. The 1730 Act had permitted cuts to be made: the 1756 Act had forbidden locks to be constructed; was a new Act needed? Counsel's opinion was that the 1756 Act was a temporary emendation of the 1730 Act and had expired in 1767 with the powers given to the undertakers. The 1730 Act was still valid and construction could take place under it. (26)

After this opinion was obtained, a Committee of nine Stroud subscribers, including Dallaway, agreed with the Commissioners to "execute a cut in the nature of a canal" within eight years. (27)

By 2 February, when an enthusiastic Committee met at Framilode at 9 a.m. to see the tide come up the Severn and select a place for the first tide lock, most of the line of the canal had been staked out as far as the Bristol Road, the land measured and negotiations opened for its purchase, and an advertisement inserted in the Gloucester Journal inviting tenders for digging from Framilode to the Bristol Road. The clay was being examined to test its fitness for brickmaking, rough ashlar, seasoned oak and green elm were being sought for the locks, and Thomas Bartlett, newly appointed mason, was searching for suitable stone at Gatcombe and Tintern.

About this time the Committee realised the magnitude of their undertaking and the need of the gentlemen, clothiers, plumber and tallow chandler who formed the Committee for an engineer to oversee the work. The necessity became even clearer when it was pointed out that they had planned locks wide enough to take sixteen foot wide boats but a canal where two such boats could not pass.

On February 23 1775 John Priday was appointed Engineer and Surveyor at a salary of £100 a year for which he promised to devote at least a quarter of his time to the work. Priday was instructed to start cutting the canal at once. He ordered planks for barrow ways, and special spades; he gave instruction to John Gleaves and Robert Perry who were to be in charge of the cutters, and cutting began late in March 1775.

The Committee were enthusiastic and at times just a little careless: one piece of carelessness had disastrous consequences. On March 8 Mr. Yates gave permission for the cutters to move onto his land including a piece of permanent pasture known as Carters Close at Framilode. Arkell, the tenant, did not object to work commencing. On 4 April John Gleaves and his gang moved onto Carters Close and by the 19th April had cut all but the last twelve

yards. Then a protest was received from William Purnell of Framilode Mill. Purnell stated that he had leased Carters Close and sublet to Arkell. The Committee, knowing his opposition to the canal, were convinced that Purnell had bought the land in secret and plotted to stop their canal. In fact Purnell's lease is dated 10 August 1767 long before the scheme had been projected. Purnell's permission had not been asked before the cutters entered Carters Close⁽²⁸⁾.

Purnell and the other millowners who had opposed the canal but had found themselves powerless against an Act of Parliament saw that here was an opportunity to question the legality of the whole scheme. A meeting of those against the scheme was held on 10 July. In the same month Purnell, complaining not only of trespass but also that the canal was illegal since the Act of 1730 under which it was being built was an Act to make the river navigable not to make a canal, obtained an injunction against the Committee. On 4 August the case was tried before a special jury at Gloucester Assizes. The decision of the jury was that the Committee had exceeded the powers of the 1730 Act.⁽²⁹⁾ A week later after frantic discussion the Committee ordered all work to be left except Framilode Lock which would be damaged by frost unless finished before winter. When this was done all the workmen were stood off and work came to a standstill.

On 24 August a special general meeting of Subscribers decided to obtain a fresh Act of Parliament to authorize a canal. Their case was simple; making the Frome navigable would interfere with the mills and muddy the water used to wash and dye wool and, even if accomplished, would soon be useless because of the gravel shoals that accumulated rapidly in some places. A canal was the only possible answer. It would cheapen transport, thereby reducing the cost of food and coal in the Stroudwater valleys. Coal in winter, it was forecast, would be reduced in price from 24/- or 25/- to 15/- a ton as soon as the canal was opened.⁽³⁰⁾

The case for the opponents was equally simple - landowners would lose 120 acres of good land to the canal and have a great deal more made marshy by water oozing through banks of the new cut; millowners, deprived of water, would be unable to keep their mills working.⁽³¹⁾ This secondary statement was hotly argued.

To answer this objection the Committee planned to make two of the canal levels two or three feet deeper than was necessary, the extra depth would act as a reservoir which could be filled on a Sunday with water which was unused since the mills were not working. Each of these levels would contain eighty locks of water which could be used during the week without taking any water from the Frome. Traffic was estimated at no more than six barges a week so that, even allowing for leakage, the levels would hold far more surplus water

than was needed to work the canal.

The millowners on the lower part of the Frome protested at this idea. They said that the water which ran past the mills in the upper Frome valley on Sunday was the water that worked their mills on a Monday. If the Sunday water was diverted into the canal, their mills would be idle on Monday. Benjamin Grazebrook, the Committee's Clerk conducted a series of experiments to find out how long it took for water to pass down the Frome and to estimate the volume of water in the river from the time taken to fill a mill pond. His figures proved conclusively that the millowners were wrong - the canal would not seriously reduce their useful water supply. (2)

In March 1776 the Act to amend the Act of 1730 was passed. Preparations for work to be resumed began immediately: proposals for cutting the canal as far as the Bristol Road were sought and timber and stone contracted for. However, William Purnell of Framilode Mill was not easily persuaded to allow cutting to commence once more in Carter's Close. The new Act of Parliament said that agreement as to the price to be paid for land must be reached before cutting began. Purnell asked the outrageous sum of 50 guineas for the small part of the close required. By early May the Committee had raised their offer to £40 and were considering summoning a meeting of the Commissioners set up in 1730 to arbitrate in such cases. On 16 May, after being informed that Purnell had sufficient friends among the Commissioners to gain a verdict in his favour, the Committee agreed to his price.

Even now work did not proceed smoothly. The Committee were always interfering in the work of the Engineer. In May Mr. Friday, the engineer, was given notice and in July Edward Lingard was appointed in his place.

Soon afterwards Carter's Close was cleared at last, stop gates put in and the first few hundred yards of the canal filled with water. It was too shallow in places. Lingard drained it and deepened the cut, he fetched navvies from as far as Warwickshire and Leicestershire so that by September a hundred men were working in four gangs between the Severn and the Bristol Road.

The method of working was to nick out the line of the cut with a spade. Each gang was then allocated a section. They took off the turf and sometimes the top soil and then digging proceeded until the canal was roughly the correct depth and the banks the right height. Under the Surveyor's supervision the banks and bottom of the canal were then levelled and a small stream of water let in so that clay could be puddled ready to line the banks and bottom. Puddling was normally done by trampling with clogs. The banks were then recovered with turf or sown with white clover.

In December the canal was completed as far as the Bristol Road, crossing from the south to the north bank of the Frome by way of Whitminster millpond. On 17 December the first load of coals was landed at the Bristol Road wharf⁽³³⁾ although there were soon complaints that the coal merchants did not reduce their prices.

Cutting the next section up to Chippenham Platt began in the autumn of 1776 but money was short and labourers hard to get so that progress was slow. In addition defects arose in the section already completed, Bristol Road lock was leaky, in Pool field the banks oozed, the parapet of the new Bristol Road bridge had to be reconstructed. The blame for the defects and slow progress fell upon Mr. Iingard. The Committee began ordering him to carry out specific things, to hang the lock gates at Westfield lock, to journey twice a week along the whole length of the canal to inspect the work. Iingard ignored their orders and was dismissed on November 5, 1777.

Mr. Dadford was called in to advise until an engineer was appointed but he soon pleaded that he had not sufficient time to do what he was asked. Thomas Fruen was then appointed engineer but failed to give satisfaction and was dismissed three months later. After that Benjamin Grazebrook, the Clerk, supervised the rest of the construction.

By February 1778 the canal was open as far as Chippenham Platt and work had commenced on the next section up to Ryeford. This section was completed in January 1779. By this time the Committee had only £830 left out of the £20,000 originally subscribed and a further £10,000 raised later. Some of the subscribers agreed to lend £2,000 to finish the work so that no stoppage occurred.⁽³⁴⁾ The final length was completed in July 1779 and on 21 July the first boat to travel the length of the canal was the Committee's own barge built specially for the official opening.⁽³⁵⁾

Even before the canal was opened it was found unsatisfactory in the stretch that passed through Whitminster Mill pond: the depth of water varied and shoals appeared. In May 1779, before the official opening, the Committee decided to make a cut by the side of the mill pond and to convey the Frome under the canal by four trunks each five feet wide and four feet high made out of three inch elm plank. This was not completed until 1780.

The Stroudwater Canal took four and a half years to construct and had cost over £33,200⁽³⁶⁾ at the time of the official opening. Yet it was only a little over eight miles long and included no major engineering difficulties, no tunnels, no long aqueducts, and little deep cutting. The reasons for this seem to lie in lack of experience of canal building and lack of planning in detail. No one person was responsible for planning and carrying into effect the whole scheme. None of the engineers employed was carrying out a

plan he had helped to make and often had to work with only the barest guidance as to the line to be taken. Bridges and locks were often made by sub-contractors who had no connection with the Engineer and do not seem to have been under his control. As late as March 1778 Thomas Fruen was suggesting that an additional lock might be necessary and was busy taking levels to find out for certain whether it was needed. One lock was actually commenced on the wrong level and was thereafter called Under Lock. Perhaps it was fitting that, after a succession of Engineers, the work was completed under the supervision of Benjamin Grazebrook, by profession a plumber. (37)

NOTES

1. Evidence of Edward Baghot printed in Journal of the House of Commons Vol. 21 page 437.
2. "Taylors Last Voyage" p.13.
3. Reasons offered against a Bill entitled "A Bill for making the River Stroudwater in the county of Gloucester Navigable."
4. Journal of the House of Commons XI p.711
5. The Parliamentary debate is discussed by Willan in "River Navigation and Trade in the Severn Valley 1600-1750" (Ec. Hist. Rev. VIII p.72 See also Journal of House of Commons Vol. 21 p.p. 437-8.
6. The preamble to the 1730 Act.
7. Reasons offered against a Bill entitled "A Bill for making the River Stroudwater Navigable".
8. D1180/5/1 All references in this form are to documents in the Gloucestershire County Records Office.
9. D1180/5/1 Letter to Thomas Bond, clothier.
10. D1180/5/4 See also D1180/6/2 Affidavit of John Dimmock of Stonehouse.
11. The only account of this venture is in "The Works of Richard Owen Cambridge" pp xi & xii. For the visit of the Prince of Wales see the Gloucester Journal 24 July 1750.
12. For a note about the Dallaways see B.G.A.S. Transactions LXXIII pp 216-227.
13. The scheme is described in "A scheme to make the River Stroudwater Navigable from Framilode to Wallbridge near the town of Stroud, 1755."
14. This paragraph is based upon D1180/CI/1
15. Annual Register 1760 p.143
16. "Improvements and Savings in Inland Navigations exemplified on the River Stroudwater" in Annual Register 1760 pp 142-4.
17. D1180/CI/1.
18. Annual Register 1760 p.142-3.
19. "The Case of the Stroudwater Navigation" and D1180/6/2.
20. Evidence given before the Committee of the House of Commons 8 February 1776 D1180/5/1.
21. D1180/1/1 14 Nov 1775. The Map is D1180/10/1.

22. D1180/6/2 Affidavit of John Dimmock.
23. D1130/1/1 31 March 1777
24. Gloucester Journal 18 April 1763. A later engraving in "The Works of Richard Owen Cambridge" (1803) appears to show a boat being hauled on the River Frome.
25. D1180/5/4.
26. D1180/5/4.
27. D1180/Ci/1 (29 Dec. 1774)
28. The whole dispute is documented in D1180/6/2. Purnell's lease is in Gloucester City Library. R.135.1.
29. Gloucester Journal 7 August 1775.
30. "Reasons against the Old Act" by W. Dallaway (D1180/5/1) and "The Case of the Stroudwater Navigation, Gloucestershire" (1775).
31. D1180/5/3
32. Grazebrook's notebook is in D1180/5/1.
33. D1180/1/1
34. The Acts 1730 and 1776 did not allow money to be raised on the security of the work already completed.
35. An engraving of this boat in front of Stonehouse Church was made for Bigland's "Gloucestershire" but not used.
36. £20,000 (original subscription), £10,000 (additional subscription) £2,000 (loan from subscribers), over £1,200 from the tolls taken before July 1779. Additional expense was incurred later for the Whitminster cut, warehouses, and lock keepers cottages.
37. The whole of the last chapter is based upon the Minute Book of the Committee (D1180/I/1.)

BIBLIOGRAPHY

Most standard histories of canals and river navigations include some account of the Stroudwater Navigation. The fullest modern account of the early attempts is T.S. Willan: River Navigation and the trade of the Severn Valley 1600-1750 (Ec. Hist. Review VIII) and of the later canal, C. Hadfield: The Canals of Southern England.

Two contemporary accounts, J. Dallaway: A Scheme to make the River Stroudwater Navigable from Framilode to Wallbridge near the Town of Stroud (1755) and J. Tucker: Improvements and Savings in Inland Navigation, exemplified on the River Stroud (Annual Register for 1760) are also useful.

A number of broadsheets were published in 1729 and 1730 and also in 1775 in connection with the disputes with the millowners in

those years. Copies of these may be found either in the Gloucester City Library or the Gloucestershire Record Office.

The Records of the Stroudwater Navigation Company have been deposited in the Gloucestershire County Records Office (D 1180). The most generally useful records for the purpose of this essay are the Stroudwater Commissioners Minute books (C/1 and /2), the Minutes of the Committee of Subscribers from 1774 (1/1), various plans and maps (10/1, 10/2, 10/3), two bundles of miscellaneous papers (5/1 and 5/2), a bundle of papers relating to the Act of 1776 (5/3) and details of the dispute with Purnell in 1775-6 (6/2).

GLoucestershire SOCIETY FOR INDUSTRIAL ARCHAEOLOGY

KENNET and AVON CANAL EXCURSION, 24th JULY 1965

1. History

The Kennet and Avon Canal was opened for through traffic in 1810. It runs from Bath to Newbury and is 57 miles long. As a broad or barge canal it is built to carry barges up to 60 tons, though barges carrying 80 tons and drawing 4'6" navigated it.

Although the idea of joining the Thames to the Bristol Avon had long been thought of, it was not until the Canal Age that it became a practical proposition. However by this time the Kennet had already been made navigable from the Thames at Reading to Newbury and the Bristol Avon to Bath. The formidable task of crossing the high chalk downlands between the Thames and Avon involved raising the canal 404 feet from Bath to the summit level at Savernake and lowering it 210 feet to Newbury. This involved 79 locks including the great flight of 29 locks at Devizes to lift the canal from the Avon valley to the Vale of Pewsey.

The canal was engineered by John Rennie. Construction had started in 1796 at a time of rising prices and the cost was much greater than expected: £950,000 compared with an estimate of £377,000.

Coal from the Somerset and Gloucestershire coalfields provided the basic traffic. This came via the Somersetshire Coal Canal which joined the canal at Limpley Stoke, while coal from the Gloucestershire field came along horse tramroads

to the Avon. The eastward movement of coal formed a local traffic and deliveries were made at a number of wharves along its course. Heavy long distance traffic included building material, lime, corn and cheese. The Wilts and Berks Canal branching off at Semington provided connections with Swindon and Abingdon. Fly or express boats for light goods ran to a time table. In 1830 three fly boats plied daily in each direction from Bradford on Avon to Bath, Bristol and London. Passengers were carried but usually these services were occasional. In 1813 a team barge passed through and in 1816 a French packet boat traversed the route from coast to coast. In 1837 a 'Scotch' boat with 1st and 2nd class cabins and a string band made trips daily from Bradford-on-Avon to Bath and back.

The coming of the G.W.R. in 1835 introduced partial competition and a sharp fall in tolls, and the subsequent proposal to build a railway alongside the canal from Reading to Bath sealed its fate. In 1852 the canal was bought by the Great Western Railway who continued the carrying business until 1873. The coal traffic from Somerset was diverted to rail from 1874 and by 1906 there was almost no commercial traffic with Wiltshire. In 1947 the canal became the property of the British Transport Commission and by then the canal had ceased to be navigable for through traffic. Today the canal is the responsibility of the British Waterways Board, Southern Region. An independent voluntary organisation, the Kennet and Avon Canal Association, exists to promote the preservation and resuscitation of the canal. It publishes "The Butty", a quarterly review.

2. Some Features of the Wiltshire Sectors.

The Summit

An important function of the summit level or pound is as a reservoir from which to replenish water losses from the canal such as seepage, evaporation and downhill flow through the locks. This summit level, at 450 feet, is 3½ miles long and is the shortest in the country. It was specially deepened. Originally it was proposed to tunnel under Savernake Forest from Crofton to near Wootton Rivers, nearly 4 miles, but the idea was abandoned and the highest gradient was crossed by an additional 4 locks up to each end of the present summit level, a deep cutting near Savernake and the Bruce Tunnel of about 400 yards.

The Crofton Pumps

The Summit pound is replenished by the Crofton pumps which draw water from Wilton Water, a lake specially created by

damming the headwaters of the little River Dun, a tributary of the Kennet. As the summit level lies to the west of Wilton Water it has been necessary to connect it to the outflow from the pumps by an open leat a mile long. In the heyday of the canal pumping was more or less continuous.

The pumps are served by two beam engines. No. 1, built in 1801 for the West India Dock Co. by Messrs. Boulton, Watt and Co. of Soho, Birmingham but diverted to the canal in 1802, began regular pumping in 1809. No. 2 Engine ordered from the same firm in 1810 was more powerful. It began work in 1813. Both engines were originally single acting employing Watts' condensing cycle with steam at $4\frac{1}{2}$ lb p.s.i.

No. 1 Engine has a bore of 36" and a stroke of 8' 0" and operates a $26\frac{1}{2}$ " bore bucket pump at the bottom of a well connected to Wilton Water by a tunnel. The water is lifted 40' 0".

No. 2 Engine has a bore of 42", a stroke of 8' 0" and operates a 30" bore bucket pump.

In 1844 both engines were converted to the Cornish cycle and the pumps improved. As far as is known the original beams were of wood and the changeover to iron made at this time. The Cornish cycle used the higher steam pressures of 20-25 lb p.s.i. In 1949 the pumps were tested. No. 1 Engine produced 37.6 h.p. with a flow of 2340 g.p.m. Steam pressure No. 1 was 19.5 lb p.s.i., No. 2 20 lb p.s.i.

The Bruce Tunnel

So called after the family name of the Marquis of Ailesbury, the owner of Savernake Forest. The barges were pulled through manually by means of wall chains.

Ladies Bridge

Canal builders were constantly obliged to join together with bridges land that they had divided. Ladies Bridge does this. It bears the date 1808 and is attributed to Rennie. Landowners sometimes insisted on canals being disguised as lakes when passing through their parks. Whether this was the case here is not known but this fine ornate bridge marks the entrance to a lake on the Wilcot estate.

Honey Street Wharf

Considered by Pevsner the best bit of canal scenery in Wiltshire. The clock face on the weatherboarded turret bears the date 1854. A print of 1873 shows timber yards on both sides of the canal.

Devizes Locks

This flight of 29 locks is the second largest in England. It was lit by gas in 1829. The locks have side pound reservoirs. At the top of the flight there begins the 15 mile pound that extends to the locks leading up to the summit level.

Dundas Aqueduct

A fine piece of architecture in the classical style of the early 19th century. It crosses the Bristol Avon and the railway and is named after Charles Dundas, the principal promoter of the canal.

Claverton Pumps

These pumped water from the Avon to the canal. They are of beam engine design and are powered by a large undershot waterwheel. The wooden patterns for the iron beam castings are still in the pumping station.

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Contributions and letters for future issues of the Newsletter will be welcome and should be sent to the HON. EDITOR, G.N. CRAWFORD, c/o COUNTY ARCHITECT'S DEPT., SHIRE HALL, GLOUCESTER.

The Editorial does not necessarily express the views of the Committee.
