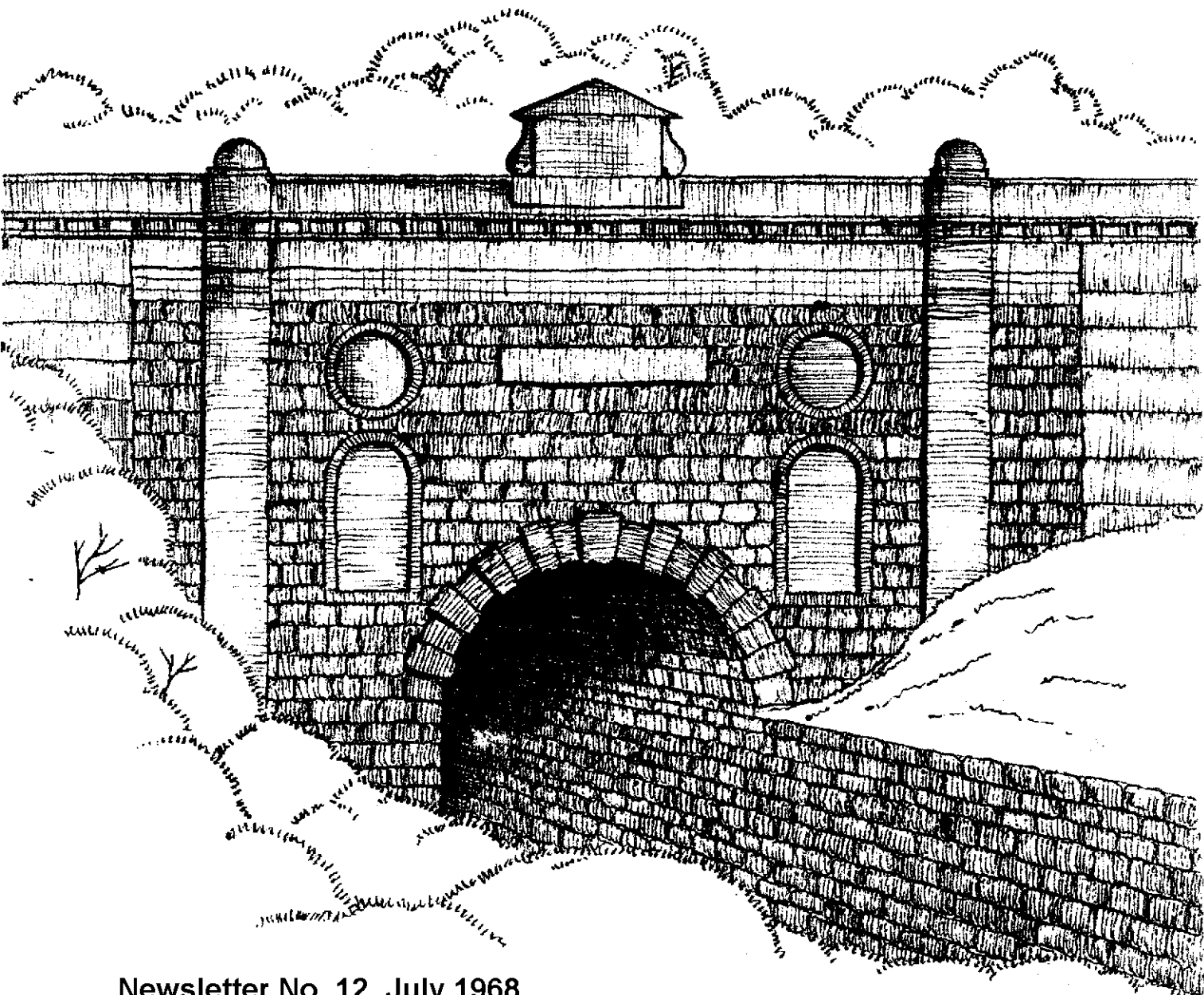


THE NEWSLETTER OF
THE GLOUCESTERSHIRE
SOCIETY FOR
INDUSTRIAL ARCHAEOLOGY



Newsletter No. 12 July 1968

GLoucestershire SOCIETY FOR INDUSTRIAL ARCHAEOLOGY

NEWSLETTER NUMBER 12

JULY 1968

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EDITORIAL

A number of pages in this twelfth issue are devoted to surveying in the hope that it will encourage members to undertake recording work. In spite of several appeals it must be admitted that your Society has not been very successful in attracting members to take part in organised fieldwork; it seems that most industrial archaeologists are happier carrying out research and recording on their own, or with a friend or two.

Unless the building or site is extremely small it is impossible accurately to record measurements by oneself and a member wishing to make a survey should look for a kindred spirit in the list of society members, or contact one of those on the committee.

To some members the information in this article on surveying will be known already and for those members notes concerning metric measurements have been added. Very shortly all our recording will have to be carried out in metres and millimetres (centimetres and decimetres have been omitted for clarity), litres, kilogrammes, hectares (instead of acres), newtons (force), joules (energy) etc. I think members will quickly get used to metrication but the principal difficulty will be comparing metric measurements with those in the old imperial measurements. This is especially the case when two units are involved; for example kilogrammes per cubic metre compared with pounds per cubic foot. Soon no doubt we shall all have diaries with numerous conversion tables !

Finally, our Chairman has asked me to remind you that it is vital that we continue to fill in the Council of British Archaeology (C.B.A.) report cards, recording any I.A. items we come across in our travels. If necessary a survey with dimensions can be roughly drawn on the blank reverse side of the card.

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

CONTRIBUTIONS and LETTERS for the next issue will be welcome and should be sent to :

Hon. Editor, G.S.I.A. Newsletter, G.N. Crawford,
c/o County Architect's Department,
Shire Hall, GLOUCESTER.

DUE ACKNOWLEDGMENT SHOULD BE GIVEN TO ANYONE PUBLISHING AN ARTICLE, OR PART OF AN ARTICLE, INCLUDED IN THIS NEWSLETTER.

SOCIETY VISIT TO THE FOREST OF DEAN

Sunday, 31st March, 1968

A large party of members and their families set off in two coaches on a pleasant sunny afternoon for a walk in the Forest of Dean, ably led by Messrs. G. and P.J. Higgs.

Leaving our coaches at the Cannop crossroads we first of all spent an interesting half-hour walking round the Charcoal Works, erected in 1913 by the Ministry of Munitions. After the sawmill waste has arrived in waggons, it is placed in steel retorts where it is heated at 500°C for 24 or 48 hours by coal fires underneath. The charcoal remaining is next put in steel coolers for 24 hours. Some charcoal is reheated with steam in a rotary kiln and used for batteries etc.

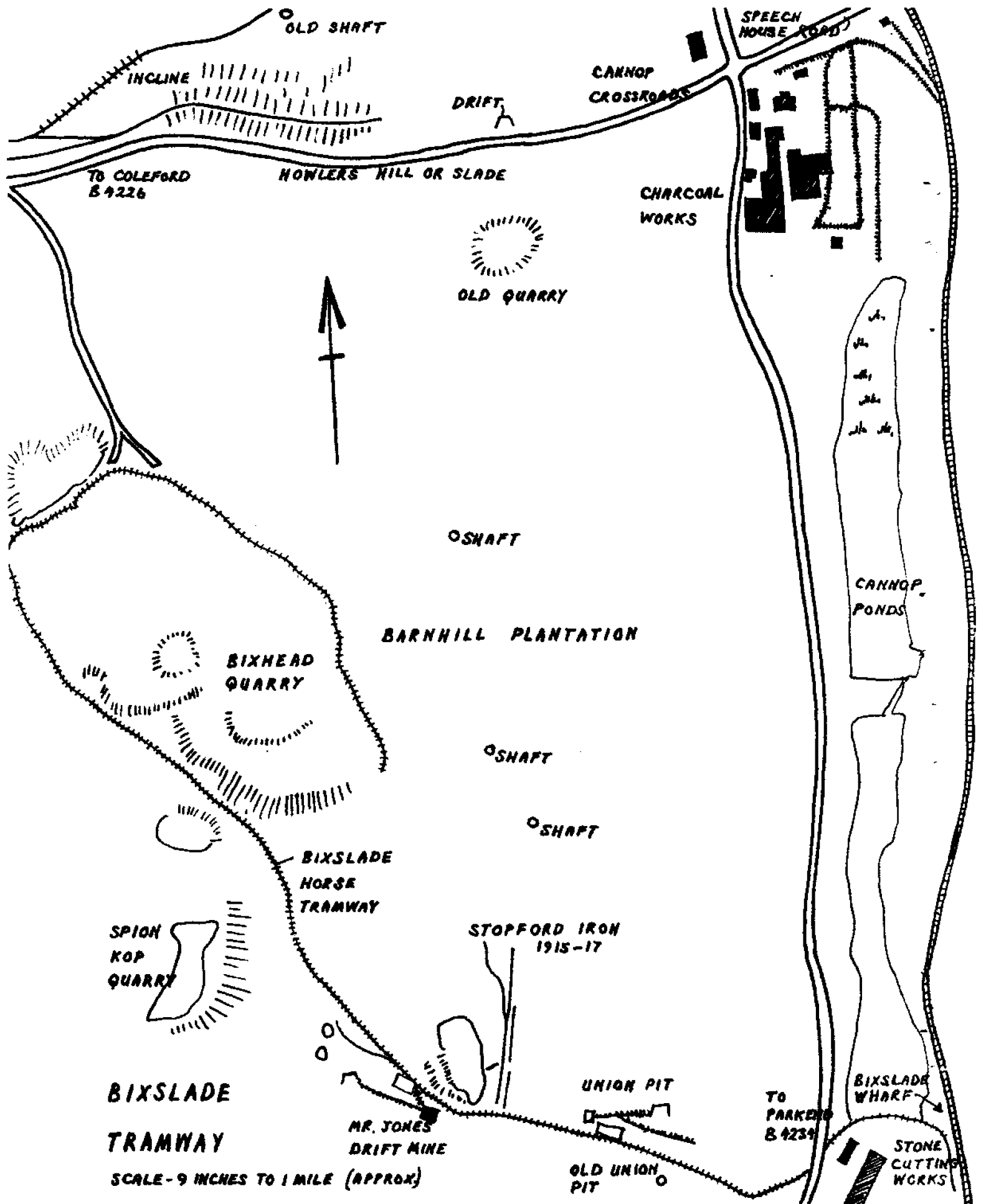
Walking round the back of the retorts, past an open shed with paper bags filled with charcoal, we reached the grading house where the charcoal travels up an elevator and then down through sieves, thus being graded from large pieces down to fine particles. This charcoal is used as a flux in copper smelting and also in the chemical industry.

A short journey in the coaches on the Coleford road took us nearly to the top of Howlers Hill where our walk began in a southerly direction. We soon reached the Bixhead Quarry of the Forest of Dean Stone Company where stone is still brought out for walling, bridges, gravestones, pickling tanks etc. The best stone is approximately 75 feet under the surface so numerous cranes are necessary though only one steam crane is left and this has the jib down.

After walking round the quarries we followed the former track of the Bixslade horse tramway which was laid in 1812 and lasted until 1944. It served these quarries as well as iron and coal mines. On our way down the valley which the tramway followed we passed several coal gales, or free mines, one of which was at that moment being dismantled.

We examined the entrances to the Stopford iron mines which were worked from 1915 - 1917 and then another free mine, Union Pit, where two men produce about 16 tons a week.

Reaching the Cannop-Parkend road we looked at the stone cutting works of the quarries and finished at the site of the Bixslade Wharf where the cut stone was transferred to the railway. The afternoon had shown how, in a fairly short walk, one could see numerous different types of industry hidden in a valley away from the main Forest of Dean roads.



SOCIETY VISITS TO POSTLIP MILLS, WINCHCOMBE,

Saturdays May 4th and 11th., 1968

Two small parties of about twenty members each visited these paper mills on consecutive Saturdays in early May. Before taking us round, a member of the firm of Messrs. Evans Adlard & Co. gave us a short history of the site which dates back to the Saxon period. At first flour mills, paper making was later carried out in winter. It is known that this dates at any rate since 1749. Production records dating from 1850 are still in existence.

Fine grade writing paper was manufactured at first and a middle mill a little distance down the Isbourne Valley made brown wrapping paper. A third mill in Winchcombe produced sugar and blue papers which were a still lower grade. In the second half of the 18th century, Gloucestershire had about 9 paper mills and was the major maker after Kent, while by 1800 there were 16 in the county out of 417 total in England and Wales.

Up to the 1914 - 18 war the mills concentrated on blotting, sample and needle papers. At that time all filter papers were imported from Germany. The shutting off of this source of supply led to the introduction of filter paper making to Postlip and now all papers made are of the filter or absorbent variety. Nearly three quarters of the weekly output of 35 tons go to the motor trade; beer and coffee filter papers form a large proportion of the remainder.

Until the early 1950's the raw material was rags which had to be hand-picked, sorted, all buttons, fasteners etc. to be removed in a first floor room, and then boiled and bleached in a boiler dating from 1870 for 6 hours. Rag sorting was an extremely dirty and unpleasant business. The increasing use of man-made fibres for stiffening and reinforcing purposes, which also had to be removed, together with the rising labour costs, rendered this process uneconomic. Rags were replaced by 'cotton linters' produced in the north of England from imported cotton seeds. Subsequent rises in the price of 'linters' have resulted in increasing use of wood pulp from Sweden, Finland and the U.S.A., together with some esparto grass from North Africa. The pulp arrives in packages of sheets which look like blotting paper and also in loose pulp form.

Long fibres are required for open porous paper. The wood pulp together with water, esparto grass, and colouring if required, is put into 'beaters' which tear the fibres apart. The beaters all work on the same principle; a cylinder approximately 3' deep and 3' in diameter has some 80 to 100 steel bars arranged on edge

around its circumference in groups of 3, each bar separated by a narrow wooden lath with larger strips of wood separating the groups. The steel bars and wooden separators are held tightly to the drum by means of iron hoops engaging square-shaped notches in each end and the hoops are 'heat-shrunk' in position. The drum presses against a 'plate' of some 15 steel bars in the base of the beater and the fibres, in suspension in water, are shredded between the drum and the plate. Each type of filter paper has its own recipe according to the grade required.

After beating the pulp is piped into a 'chest' in which slowly revolving paddles on a vertical shaft keep the fibres in suspension. From the chest the mixture is pumped to the making machine where it flows out onto a continuously revolving belt of fine wire gauze to reduce the water content. It passes under a 'dandy' roller which has raised lettering to provide a watermark if required. By the time it reaches the end of the belt the paper has dried sufficiently to leave the supporting gauze and it then passes round numerous large heated drying rollers. As the warm dried paper is finally wound on the take-up roller it has acquired a noticeable charge of static electricity.

Luckily we were able to see the change-over when one of these rolls was completed. These rolls are then taken to a guillotine machine which cuts the spools into sheets and, on the first floor, squares, rings or circles are cut out by powered hand guillotines or circular cutters etc. Some rolls are taken to a large shed to be coated with a resin (dyed green) to strengthen the paper for the automobile industry. This is then passed through a long heat chamber to remove the solvent and finally trimmed on a 'slitter' to the required size.

Some old plant from the mills has been preserved in the Museum of Papermaking at Maidstone and an old forge bellows went to the Museum of Industry in Birmingham. Various old machines are still in use and a washer bears the date 1854. It has been given a fibreglass lining so in this respect is more up-to-date than a later machine next to it which has a lining of ceramic tiles.

The 'new' building, which contains most of the processes, bears the date 1890 and at the rear we saw the deep pit which contained the original waterwheel. It is a considerable depth (30 ft by estimation) but its length was probably reduced when steam power was installed in the middle of the century. The engine was probably a two-cylinder compound but was scrapped in 1950. We had a look at the present boilerhouse where one of the Lancashire boilers was stated to date from 1880/90. In the first floor of the 'new' building, C.I. columns supporting the timber trusses were inscribed 'J.M. Butt & Co., Iron Founders, Gloucester'. Some smaller buildings which we did not visit were evidently of an

earlier date. Sixteen horses were stabled here to haul coal from ~~Wincombe~~ Station and, before the Honeybourne line was opened, from Beckford or Ashton Under Hill. The stable buildings have long since been converted to company housing. Finally, we visited the mill pond, fed by a small stream, which provides 80,000 gallons an hour for the plant. A spring gives drinking water and it is interesting to note that Postlip or Poteslip means 'slippery pool'.

An old grindstone approximately 5 feet diameter by 1 foot base can be seen set in the wall of the car park. It was used up to 10 or 12 years ago to sharpen the bars in the plates of the beaters and needed two men to operate it. They took a day to grind the 15 or so bars in one plate and a shaping machine is now used to do the job much more speedily.

A book has been written on the history of the mill by Miss Eleanor Adlard, but this account has been based on notes compiled by Mr. N.C. Ferry.

Editor.

SOCIETY CRUISE ON THE BIRMINGHAM CANAL NAVIGATION

19th May, 1968

Sixty members enjoyed a full day's cruise in two narrow boats on canals of the Birmingham Canal Navigation, a day that was ably organised by members of the Staffordshire & Worcestershire Canal Society. Mr. Dunham, their Chairman, kindly brought out his own boat to take the overflow from the other boat, but in spite of this over twenty of our own society members had to be turned away. As it turned out it was just as well that we had this second boat as there were three occasions on which a tow was necessary.

We left our coach at Gas Street Basin, in the centre of Birmingham, to embark and were soon under Broad Street 'tunnel' which is actually made up of a series of bridge widenings. We were soon on Telford's New Main Line to Wolverhampton and passed some of the windings of the contour canal, now a series of loops leaving the main line at intervals, only one of which is now navigable.

Through a loudspeaker we were given interesting details throughout the cruise, such as the fact that all the bridges are named instead of numbered, which is more usual on canals. The

system is now mainly used for carrying rubbish, the commercial traffic having almost ceased, and also supplying water for industry. The boat we were on used to carry coal to London on the Leicester Canal until ten years ago, but is now operated by Canal Transport Services.

At Smethwick we climbed off Telford's route by a series of three locks on to the old canal and, at the top, left the boats to look at Telford's aqueduct below us. A little later on we tied up for lunch at a place where we could see Telford's canal in the Galton Cutting down below and up above the line of the original Brindley Canal.

We next reached the Oldbury area, where the wharves and basins are being destroyed and the canal re-routed for the vast motorway complex linking up the M5, M6 and M1. Then three locks at Spon Lane took us down to the main level again before we disembarked at the now disused flight of six locks at Oldbury. We walked up alongside these to reach the pumping house at the top, 511 feet above sea level and the highest point in the Birmingham Canal system.

Once again we passed boat building and repair yards and around here were the hulks of numerous narrow boats. Whilst on the Tividale Aqueduct we could see below us the entrance to the Netherton Tunnel and a little later on there was the branch canal to the Dudley Tunnel.

Arriving at Tipton and Factory Junction there were three more locks to navigate and more time for exploration while the boats went through them. Incidentally it was here that one of the crew members accidentally slipped into the canal. The following straight stretch of Telford's canal had only been re-opened a week previously after being closed for twelve months while a new concrete aqueduct was constructed over a widened main road.

At Dudley Port Junction, where there is a branch off for the Netherton Tunnel and Stourbridge, we stopped for a short while so that members could visit a recently closed brickworks. Then on to the Netherton Tunnel, $1\frac{3}{4}$ miles long, which has twin towpaths and seven dripping ventilating shafts. The only light now is that provided by the boat but one could always see daylight at the far end.

Coming out into light again we passed another pumping station and were soon at Bumblehole, an intriguing name, where we disembarked for the last time, after a most interesting and adventurous day.

G. N. Crawford.

NATIONAL MUSEUM OF WALES, CARDIFF

After the shipping section a further part of the industrial department, including the basement, has now been opened. In the centre of the room are items like a tinplate trolley, coal and iron-ore trams, tram plates from the Penydarren Tramroad, the light of the South Bishop lighthouse and a large model of a coalmine, shown sectionally.

Along one wall is a series of very fine dioramas showing the Glamorgan Canal weigh lock, opencast copper mining in Anglesey, Dowlais ironworks, Milford Haven oil refinery, Bessemer steel plant in Ebbw Vale and copper mine drainage at Gilfach. In addition there are a large number of excellent models, including ones depicting an early 19th century Welsh colliery with horse gin, blast furnaces at Port Talbot and Penydarren ironworks, Penmaenmawr quarry and Pembroke Dock power station.

In the basement a replica of a life-size coalmine has been constructed. This mine, which has many interesting features, will be better still when the second portion is complete.

G.N.C.

BRUNEL'S TAMAR BRIDGE

Some members will have no doubt seen the announcement that British Rail are to strengthen the Tamar Bridge between Devon and Cornwall at a cost of £80,000. The improvements, including the provision of 24 steel bracing ties, will make the 109 years-old bridge safe for at least another 25 years and will enable it to carry heavy freight trains of up to 3,000 tons. The main idea is to find a market for part of the enormous quantities of china clay waste in the English building trade, using the coarse quartz aggregate in concrete for instance.

G.N.C.

TOUR OF SOME I.A. SITES IN WILTSHIRE & BERKSHIRE

15th June, 1968

This was a tour mainly devoted to railway subjects but I am sure even those members on the coach with only a smattering of railway knowledge thoroughly enjoyed the day, a day which started at the Pendon Museum of Miniature Landscape & Transport, Long Wittenham (S.E. of Abingdon).

At the pleasant village of Wittenham, a team of craftsmen is producing models of the countryside, villages and railways as they used to be in the 1930's. One extensive model nearing completion shows a scale reproduction of a now demolished timber viaduct, by Brunel, crossing a Dartmoor valley, and here we were given a display of beautifully detailed model trains which lasted nearly an hour. One goods train brought forth gasps of astonishment at its length, being comprised of no less than seventy different waggons, and an express passenger train had taken 4,000 hours to build. This latter had over a hundred passengers who could be seen reading their newspapers, eating their lunch etc. all to a scale of 1:76 of the original. The demonstration ended with another passenger train travelling round the circuit, this time in the dark with all its compartments lit.

Another model showed a town built round an imaginary harbour, the Madder Valley layout, and we were shown many of the intricately detailed cottages, ready for the third large model of the Vale of White Horse. In the museum, which is a non-profit making concern, there is also a collection of railway relics dating from 1812. For those members who could not go on this excursion, the museum is open on Saturdays and Sundays from 3 to 6.15 p.m.

Our stay in Wittenham was prolonged by a puncture, but most members utilised the time by having lunch there in the hot sunshine. Moving on, our next stop was at the Wantage Road Station from where a tramroad followed the main road into Wantage. In the town we saw the sites of the tramway terminal and the basin of the Wilts. & Berks. branch canal.

The final stop at Swindon started with a visit to the fine railway museum. One can always find fresh items of interest; this time my attention was drawn to the seal of the Gloucester & Cheltenham tramroad which shows the horse-drawn waggons. After tea, Ian Parsons took us on an interesting tour of the railway housing, an account of which appears elsewhere in this issue, and the day ended with a look at St. Saviour's Church which was built by railwaymen in six months in their spare time. This church is especially noteworthy for its curious steel roof trusses.

Neville Crawford.

CONFERENCE - THE PRACTICE OF INDUSTRIAL ARCHAEOLOGY

Held at Oxford, May 11th

The Council for British Archaeology Group 9 covers the counties of Berkshire, Bucks., Beds., Northants., and Oxfordshire, and the Conference was organised to present and discuss the results of some work undertaken in this area.

The morning session was entitled 'The Approach', when the two speakers revealed that they had in fact adopted a very similar approach, and it was more the scope of their studies that differed. John Carter described a survey of Oxfordshire watermills, ranging in his investigations from a measured survey of a mill with machinery still intact to the location of a shallow depression near a dried-up stream that marked the site of a mill-pond long vanished. Then George Freeston spoke on 'The Industrial Archaeology of Blisworth', a village in Northamptonshire within whose boundaries the remains of early canal, tramway, railway and quarrying ventures are to be found. His subject was presented with a lively enthusiasm backed by a wealth of local knowledge - both essential to a speaker (or writer) seeking to recreate past ways of life for his audience, rather than simply pumping out raw facts.

After lunch, Dr M.J.T. Lewis, Tutor in Industrial Archaeology at Hull University, spoke on 'Fieldwork, Dating and Research'. He made two particularly useful points: "do your bookwork" before getting into the field, lest significant evidence is overlooked in ignorance, and conversely don't waste valuable time surveying microscopic detail where the overall picture only is required. Photographs are generally more useful than a host of illegible minor dimensions on a rain-stained sheet of paper. And on that last point, Dr Lewis advises that all fieldwork should be drawn out neatly, with rough notes made legible, as soon as possible after survey. Anyone like me who has tried to decipher his own field notes after 2 years or more will know what he means !

Examples of cine film recording were then shown : these were made in colour by local cine enthusiasts. One particularly valuable reel showed early machinery in action at Wolverton railway carriage works. Some of this machinery was brought back to life briefly for the filming, and was destroyed soon after as part of the railways' modernisation programme. The value of old photographs in compiling a history was illustrated by a member of the Wolverton Archaeological Society, which has now copied some 4000 pictures loaned by local residents.

In the concluding session, Mr. J. Kenneth Major outlined progress of the National Record of Industrial Monuments, and lamented the slow and irregular return of completed record cards -

something that was reiterated by Mr Rex Wailles who attended the Conference. Mr Major went on to discuss the protection and preservation of industrial monuments. The Civic Amenities Act can, with new planning regulations, provide greater protection but a good case must be made on a basis of facts, not emotion, for listing, protection or preservation. This is where the urgent need to complete the nation-wide survey of industrial monuments becomes apparent, in order that the buildings, machinery, etc. ultimately recommended for listing may be fully representative.

It is possible to draw an interesting comparison between points brought out by this conference and that on the problems of urban recording reported elsewhere in this issue. Common ground in town and country is found in the shortage of time and manpower available for recording. Although subjects for survey differ considerably, obviously the same methods of surveying and recording are available. The great difference as it appears to me lies in the approach of the individual. Interest in country areas is often confined to a small locality, known and studied in detail, and accompanied usually by a very sound backing in local history: what I would call, without the least derogatory tone, the parochial approach.

In the larger urban areas, on the other hand, the very size of the community means that large numbers of buildings and their contents exist and vanish virtually unrecorded, as few townsfolk have that necessary interest in their own place of living or working. From experience of a survey of industrial monuments in London, I would say that coverage of industrial buildings and machinery in Gloucestershire has been more thorough than coverage of their counterparts in London, or at least many areas of London. Which is - for Gloucestershire - gratifying.

Michael N. Bussell

CHELTENHAM ORNAMENTAL IRONWORK WALK

Saturday, 9th March, 1968

Before starting on this walk, led by Miss Amina Chatwin, most members took the opportunity of visiting an exhibition in the Museum, Cheltenham, arranged by the Cheltenham Society in which local ornamental ironwork and street furniture had a prominent place.

Our first stop was a few yards from the Museum in Clarence street to look at the 'shopfront' ironwork over Messrs. Haynes bookshop. Round the corner were the simple pre-1820 balconies

on the Police Station with a dragon and onion lamp-post nearby. Here we walked round the early Royal Crescent, completed 1810, noting the fine balconies and central lampholders.

Through Royal Well Place to the corner opposite Messrs. Lockes Bakery where there is some unusual ironwork of the 1860's on top of the wall round Beech House, all the points or 'flowers' being different. Back along St. George's Street to St. George's road where the very fine Royal Well Terrace, built between 1834 and 1840, attracted our attention. Here is the trellis design but the balcony effect has been somewhat spoilt by the misguided person who added a verandah roof to one. Opposite, Fauconberg House, after 1840 but before 1853, has unusual cast-iron gate posts.

Reaching the Upper Promenade we saw the ornate roof supports on the lower terrace, whilst the paired houses above originally had the cast design shown inverted in L.N. Cottingham's 1823/24 pattern book.

Turning right along Fauconberg road we reached Bayshill road to look at the Royal Parade with its balconies having a heavy cast design, not used in Cheltenham until the 1840's, though there is a suggestion for a similar design in Cottingham. Opposite, a porch railing is similar to a design in H. Shaw, 1836.

At the top of the road, in Queen's Parade, balconies have the heart and honeysuckle design in Cottingham and the Regency railing at Fildes corner, derived from the classic spear, is functional and aesthetically pleasing.

In Montpellier Exchange, the balconies on the Elston Boutique have recently been replaced by Miss Chatwin. Of pre-1820 workmanship, they were originally on Trafalgar Cottage, demolished a few years ago.

The balconies on Messrs. Chamberlaine Bros. were replaced from London road and along Montpellier terrace we saw the heart and honeysuckle design used on short balconies on an end house. There is also a good divider over the porch of Wilson's house.

Through Montpellier Gardens to Imperial Square which is after 1829 but before 1834. The balconies use four different widths of panel interspersed with rods to allow any length to be filled. This is a cast honeysuckle and heart design with all the delicacy of wrought-iron and is used on about 136 houses in the town.

To reach our final destination, Oxford Parade, we walked along Oriel road and through Sandford Park to the High street. At the Parade there are pleasant pre-1820 balconies with conical hoods and a corner house has heavy cast balconies with square heads added after 1845.

continued on page 17 ..

This article takes the form of a chronological summary based on research into the following books : 'Studies in the History of Swindon' by Grinsell, Wells, Tallamy and Betjeman. Swindon Borough Council 1950. 'Locos of the Royal Road' by Chapman. G.W.R. 1936. 'St. Mark's, Swindon 1845 - 1945' by Priests and People. The Swindon Press Ltd 1945. The comments are based on the writer's personal observations after a visit to all sites mentioned on 16th April 1968.

1840. On September 13th the Locomotive Superintendent, Daniel Gooch, wrote a letter to the Chief Engineer, Isambard Brunel, in which he gave the reasons for selecting Swindon as the site for a locomotive depot and works.

1. It would be necessary to change engines at Swindon in view of the steeper gradients on the line West of the town, and to keep pilot engines to haul trains up the Wootton Bassett incline.
2. The selection of Swindon would divide the line into three more or less equal sections : Paddington-Reading, Reading-Swindon, Swindon-Bristol.
3. An important station would be required for the intended junction of the Cheltenham and Great Western Union Railway.
4. The Wilts and Berks Canal already in Swindon would provide coal and coke at a moderate price, and the canal and reservoir at Coate, (map ref. SU. 178827) would serve as a water supply, if no other source could be found.

On December 16th the main line from Paddington to Swindon was opened.

1841. In February, the Directors decided to build engine sheds, repair shops, refreshment rooms on the station, (as at Wolverton on the London and Birmingham Railway), and cottages for company employees. The company bought the land for the engine sheds and repair shops and built these themselves because they were urgently required. But although they bought the land for the housing, they were too busy to build and required capital for the expansion of the system. So they leased the site to the contractor who had built their stations, J. and C. Rigby, Millbank, London and he in turn collected the rents. The housing was designed by Matthew Digby Wyatt (1820-77) who assisted Brunel with the design of Paddington Station 1852. This company town, lying historically between New Lanark and Welwyn Garden City, is particularly interesting because this was one of the first attempts really to design both the layout and the buildings with care, to produce a

functional solution to the layout of various types of houses and centrally placed community buildings in an organised composition.

The main railway line from Swindon station to Bristol ran in a straight line from North East to South West, and in the land between this and the line to Stroud and Cheltenham to the North West, were laid out the engine sheds and the repair shops. As this was considered the best view, two large houses for managers, in their own grounds, were built on the South East side of the main line, facing across this track to the sheds.

The main central axis started at the main line on the South West boundary of the second house, and ran away at right angles from the line to the existing Faringdon Road, the present A.420, which was bordered by grass and trees. This grass still remains in front of the G.W.R. Sports and Social Club flanked by a house on either side. This group of buildings appears somewhat inadequate as the centre of the composition of the town. This main axis contained central gardens and trees, but these went in 1855 to make way for the Mechanics' Institution, which included a large octagonal market hall.

On the London side of this axis were three streets parallel with the line, called London, Oxford and Reading Streets; and on the Bristol side of the axis were three similar streets called Bristol, Bathampton and Exeter. There could not be a Bath Street, as there was already a Bath Road up the hill in Old Swindon. The ends of the six terraced two-storey houses on either side of the axis were terminated by three-storey towers with splayed corners. Some of these were public houses, including the famous Glue-Pot Inn, where some of the weekly pay got stuck on pay-day. Architecturally the houses were generally in the Tudor idiom obviously favoured by Brunel and used by him on the stations, including Bath and Bristol. The houses in Bristol Street were built neatly in ashlar masonry with stone weather moulds above ground floor windows and doorways, with bonded and splayed stone window quoins, containing outward opening folding casement windows, complete with unique radiused corners to the window panes, as in carriage windows.

The houses in Bathampton Street have splayed stone window frames without bonded quoins, containing windows with normal square corners to the panes. The houses in Exeter Street have shallow arched window heads of brick in stone walling, stone cills and no splayed jambs. Many of the houses in all the streets share two angled front doors within a common doorway, approached up a common front path.

The ends of the terraces facing the Park at the South West end of the company town, are closed by larger houses with archways between, shielding the neat blue brick paved back alleys, with

flanking brick walls and boarded gates, and rows of neat pitched roof stone outbuildings, originally privies.

The basic house plan was livingroom and kitchen with a glass-roofed wash-house projecting into the court at the back, with two bedrooms on the first floor. Originally vegetable gardens were in the Park.

On the land between the Park and the line was a school, now the research laboratories, the vicarage and church of St. Mark's, designed in 1845 by George Gilbert Scott (1811-78), and built for £6000. Wyatt's cousin was working in Scott's office at the time, which may explain how Scott came to be asked to design this, one of his first churches at the beginning of a lengthy career. This church was rather a dull Victorian Gothic building, but it did have a fine tower and spire, detached from the nave on the railway side of the church, presumably to be conspicuous to travellers and to act as a landmark.

1847. The Locomotive Superintendent, Gooch, persuaded the Directors to allow the works surgeon Dr. Rae, to occupy a large house rent free, in return for attending on employees. A similar arrangement was in operation at Crewe. A Medical Fund was started, financed by minor weekly deductions from wages, giving medical facilities for complete families, providing lime for cleaning the cottages, and subscribing to two hospitals in London and one in Bath.
1853. 300 cottages had been planned but only 253 were completed when a typhus outbreak stopped building.
1854. William Morris from Kelmscott, 20 miles away, published the 'Swindon Advertiser', the town's first paper.
1855. The Mechanics' Institution was built, including eight baths, dining and reading rooms. This last was the only library anywhere in the town until 1938.
1860. Turkish baths were built behind the Institution.
1861. Knowing Morris's views on the machine it was ironic that his paper was the first in Wiltshire to be printed by steam power. The boiler and the engine were made in the company works.
1862. New Swindon Gas Company started.
1863. The baths moved to the Barracks yard. This block was built for Welsh immigrants who had been brought to operate the recently opened rolling mills in the works. Housing the men only in this block was unsuccessful and in

1864. two long rows of stone faced terrace houses in the characteristic Welsh idiom with light coloured window quoins, were built in Cambria Place, a block behind the Faringdon Road, and fronting onto the Wilts and Berks Canal. Also in this year New and Old Swindon adopted the Public Health Act. At this time there was neither a sewerage scheme nor piped water supply.
1865. A Baptist Chapel was built between and in front of the two terraces in Cambria Place (map ref. SU. 144844).
1867. The Directors agreed to build a carriage and wagon works on land between Bristol and London Streets, and the line, which meant the end of the two managers' houses there.
1868. The baths moved again to the present site. The Barracks became a Methodist Chapel, and is now the Railway Museum.
1870. After many fatal accidents caused by crossing the line between the houses and the works, a tunnel was built underneath.
1871. The Cottage Hospital and Dispensary was opened in the former Armoury. There was a bad attack of smallpox. At this time there were many cases of three families occupying one house because of high rents.
1872. Accident Hospital built.
1876. Works pay roll 4500. (In 1947 it was 12,000).
1877. The School Board was formed because 700-800 children had not got school places.
1881. The original school was converted to laboratories, and a new one was built in College Street.
1890. St. Saviour's Church, Ashford Road, off Bath Road (map ref. SU. 149839) was built in six months by railway employees after a 12 hour working day, in two working parties each on two nights a week. The construction was timber framing clad with vertical boarding inside and out. The most interesting feature was the angle iron and tie rod roof trusses, very similar to those beneath long goods wagons. The church was opened by the daughter of the Locomotive Superintendent, Dean.
1892. The Medical Fund consulting rooms and dispensary moved to the present site in Faringdon Road. This was one of the foundation stones of the National Health Service.
1893. Most houses had been equipped with a water closet. Few however had piped water.

1895. The water supply was taken over by New Swindon Urban District Council. The electricity power station was built.
1900. The works manager, Churchward, was elected the first mayor.
1903. The Corporation built the new water works at Ogbourne St. George.
1904. The tram service was opened from New Swindon up the hill to Old Swindon.

I.M. Parsons

May 1968

STROUD FESTIVAL OF RELIGIOUS DRAMA & THE ARTS, 1968

Your Society has been invited to mount an exhibition in the Stroud Subscription Rooms for this Festival starting on 13th October. It has been decided to concentrate the display on the Cloth Industry, Transport and Engineering, with a small section illustrating the Society activities. The exhibition will principally consist of photographs, maps, drawings and records but it is also hoped to have a few models and 'live' exhibits. Any offers of help with the provision of exhibits, or in the mounting of the display, will be welcome and members should contact any member of the Committee.

G.N.C.

Continued from page 12

CHELTENHAM ORNAMENTAL IRONWORK WALK

It is difficult to obtain accurate dating of ironwork, particularly as many maps are inaccurate. Any dates of buildings that can be obtained from deeds etc. will be much appreciated by Miss Chatwin (6 & 7 Montpellier Street). Our thanks are due to Miss Chatwin for leading the walk and for preparing notes on which this account is based.

Editor.

CORRESPONDENCE

Dear Mr. Crawford,

It may be of interest to readers of the report on page 22 of Newsletter no 10 of the visit to Buckingham Town Hall last year that Robert Hope Jones built the present Worcester Cathedral Organ. I gleaned this fact from a record review in the March 1968 'Gramophone', which includes the following paragraphs :

'Hope-Jones, who died some 50 years ago in the United States, was perhaps the most controversial figure who ever had anything to do with organ design. Clutton and Niland in their standard work describe him as "an electrical engineer by trade who unfortunately strayed into organ building, to which he first applied an electric action of more ingenuity than reliability and then a tonal system of tasteless vulgarity." Another authority, Dr. W.L. Sumner, calls his influence "entirely unfortunate .." In fact, Hope-Jones invented a number of new and extreme tone qualities that did not blend with other, particularly foghorn-like diaphones blown at high wind pressures. After he went to America, the Wurlitzer concern took over some of his tonal and electrical innovations, which paved the way for the cinema organ of the 1920's.

Before he left, however, Hope-Jones sold one of his organs to Worcester; the only piece of music directly associated with it is Elgar's Organ Sonata. A quarter of a century later the action was in a state of collapse and Harrison's were called in to perform major surgery. They set to work to try to reconcile its unsociable sonorities, and in particular to provide the great organ with a proper diapason chorus, and add the crowning glory of mutations and mixtures. To this day, however, the organ remains something of a hybrid, with some prominent diaphones, tibias, and reeds more reminiscent of the cinema than the church.'

Norman C. Ferry
Kingsweston
21 Hempstead Lane
Gloucester

Steam Carriages in Gloucestershire

A correspondent in the last Newsletter raises the interesting subject of steam carriages, including the Gloucester-Cheltenham service, run for three months in 1831 by Sir Charles Dance. The innovation met with strenuous opposition from vested interests, the coach proprietors and turnpike trustees, which proved too powerful for it.

cont

CORRESPONDENCE (continued)

A minute-book of the Cheltenham & Tewkesbury Turnpike Trust, 1798-1851, now in the Gloucestershire Records Office, contains two interesting entries. A meeting of the Trustees was held in Gloucester on 25 June 1831, 'for the purpose of taking into consideration the annoyance and inconvenience occasioned on the road leading from Gloucester towards Cheltenham by the Steam Carriages which now pass along the said Road, and for adopting such proceedings for the prevention and discontinuance of such annoyance and inconvenience as may be considered expedient ...' No less than 14 trustees attended, a most exceptional number, and they included several prominent county magnates. It was resolved 'that the Steam Carriages ... are a public nuisance' and that 'unless such nuisance shall be abated prior to the sixth day of August next an indictment shall be preferred by our Clerk against the proper parties at the next Assizes.' A copy of these resolutions was to be transmitted to Sir Charles Dance.

Sir Goldsworthy Gurney, the inventor of the steam carriage, in a pamphlet entitled Steam Carriages on Turnpike Roads (1832) prints a letter from Sir Charles Dance (3 Feb. 1832), in which Dance quotes from his own letter to the Turnpike Trustees dated 20 June 1831, which evidently gave rise to their meeting. Dance also says that on 22 June (three days before the meeting) large heaps of stones were laid across the road about 4 miles from Gloucester. In consequence he had discontinued the service from that day. In his letter, Dance further states that the Cheltenham Trust had sponsored one of the many Bills laid before Parliament, seeking authority to impose high tolls on steam vehicles. All this has rather a topical ring in 1968, and the article on Gurney in the Dictionary of National Biography says that it was in fact the imposition of prohibitory tolls by Parliament which ruined the steam carriage as a commercial proposition, so that Gurney threw up the subject in disgust. It was later recommended that the legislation be repealed, but by that time railways had diverted interest from road carriage. According to the D.N.B., it ran the distance of nine miles between Gloucester and Cheltenham in an average of 55 minutes and frequently in 45 minutes.

The only other relevant entry in the turnpike minute book is for 6 August 1831, when all interest had lapsed and only one trustee, a Mr. Chadborn, attended. He recorded his belief that the proprietors of the steam carriage had discontinued its use and assumed that any proceedings would now be unnecessary; but in case the trustees should still wish to institute a prosecution, he advised that a special meeting should take place on the following Wednesday. The minutes do not record that this meeting ever took place.

I. E. GRAY

(As many members know, Mr. Irvine Gray has now retired and hopes to move to London. Since our Society was formed, Mr. Gray has helped many in their research, has lectured to members and contributed several articles for this 'Newsletter'. Our thanks are due to him for his interest in the Society and I am sure all will wish him a happy retirement.

CORRESPONDENCE (continued)

I consider that it is very fortunate for us that Mr. Brian Smith has been appointed his successor as County Records Officer. Over a year ago a letter was published in which Mr. Smith kindly invited members working in the Oxenhall district to call on him. This year he is leading a Society visit to the Hereford & Gloucester Canal.

Editor)

12 May, 1968

Dear Mr. Crawford,

Surveying

Thanks for your letter of May 7th when you mentioned your article on surveying and in particular photogrammetry. There seems to be more interest at the moment in surveying using two camera positions, a precise distance apart horizontally and on the same level vertically. I did an afternoon's work last spring with Rex Wailes, attacking as subject a watermill. The results unfortunately were not valuable, but I think it can be made to give good results. Mr. Wailes told me that I.C.I. have developed the technique and will plot out resulting photos to give scale elevations, etc.

Aerial photography is more the province of the true archaeologist and consequently is more proven in practice. The RAF has flown a complete vertical coverage of many parts of England - I myself have used those for Bristol - but these of course are only valuable for site plans and need a follow-up at ground level.

I have a copy of an article in which the writer set out to obtain plans and elevations of a rectangular building from 2 views taken at diagonally opposite corners. This he did, and I hope to find the time one day soon to try the method on some photos I have of now-demolished buildings. The great advantage seems to be that one needs only three or four horizontal dimensions and some photos, consequently site work occupies much less time. Plotting is however more lengthy, and requires an understanding of the theory of perspective - a fascinating subject in its own right, as I am finding.

There is a book called 'Photogrammetry' by Professor Hart, but this I believe is mainly aerial work and is written for land surveyors. It's some time since I looked in it, so I can't remember if there were any useful references, but I feel sure there probably would be.

I hope these disjointed notes might assist.

Michael Bussell
23 Fitzgeorge Avenue
London, W.14

Gloucestershire Society for
Industrial Archaeology
Newsletter No. 12 July 1968

CORRESPONDENCE (continued)

Dear Mr. Crawford,

I confirm my telephone conversation yesterday in regard to the editorial in the February issue of the newsletter of this Society.

The statements made in regard to the Gloucester & Sharpness Canal (not Berkeley) are entirely erroneous, extremely misleading and damaging and it is imperative that a correction should be issued without delay. The Gloucester & Sharpness Canal cannot be included in the same category with gravel pits. Contrary to the statement that there is a diminishing use, the commercial trade on the canal and to the docks at Sharpness and Gloucester has shown a steady improvement with most encouraging results over the last few years. This follows the improvements which have been made to the navigation and facilities generally. The new berth to accommodate shipping at Llanthony has been of great assistance, has proved its worth and is used to capacity for a wide variety of cargoes both imports and exports. Berths in the main dock at Gloucester are also used to satisfy the necessary turn round of ships and all storage space has been continuously filled throughout the whole of the last year. To assist importers in their shipments of timber a new quay was opened at Monk Meadow 3 years ago and a further extension became necessary and was opened last year. This caters for direct shipment from Scandinavia and also movement by local lighter from Sharpness and Avonmouth for merchants who have developed extensive sites behind the quays. Other timber importers on existing sites at Gloucester also take advantage of direct shipments to their yards.

Oil traffic which has been affected by certain changes in the trade is now being held and there is every reason to expect a resumption in the development of this trade on the canal in the near future.

Sharpness dock is very much alive. Facilities for a unit load service between Sharpness and Ireland have been brought into being and this developing line will soon result in a daily shipment of inwards and outwards traffic. To meet the growing needs of this new business an improved terminal with Customs compound and provision of a new 30 ton crane is now in hand. Facilities have also recently been brought into being to cater for assembly and export of large tonnages of English grain. In addition to these specific features our efforts combined with the geographical advantages of the area have resulted in an increased interest on the part of shipping to the Port and a wide range of varying types of cargo are now being handled.

This is a brief resumé of the position which clearly contradicts the erroneous report and I must ask you please to ensure that this be corrected as a matter of urgency to avoid any repercussions.

H.A. Roberts
111 Stroud Road
GLOUCESTER

CORRESPONDENCE (continued)

Dear Sir,

Today I visited the Record Office, County Hall, Cardiff, where several thousand engineering drawings of the old Neath Abbey Ironworks are preserved, going back to the early nineteenth century. Many of the drawings concern railway and tramroad locomotives, beam engines, gas plants and much else besides.

Of particular interest to local Industrial Archaeologists are those relating to the pumping engines at Gloucester Docks. The reference is NAI. M93/1-16. One plan, dated Jan. 1855 shows the layout of the buildings, most of which still remain, and gives the position of a 'large Pumping engine', 'Graving Dock Pumping engine' and a 34-inch rotative beam engine which apparently was to be added to the complex. This latter engine house can plainly be seen from the road alongside.

A full sized copy of the plan, about 2ft square, can be obtained from the Record Office and would yield much information about the development of this part of Gloucester Docks.

D.E. Bick
13 Rotunda Terrace
CHELTENHAM

Test Borings at the Iron Bridge,
Coalbrookdale

A short article appearing in the April 1968 issue of 'Civil Engineering and Public Works Review' describes a site investigation being carried out under the abutments of this unique bridge that spans the Severn at Coalbrookdale. Since being built in the late 18th century, the bridge abutments have moved inwards some seventeen inches, producing the slightly pointed arch that is visible today. This movement has also resulted in cracks gradually developing in the cast iron ribs, and the Shropshire County Council in conjunction with the Ministry of Public Building and Works have asked a company specialising in site and ground investigation to ascertain the feasibility of anchoring the abutments to limit further movement.

Probes have been taken down to a depth of some 80 feet to obtain samples for laboratory investigation.

In the same issue there is a lengthier article dealing with the technical problems encountered when considering proposals to strengthen Brunel's Royal Albert Bridge across the Tamar for heavier train loads.

Michael Bussell

THE PROBLEMS OF URBAN RECORDING

This was the theme of a one-day conference held on March 8th in the august surroundings of the Goldsmiths' Hall, London. Although organised by the C.B.A. Research Committee on Industrial Archaeology, the conference ranged widely in the subjects covered by speakers and in the final discussion.

After a brief introduction by Professor Grimes of the London University Institute of Archaeology, the chairman Professor Asa Briggs set out to define the special problems of urban recording. He stressed the urgency which arose from the pressing demands for redevelopment of a site once it had outlived its original function. It was the rapid change in urban society and the types of building that it needed from one age to the next that produced this pressure. He dealt briefly with methods of recording, not only the standard techniques of measuring, photography and documentation, but also the more recently developed 'dynamic' approach (cine-filming, tape-recording, etc.) and methods of information storage and retrieval using microfilm and computer. Professor Briggs finally discussed information assessment, but stressed that the immediate need was for actual recording; assessment could come later.

The next speaker, Dr. Dyos of the University of Leicester, considered manuscript and printed sources of urban history. Pointing out that for many buildings, particularly small houses, the only 'document' of the building's existence was the building itself, he emphasised the importance in urban recording of an ability to 'read' a street frontage as clearly as one reads a book. Dr. Dyos warned his audience that the increasing pressure on storage space in the offices of estate agents, town councils and the like was forcing them to throw out many documents of great value to the local historian.

Mr. Quick, principal photographer with the Scottish Royal Commission on Historical Monuments, gave an interesting talk on photographic recording. Photogrammetry, whereby a complete 3-dimensional picture of a building or an area could be recorded on film and later transferred to drawings, was as yet rarely used in this country. But it enabled a site to be surveyed much more rapidly than by the traditional approach of 'measurement and booking'. Mr Quick showed slides illustrating how this technique had been used in the rescue work on the great statues at Abu Simbel, threatened by rising waters behind the Aswan Dam. These had been cut into blocks, and accurately reassembled on a hill above their original site with the aid of a photogrammetric survey carried out before work began.

After lunch, Walter Ison spoke on the experience of the London Survey, which had set out 70 years ago to produce a complete record of London's historic buildings. 34 volumes have so far appeared, and any of these may be studied with advantage by anyone working on a local history, whether urban or rural.

The final speaker, Mr J.S. Millar, City Planning Officer of Manchester, dealt with the problem of preservation of old industrial buildings, illustrating with examples from his own city. These included the Central station and some splendidly solid warehouses. He stressed that any old building should, with rare exceptions, have a sound potential use before its preservation could be regarded as practicable. Otherwise, the combined efforts of weather and vandals would conspire to reduce it to an eyesore.

There was a brief discussion during which various problems were considered : sample - how would you set about recording 130 acres of London's dockland shortly to be razed to the ground ? Fortunately that is not a problem to be faced in Gloucestershire at the present time. Nevertheless, the conference did throw up a number of points that are relevant throughout the country - and not only in towns and cities.

Michael Bussell

BOOK REVIEW

OLD COTSWOLD by Edith Brill Published by David & Charles, 1968.
40/-.

The publishers state that the 'Old' series are mainly concerned with the period since 1750 and have a bias toward social and economic history, with special reference to the visible remains of yesterday. The terms of reference having been laid down, one feels justified in considering how successful the author has been in adhering to the publishers' statement.

The reviewer must admit that the Cotswolds, except for the Stroudwater and Wotton-under-Edge valleys, are not a rich source of industrial archaeological material, and this book is clearly intended for the general reader rather than the specialist. The author concentrates on infusing life into historical records, making them extremely readable, but references to present day remains are rare and, when they do occur, unfortunately the facts are not always correct.

A short introduction would have helped to explain the author's choice of subjects and also the chapter order, which appears to be

24.

somewhat arbitrary. Ten pages on Cheltenham, a town so utterly dissimilar to those in the Cotswold and a place that has already been well documented, could have been omitted for an article on Blockley and its silk mills, or perhaps the fascinating brewery operated by water-power at Donnington. The author was wise not to include the Thames & Severn Canal as it is hoped that this will soon be the subject of a separate book.

Four chapters cover the history of the Cotswold woollen industry but this tends to cover the same ground as the recent book on the 'Gloucestershire Woollen Mills', though Painswick and Wotton-under-Edge are examined in more detail. In the chapter on Painswick the Pooles from Wirral (not Wirrall) in Cheshire are mentioned as having intermarried into the local clothiers. They were wise to come south because the seclusion of Poole Hall was ended by the construction of the Manchester Ship Canal less than a quarter of a mile away, and the whole area is now a vast industrial complex. A description of the pin-making industry in Painswick would have made an interesting addition.

The chapters on 'Cotswold roofs', 'Two Cotswold Quarries' and 'Some Cotswold Masons' are very much inter-related, dealing with a subject on which little has been written. However there still remains a vast number of quarries and stone mines of all sizes which require recording.

'The Clothier's Teazel & other Cotswold Plants' is the heading of a chapter on a little-known aspect of the cloth and dyeing industries. Fivehead in Somerset is the only place where fullers' teasels (*Dipsacus fullonum*) are grown today, incidentally by a relation of the reviewer. Adding to the information the author provides, teasel seeds are sown in April and transplanted by hand in the late autumn, 2½" deep, 3 feet apart in rows about 18 - 24" wide. This means approximately 12,000 plants to the acre. When about 5 feet high the following August, they are harvested, protective clothing having to be worn. The teasel is cut and dried in handfuls of 50, and a 'pack' is formed of 20,000 before stacking in the sun to dry, an often difficult process in our summers.

The history of the Postlip Paper Mills was particularly interesting to the reviewer as he had recently visited them with other members of our Society. The last paragraph says that bundles of rags were taken over to Cheltenham; surely this should be 'from Cheltenham' as rags were sorted by women at Postlip until the early 1950's.

There is a good chapter on 'Burford in the coaching era', the author being particularly interested in roads, and an account of Jonathan Hulls, the first man to attempt to use steam to drive paddles on a boat.

The selection and quality of many of the photographs, a feature bearing on the cost of the production, is particularly disappointing. This is unfortunate as the author evidently decided that she would not include hackneyed subjects, but the reviewer considers that only seven or eight of the twenty-three plates are really worthy of inclusion. Although the author says nothing remains, one illustration labelled 'Ruined Mill, Ozleworth Bottom' in fact shows Monks Mill and the reviewer was one of a party who surveyed this mill. The Society's record drawings can be seen in Stroud Museum.

This volume contains many historical facts on clothiers, weavers, fulling mills, paper makers, quarries and the coaching era, interestingly brought together. But its failure to connect history with visible remains will not fully satisfy the industrial archaeologist.

Neville Crawford

WHITMINSTER MILLS

R. A. Lewis

The Frome at Whitminster has had its course so altered that it is difficult to reconstruct where it originally flowed. Today the Frome divides at Whitminster and flows into the Severn by two separate channels. A close examination of old boundaries suggests that at one time this parting occurred almost half a mile further upstream than at present. By the time of the Domesday survey a mill had been constructed at Whitminster on the eastern branch of the Frome and, since the Frome is liable to flooding and the mill was almost certainly built across the stream, a weir and overflow had been cut to the western channel as a safety measure.

Before 1336 a second mill was constructed⁽¹⁾ on a leat dug parallel to the eastern channel. As this branch by itself had insufficient water to power two mills, the western channel from the parting to the mill overflow was closed and all the water diverted to the mills. The effect of this diversion was that water used to drive the mills went to the Severn by the eastern channel while water going over the weir reached the Severn along part of the old western channel. The date of this second mill may be fixed more closely by a complaint made at Whitminster in 1288 that the Abbey of Gloucester had diverted a watercourse towards its mill.⁽²⁾ The names of the watercourses can no longer be identified but a field name Calphey can be traced and this

suggests that the diversion of the watercourse may be connected with the building of the second mill.

The second mill was probably built as a fulling mill for it was used for this purpose in 1336. Fulling was still carried on here in the seventeenth century and in 1608 there were seven fullers or tuckers at Whitminster.⁽³⁾ However, by the early eighteenth century the cloth industry had moved away from the lower Frome and the mill ceased to work at fulling.

The mills were extensively altered and rebuilt in the middle of the eighteenth century - the date is indicated only by a reference to one mill as being 'new built' in 1760.⁽⁴⁾ The two separate mills, now both corn mills, became the two ends of one range of buildings with a paper mill erected between them as the central part of the range. At this time, or more probably at an earlier date, a small connecting channel was dug between the two branches of the stream. Probably the existence of mills at the mouths of both the eastern and western channels had made it desirable to ensure a flow of water along both channels even when the mills at Whitminster were not working.

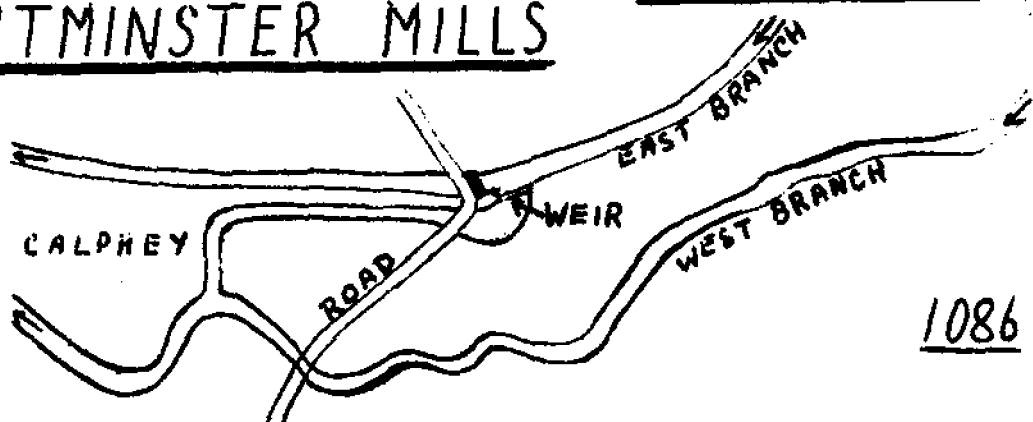
The paper mill was let to Thomas Evans who was advertising for a foreman in April 1764.⁽⁵⁾ By 1788 this mill had passed into the hands of Joseph Smith, paper maker, who also leased Rivers Mill at Dursley.⁽⁶⁾ After his death in 1791 the business was carried on successively by his widow Elizabeth, his son Thomas, and Thomas' widow Hester. Rudge states that it made only coarse paper.

A report drawn up by Thomas Fulljames soon after the death of Charles Owen Cambridge, the owner of the freehold adds some details of the mills in 1804. 'The mills to which there is a good stream of water, consist of a large stack of building partly stone, partly brick and tiled, comprising two water grist mills (let to Carter who lives in the mansion) with two undershot wheels and two pairs of stones, all in pretty good repair. A paper mill between the two water grist mills (let to Mr Smith who lives in part of the mansion) with drying houses etc all in pretty good repair except the joists and floor.'

The mill pound was part of the Frome made navigable by Thomas Bridges and his partners after 1759⁽⁷⁾ but this had little effect on the mill except that the stream seems to have been widened and deepened in places. When the Stroudwater Canal was originally constructed it entered the mill pound and made use of the wide deep stream for a short distance before taking to an artificial channel again. Because this was found to be unsatisfactory, the canal was diverted in 1779 and a wooden weir constructed upstream from the mill to allow the canal company to take water from the Frome for the canal. In 1802⁽⁸⁾ this was replaced by a stone

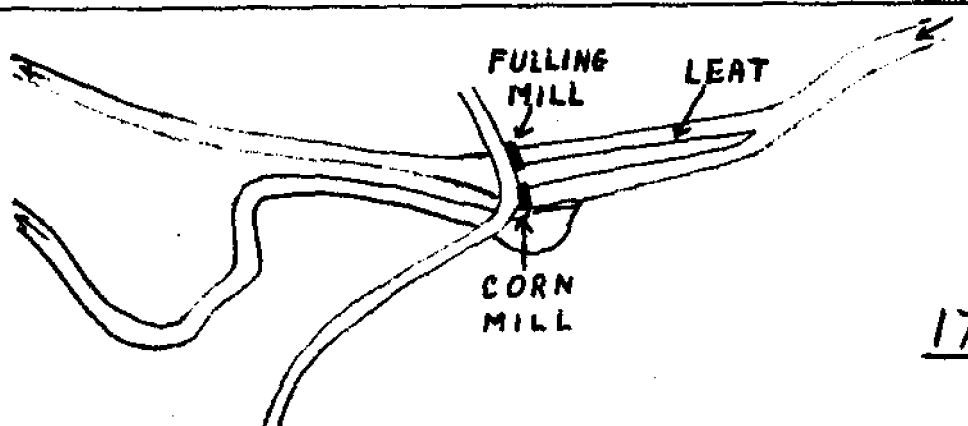
WHITMINSTER MILLS

(A)



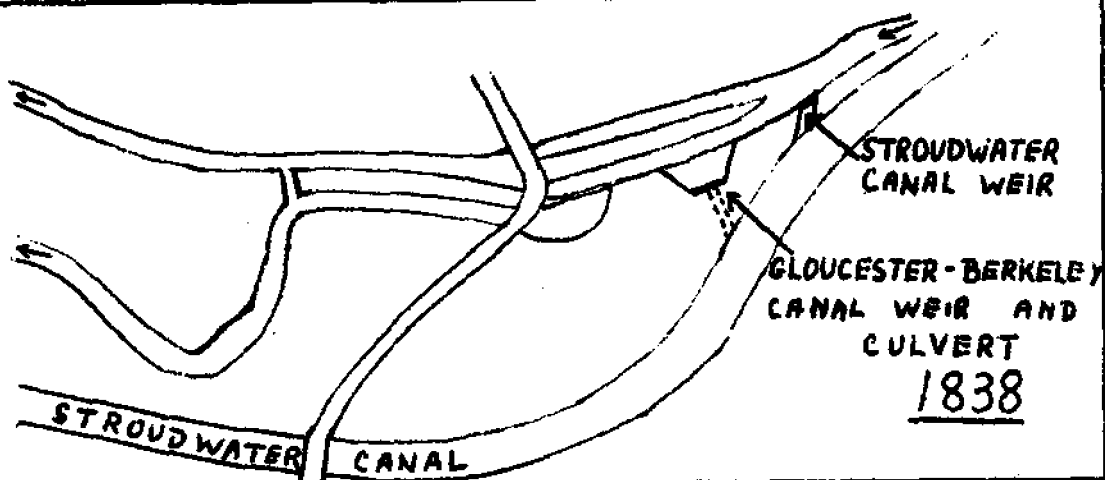
1086

(B)



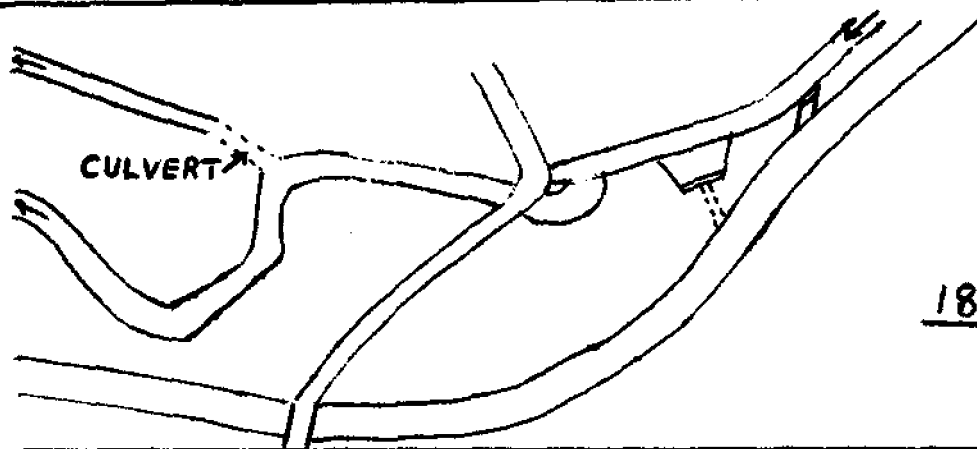
1717

(C)



1838

(D)



1882

weir on a slightly different site.

The completion of the Gloucester-Berkeley Canal led to greater demands for water from the Frome. This had to be taken out above Whitminster mills because of the relative levels of canal and river. The Gloucester-Berkeley Canal Company planned to take water from the Frome above the mills into the Stroudwater Canal and then feed it into their own canal at Saul junction. In 1834 the Company obtained an Act of Parliament⁽⁹⁾ which, among other things, allowed them to acquire compulsorily the mills at Whitminster which would no longer be able to work if water was extracted.

The mills were immediately dismantled. The leat, now useless, was filled in between 1854 and 1882 and at the same time the mill race was filled in and an underground culvert made to lead water into the branch of the Frome previously fed by it. The nearby Whitminster House was extensively modernised by Robert Wilton in 1866 and these changes, which had the effect of removing the stream further from the house, were probably made at that time.

NOTES

1. Gloucester Inq. P.M. v p.257
2. Hart - Historia et Cartularium Monasterii Sancti Petri Gloucesteriensis iii p.227
3. Smyth - Men and Armour for Gloucestershire p.305
4. Gloucester Journal 3 June 1760. To be let 'a new built corn mill with two pairs of stones, a dressing mill and all things necessary for making flour in the parish of Wheatenhurst.'
5. For the paper mill see Shorter - Paper Mills in Gloucestershire in B.G.A.S. vol. 71
6. Gloucester City Library : Dursley Deeds Box 6
7. Lewis - The Navigation to Stroud, in Newsletter of the Gloucestershire Society for Industrial Archaeology No. 6
8. Gloucestershire Record Office : D 1180/1 Minute Books of the Stroudwater Canal Company.
9. 4 & 5 William IV c 54

The following maps have also been used - The View of Whitminster 1717 (Gloucester City Library : uncatalogued); Gloucestershire Record Office D 1180/10/2, 3 and 7 : Ordnance Survey maps of various dates : Particulars of the Sale of Whitminster House Estate 17 June 1854.

SURVEYS

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I INSTRUMENTS & EQUIPMENT

(a) Pencils, Pens and Eraser

At least two pencils of reasonable length should be taken. If too short they are difficult to use and are more easily lost. A sharp penknife is useful for sharpening them on a large survey and fine sandpaper files are also available. The pencils should be of a good make, not merely a 'present from Southend', and nothing harder than HB grade should be used, F being preferable. Harder grades, H, 2H, 3H etc. although they do not require sharpening so often, cut into the paper, are hard to rub out and the thinner lines are more difficult to see when the drawing gradually becomes dirty. Softer pencils, B, 2B, etc. produce lines which are inclined to smudge.

Ball-point pens in black and various colours are useful for adding dimensions and lines which might otherwise confuse the drawing. A felt pen is helpful for sketching the general

layout if several buildings are on the site. Finally take a thin rubber which incorporates both ink and pencil erasers.

I (b) Survey Paper

For some small surveys, flimsy typing paper is quite adequate as it is transparent enough for tracing upper storeys and it is cheap. However it is not so efficient if the survey will take some time, or when there is rain about, and I personally prefer a thin cartridge paper. This can be cut near the size of the board; is not so susceptible to damage; takes a better line which can be erased easily, and is held more securely by the elastic bands round the survey board.

Others prefer graph paper. This certainly helps one to get near the correct scale and also to draw straight lines and right angles, but the number of lines on the graph paper can make the whole drawing confusing. Finally it should be noted that tracing paper is not so useful for surveys as it tears rather easily and also crinkles in damp weather.

I (c) Survey Board

A piece of $\frac{1}{8}$ " (3 mm) hardboard about 12" x 18" (300 x 450 mm) with rounded corners is the cheapest type of board suitable for surveys. My own is of 5 ply wood, size 15" x 18", and this should last for ever.

A pair of large strong rubber bands round the board will hold sheets of paper secure, especially in windy conditions. Pencils, when not being used, can be slipped under the bands, but this will depend on how near the bands are to the edge of the board. If a hole is made in it, a rubber can be attached to one band by a string and therefore the eraser cannot be dropped and lost.

In light rain or showers it is possible to keep the board in a largish polythene bag and continue to write.

I (d) Linen Tapes & Folding Measuring Rods

A 100' (30.000 m) metallic linen tape, in which strands of copper wire are woven to help stabilise the length, is adequate for general surveys, but the addition of a 50' (15.000 m) tape for offsets would also be useful. Both are made up in circular leather or plastic cases with folding metal re-winders. It is important to note that in most tapes the zero is at the outside end of the ring. Ordinary linen tapes are not accurate and may be an inch or two out in 100'; though extreme accuracy is not so important in our recording and it is not necessary to resort to a steel tape. Linen tapes will be found to be so much lighter and more flexible than steel.

Maintenance of tapes is important and no tape should ever be reeled up wet or dirty. Allow it to dry off first in a loose coil as a wet tape expands and will jam in or damage the case. Be careful also to remove mud, dirt and twists when reeling in by drawing through a cloth or your fingers. When reeling in, walk along at the same time so that the tape is not dragged as otherwise the markings will be eventually rubbed off.

Also essential is a folding 6' (1.800 m) measuring rod marked in feet, inches and eighths of an inch; used for obtaining heights and horizontal measurements in places where it is difficult to hold a tape. This timber rod which is rotary opening can either be two-fold or multi-fold, the former being stiffer while the multi-fold tends to droop when held horizontally. The two-fold cannot be put in your pocket and a small 6' (1.800 m) steel tape that can be easily carried around is also useful for short dimensions. This short steel tape also tends to bend when fully extended, unless supported. The most useful type has a case 2" wide and then the steel tape can be used to measure between two walls.

A metric version of the timber measuring rod is now available in multi-fold, each fold being 300 mm long, and with a total length of 1.800 m.

I (e) Compass

A fairly cheap pocket-type compass gives an accurate enough indication of the magnetic north point to show the orientation of the site. This is especially important where the item one is recording does not appear on an ordnance survey sheet e.g. old mine workings. It also helps to put the north point, indicated by an arrow, on a survey where it covers several sheets. Magnetic north is approximately 8° W of true north.

It is important to remember to remove metallic objects from your pockets when taking bearings and also to keep away from buildings constructed of corrugated iron and from railway lines.

You can find south by using the sun at one o'clock but this is not a reliable method in the British climate.

I (f) Torch

Occasionally a torch will be necessary internally as usually electric light is not available. A waterproof rubber cased type is useful as the batteries seem to last for years, but some people will find it rather bulky and heavy for the pocket.

I (g) Spirit Level and Plumb Bob

Sometimes a spirit level is necessary to see if floors etc. are level and a plumb line and bob can be used to make sure walls are vertical.

I (h) Ranging Rods, or Poles, and Arrows

Depending on the type and size of a site survey, ranging rods, painted in 1 foot (300 mm) bands of contrasting colours, may have to be taken. These poles are about 1" in diameter and 6 feet (1.800 m) or 8 feet (2,400 m) in length, with a pointed steel shoe at one end.

It is always useful to have at least one rod for placing against buildings or laying on the ground to give scale when taking photographs. It will also be found helpful for other purposes, for example in extending the length of a measuring tape to an otherwise inaccessible point by placing the rod point in the tape ring.

The type that is two halves and then screws together will be found more convenient for putting in the car boot. There is also a similar pole with slots in it so that an approximate right angle can be obtained by sighting through it. A metric pole 2.000 m. long, with half metre (500 mm) bands of contrasting colours, is now obtainable.

Arrows, sometimes called markers, are skewer-shaped pins made of steel about $\frac{3}{8}$ " diameter and approximately 15" (375 mm) long with a bent eye about $1\frac{1}{2}$ " diameter at the opposite end to the point. On this eye is tied a short length of red tape, otherwise it is often difficult to spot the arrow in a field. Their main purpose is to mark every 100 ft (30.000 m) or less on a site survey.

I (i) Dumpty Level and Staff

A level and staff are needed when it is required to relate external levels either to each other, or possibly in addition to internal floor levels. An example would be the surface of a mill pond compared with the wheel pit floor. Setting up the dumpty level, taking readings on the staff and noting the results in a level book, can soon be picked up with a little practice.

The dumpty level basically consists of a telescope attached to a spirit level and mounted on a tripod. When setting up the level choose a spot where, if possible, one will be able to take readings where required. Extend the tripod legs and tread the steel steps on the points firmly into the ground before screwing on the level. The telescope is supported by three adjustable feet and, simplified slightly, it is these foot screws that must be adjusted to alter the spirit level to the correct central position. (There is also a 'Quickset' level supported by a ball and socket joint).

The telescope is then focussed, first getting the cross hairs sharply defined and second focussing on the distant staff until one can read the figures, in this case upside down. The level can be swung round on a horizontal plane and it can

be seen that all readings taken on the staff can be related to that plane and therefore to each other. This type of level can be hired for about £1 a day.

The traditional mahogany levelling staff is telescopic in three sections but a light version in aluminium and also folding types are available. The total height is usually 14 feet but one to 16 feet is also obtainable and the metric staffs are 3, 4 or 5 metres in height.

The staffs, apart from the metric, are graduated in feet and decimals of a foot, not inches, which is rather confusing at first. The foot figure is always in red and great care must be taken to read these and the decimals of a foot, marked in black, correctly.

The person holding the staff must keep it upright and still, making sure his fingers do not obscure the figures on the front. To gain better control it is usual to stand behind the staff and the person at the level signals whether the staff is straight or not. If the staff is too low or too high for a reading, or cannot be seen, the level will have to be moved. The first thing to do at the new position is to take a reading on the staff where one was previously taken, so that the two sets of levels can be related.

It is usual to base one's levels on the Ordnance Survey bench marks shown on the larger scale O.S. maps and plans, giving the height above mean sea level at Newlyn. When one has located the nearest bench mark to the site, generally marked on a building or wall, the bottom of the staff is placed level with the horizontal line above the arrow to obtain a reading from the level.

(j) Field and Level Books

Special field-books, usually 6" x 4" or 8" x 4" and opening on the short edge, can be bought for booking offsets, but any notebook with hard covers could be ruled up with two lines down the centre of the page to represent the survey line. Bookings are made from bottom to top of the page.

Other books 8" x 4" also specially divided into 6 columns with one for remarks can be bought for booking levels, but here again an ordinary notebook with hard covers, only opening on the long side, can be ruled up by hand.

(k) Dress

To some members it may seem rather presumptuous of me to advise them on how to dress for a survey, but on the other hand I suspect that there are quite a large number who have yet to help on one.

For men a cap is more useful than a hat as it can be kept on in confined spaces. It helps to keep the hair clean and also partly protects your head when you inevitably collide with low doorways and beams. Ladies would no doubt prefer a head scarf. If worn, a neck scarf should have the ends tucked in or they may catch on projections.

Shoes are important and should have stout soles and uppers and not be pointed, as they are a danger on ladders. For both ladies and men lace-up shoes are better than pull-on; as the latter often prove also to be pull-off in mud or narrow spaces. If possible rubber boots should also be taken, especially as so many of our sites are associated with streams, and a spare pair of socks or stockings carried.

In cold weather mittens, or gloves with fingers cut away, are more useful than ordinary gloves, otherwise you will find it difficult to write. Thin leather gloves are another alternative.

Whatever else you wear depends on the time of the year and whether the survey is indoors or out, or both. A rain-coat is preferable to an ordinary coat, unless the weather is very cold, and should of course not be your best or only one, as projecting nails etc. can easily prove disastrous. Large safe pockets are extremely useful for carrying the survey tape, pencils, rubber, pens, torch, light meter, flash bulbs etc. Indoors, if conditions are poor a boilersuit, if available, would be the best wear.

If one wants to get the worst of the dust and mud off one's hands before a meal, or before returning, a flannel in a toilet bag will prove useful. Finally to carry all the odd bits and pieces, especially if you have to take a meal, a small rucksack or haversack will be required.

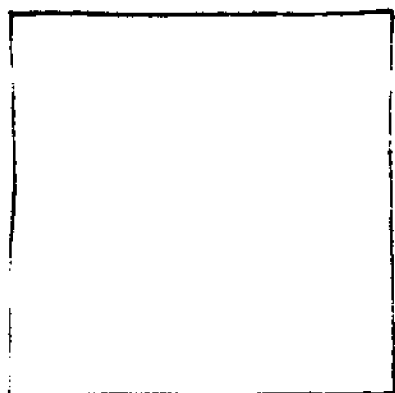
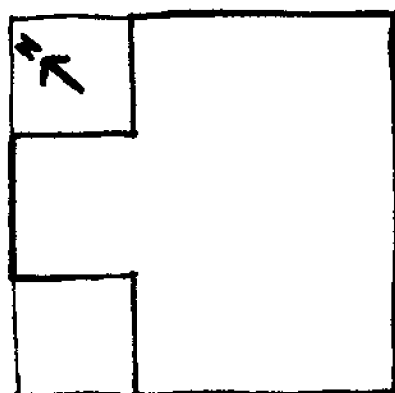
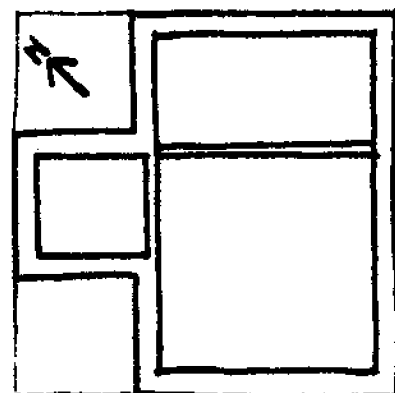
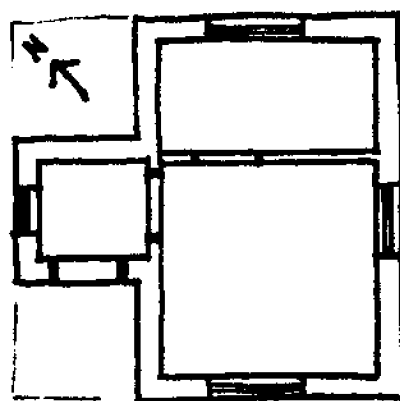
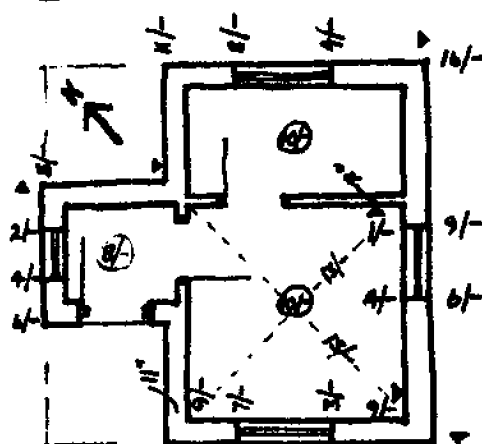
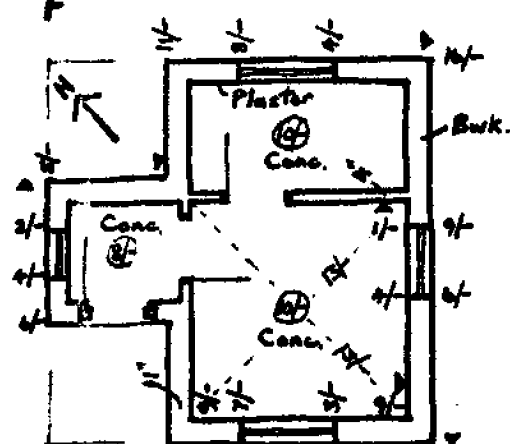
BUILDING SURVEYS : MEASUREMENT

(a) Initial Procedure

It always pays to carry out as much initial investigation as time allows. It is quite possible that you will find that the building has already been surveyed, or at least outline drawings have been prepared which will be a useful start. Do not, however, rely too much on these drawings without confirmation on site.

A site plan traced from the largest ordnance survey sheet obtainable; information from libraries, museums, the County Record Office and from the owner, can all provide useful preliminary information and give an indication of the location, size and scope of the intended survey.

If possible, arrange to visit the building to make a preliminary exploration and general appreciation of survey needs. Walk round the whole of the building and the site,

A**PAGE LIMITS OF BUILDING****B****SKETCH GUIDE OUTLINE****C****SKETCH IN WALLS****D****DRAW WINDOWS AND DOORS****E****ADD DIMENSIONS (PART SHOWN)****F****ADD MATERIALS AND FINISHES****SURVEYS - BUILDING PLANS****JUNE 1968 G.H.C.**

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noting any special problems. Decide upon the way the survey is to be carried out.

(b) Plans

When starting the physical survey begin with the ground floor plan of the largest building on the site. First walk round the outside to appreciate the size, shape and proportion of the ground floor plan, pacing out roughly the length; width ratio and from that decide how the plan can best be drawn to the largest reasonable size on the survey board (a).

A very large building may require to be split into smaller parts, otherwise the scale becomes too small and it is almost impossible to fit in the dimensions. Split if possible on a main internal partition, remembering to ensure that the partition thickness is included on one drawing. In addition provide a layout drawing showing how the parts fit together and giving overall dimensions. As a guide, if the plan is drawn to roughly the scale of $\frac{1}{4}" = 1 \text{ foot}$ (or put another way $1" = 4'$) there will be room to show most necessary details. In metric the nearest equivalent scale will be 1:50.

Draw light guide lines on the survey paper for the outer faces of the main walls, ignoring any small recesses, projections, windows, doors or other features (b). These guide lines should be approximately in proportion to the lengths of the walls. At this point mark the direction of north with an arrow. This can be obtained from a compass or from an ordnance survey map.

Walk through the rooms and other spaces on the ground floor to get a general idea of the layout. Draw in light lines the interior faces of all walls, and internal partitions, again ignoring recesses, projections, windows, doors etc. (c) Pacing may be helpful to proportion the rooms.

Then take each room in turn and complete the interior plans by drawing over the guide lines and adding windows, including door swings, doors, chimneys, built-in cupboards, steps and stairs (showing up or down), hatches and columns (d). Also show, dotted, the positions of the joists above and any shafting or machinery. The latter may have to be detailed to a larger scale on separate sheets.

Complete the plan externally using the positions of windows and external doors previously located on the internal layout details, and adding any further external details such as recesses, projections, buttresses, chimneys etc.

The building can now be measured with a tape and the sketch plans dimensioned. For accuracy, it is essential that what are termed 'running dimensions' are used (e). Internally the zero end of the tape is held by the recorder at one corner of a room whilst the helper goes off in a

clockwise direction paying out the tape along a wall. An arrow is shown on the drawing at the zero end. The helper shouts out the dimension shown on the tape everytime a feature, e.g. door frame, is reached. The recorder repeats this back while noting the dimension down on the drawing at right angles to the feature using the convention 3/6 which will be found neater and quicker than 3'-6". The dimension at the next corner will therefore be the length or width of the room.

With metric measurements 5.400 would indicate 5 metres 400 millimetres; 400 by itself would be millimetres and 5.000 is 5 metres. It is suggested that the simplest way to call out 5.400 would be '5 metres, four hundred.'

Curved walls can be measured by stretching a tape across from one end to the other of the curve, and then using a measuring rod to dimension lengths of offsets at regular intervals. Angled walls such as in bay windows or niches are best measured and checked by diagonal lines and offset dimensions.

If the opposite walls of a room or building are unequal, diagonal dimensions should be taken as otherwise it will be impossible to draw it out. Diagonals are also useful for checking relationships between irregularly placed buildings. For accuracy, diagonal lines should not assume too acute an angle with the walls whose corners they meet.

Externally 'running dimensions' should similarly be taken, only this time going round the building in an anti-clockwise direction, otherwise you have to read the tape standing on your head!

With multi-storey buildings, the ground floor plan can normally be used as a guide to prepare drawings showing the layout of floors above or below, but dimensions should always be checked as wall thicknesses may vary. Wall thicknesses are naturally very important but unfortunately more often forgotten than anything else. Partition widths can be dimensioned at doorways and external walls at windows and external doors. Room heights can also vary and it is helpful to measure each room and note the dimension in a circle in the centre of the room.

Full notes should be made of all the materials used in the construction of the walls and partitions and their finishes e.g. plaster (f). If possible differentiate between load-bearing walls and partitions as this may help to give clues to an altered layout. Abbreviations such as bwk and c.i. (cast iron) should be used for speed and to avoid cluttering the drawing.

II (c) Elevations

Guide lines should be drawn to show the ground level and to indicate approximately any falls in it. Other lines

can then be drawn to show the size of the elevation and also any projecting bays or wings. Further guide lines should show the roof outline, window cills and lintels, door thresholds and heads, window and door frames, rain-water pipes, columns, water-wheel recesses etc. Windows, especially on textile mills, will usually be found to line up both horizontally and vertically.

Using these guide lines the details of the elevation can then be drawn, omitting details which are repeated as long as their position is shown. Intricate details, such as an elaborate date stone, should be sketched on a separate sheet and referenced back to the elevation drawing.

Often forgotten are all the elevations of a recess or porch and it is best to make a minute plan on the sheet with the external walls coded. Then each elevation can have its code letters under it to avoid confusion.

As on the plans, indicate the materials used and such details as to whether stone is dressed or coursed. Also show changes in material as this will probably mean that one part is later than another, as will a line of vertical joints.

Before starting measuring try and find one horizontal line which goes right round the building, for example a plinth or even the eaves, but sometimes different eaves levels will have to be related to one another. Measurements are then taken up or down from this datum line, not forgetting to relate the line to ground floor level, usually at a threshold. Heights can be obtained by dropping a tape from upper windows, using a measuring rod to find the relation to them of the eaves, and running dimensions should be taken if at all possible. Inaccessible parts such as chimney stacks can best be measured by counting the brick or stone courses - in this part of the country it will usually be found that 4 brick courses equal 1 foot, and remembering that the length of a brick is 9". The roof height is obtained from the section(s) through the building, described in the next section.

II (d) Sections

Before starting to sketch sections, careful consideration should be given to how many are necessary and also through which parts of the building they are to be taken. Sections are often taken through the stairs but this will depend on how important the staircase is in the building and the time available. The measurement and drawing of treads and risers takes longer than you would think, especially if they are not all the same and also if there are winders involved. Do not forget to draw lines on the plans to show where the sections occur, and reference letters are usually added.

First draw guide lines of the outer walls; then floor and ceiling levels and the line of the roof. Second fill in the details, showing windows, doors, floor and roof joists, skirtings, steps, stairs and any other features. Finally, take measurements of heights of rooms, doors, windows, stairs and floor thicknesses, best achieved at stair openings, but differences in thickness sometimes occur.

Roof details are important and plenty of time should be allowed for sketching and measurement. The pitch can be obtained by using a large protractor, or by using the folding measuring rod to obtain the angle and then transferring it to the survey board. Types of joints should be indicated, if necessary on separate sketches. The distances centre to centre of rafters, joists and trusses should also be measured.

II (e) Plotting

Drawing the results of one's survey as a finished drawing takes an appreciable amount of time and, to be carried out properly, requires a drawing board, T-square, set square, scales, drawing pins, drawing instruments etc. However, providing tracing paper is used, quite a presentable drawing can be produced by using a backing sheet of squared paper, preferably $\frac{1}{8}$ " to 1 foot. (1 : 100). Tracing paper is also useful if the building has two or more storeys as the plans can then be laid on top of one another and thus compared. In addition the drawing can be used as a negative and prints obtained off it at drawing office supply firms.

It is important to make sure that the size of the tracing paper is large enough for the drawing at the scale selected. First of all draw rough blocks on the paper to represent the plans, elevations and sections, so that they can be spaced out reasonably. If several sheets are required keep the size and main titles the same. Finally do not forget to include the north point, scale and date.

II PHOTOGRAPHIC RECORDS

General Records

Photographs are best taken at right angles to the subject and as much as possible should be included. It is always possible to enlarge up details providing the exposure and definition of the negative is reasonable. A ranging rod can be left against the building to give scale. Roofs are the most difficult part of a building to photograph successfully but it may be possible to climb a tree or obtain a view from the upper storey of a nearby building.

All too often items are missed when making a survey and photographs can help to provide the necessary details, especially if time is limited.