

# Industrial Archaeology and its Relevance to the Technical Studies' Teacher

Brian Austen *Shoreditch College, Egham*

**209** Changes both in society and its aspirations, and industrial structure and requirements, have resulted in a fundamental rethinking of the role of the teacher of 'craft'. This has changed from one of an imparter of traditional handicraft skills in wood and metal to a much wider concept of promoting interest and concern with design and technology and its effects on the society in which the young citizen of today finds himself or herself. This widening of aim has demanded a new title for the subject area which better reflects its new role, hence the term design and technology rather than the restriction implied in the word handicraft. The extended field of interest which has come under the purview of the teacher of design and technology has brought with it opportunities for a closer liaison with teachers of the sciences and humanities and the consequent development of integrated study units. It is however essential that such integration is a natural and logical progression and not merely an artificial concoction by those anxious to jump upon any educational bandwagon that happens to be fashionable at the time. Such a natural and logical progression is provided by industrial archaeology. At the same time this discipline can play an effective role in explaining to the maturing mind the basis of Britain's present socio-economic structure and technical development.

Industrial archaeology has been defined as 'the study of the physical remains of past industrial activities',<sup>1</sup> and this would appear to be a definition that adequately covers the range of interest concerned. It emphasises the fact that industrial archaeology deals with the whole field of industrial production from Neolithic flint mines to those processes used by industry today which are threatened by technological advance. In this connection we must remember the importance of studying industries such as plastics and the petrochemical industry whose establishment is relatively recent, but where the rapidity of

technological change has already destroyed much of the physical fabric of the pioneering years of those industries. Earlier definitions tended to emphasise the period of the Industrial Revolution but this term is not in itself precise enough and violates the continuity of industrial development.<sup>2</sup> To the newcomer to industrial archaeology it is necessary to emphasise two things in order that the picture of the subject scope can become clear. Firstly archaeology must be interpreted in rather wider terms than usual. The industrial archaeologist is seldom an excavator of industrial sites. There are too many physical remains above ground, to a lesser or greater extent endangered, that need recording, and thus it is neither necessary nor advisable to excavate in the case of most industries. For some industries, once important in specific areas, little now remains at surface level and here excavation is justified. One such is the iron industry of the Weald of Kent, Surrey and Sussex which from prehistoric times until the first decade of the nineteenth century smelted local ores and manufactured the resulting iron. This industry is currently being studied by the Wealden Iron Research Group. The second point that needs making is that industry, except at a very primitive level, cannot exist without an elaborate infra-structure of distribution facilities and the provision of housing and recreation for its employees. The industrial archaeologist is therefore concerned with a very wide group of industrial movements which can be divided into five main classes:

1. Power — horse gins and donkey wheels, windmills, watermills, steam engines and engine houses, gas and electricity works, oil refining and distribution facilities.
2. Transport — roads, bridges, tollhouses, milestones.  
— rivers and canals, locks, aqueducts and warehouses.

- harbours, cranes, dock facilities, shipyards, light-houses.
  - railways, stations, goods sheds, viaducts, tunnels, tramways both urban and industrial.
  - airports, hangers, control towers.
3. Extraction of raw materials — quarries, mines and associated equipment.
  4. Manufacturing industry — breweries, textile mills, potteries, glasshouses, brick-works, etc.
  5. Industrial housing and urban facilities provided by industrial concerns, urban services such as drainage, lighting, water supply, etc.

As with any successful scheme of work to be undertaken in schools, a project in the field of Industrial Archaeology requires a considerable amount of preliminary planning. It is necessary to make contact with those outside the school already active in this field,

both as a short cut to composing a list of suitable sites to be investigated and also to ascertain how groups from the school can take a full and active part in the national programme of recording and preserving industrial buildings. A list of the secretaries of local industrial archaeology groups and an indication of their areas of interest is provided in N. Cossons and K. Hudson (eds.), *Industrial Archaeologist's Guide*. The last edition of this, dated 1971-3 was published in 1971 by David & Charles, but no subsequent edition has been forthcoming. It would therefore be necessary to check information given with local central reference libraries or museums. Local groups would almost certainly welcome this interest and assistance from well-organised school groups. The school would also benefit from taking out a corporate membership of the local industrial archaeology group, and this would provide a means of keeping in touch with local developments by means of the newsletters and periodicals that they may publish. Apart from locally produced



Shelton Tollhouse erected c1820 in connection with Thomas Telford's improvements to the London to Holyhead Road, and removed in 1973 from its original site near Shrewsbury to the Blists Hill Museum. (Ironbridge Gorge Museum Trust).



*A porcelain display in the new Coalport China Works Museum. (Ironbridge Gorge Museum Trust).*

pamphlets and periodicals, national publishers, especially David & Charles of Newton Abbot, have taken an active interest in industrial archaeology. A useful bibliography, containing details of these regional works as well as more general works covering the country as a whole, books on specific topics and industries, aspects of transport, etc. can be found in *Project Technology Handbook No 10 – Industrial Archaeology for Schools* (Heinemann Educational Books, 1973). This book is an invaluable source of information to any teacher thinking of undertaking work with school parties in this area. Schools in rural areas might be inclined to feel that industrial archaeology was not relevant to their situation, but this idea would be entirely wrong. Until the mid-nineteenth century much industry was established in rural areas to take advantage of the water power available. The Derbyshire textile mills at

Cromford and Belper and the industry in the Severn Valley in the Ironbridge area are examples. Before the coming of the railway it was necessary for many industries whose products were heavy or bulky to be localised. Brewing was carried on in many country towns and villages in small production units and country estates often had their own brewhouse. Good examples of such estate breweries survive at Charlcombe House, Warwickshire and Shrugborough near Stafford (now part of the Staffordshire County Museum). Brickmaking was another such industry. A brickworks at Ashburnham near Battle in Sussex, using primitive Scotch kilns fired by wood stayed in production until 1968.<sup>3</sup> This method of brickmaking was commonplace when the works was set up in 1840, but near towns the growing demands of urbanisation had swept away such methods well before the end of the nineteenth century. Small rural workshops



*Abbeydale Industrial Hamlet, Sheffield, showing the tilt forge of 1785 (right) and the crucible steel furnace of c1830 (left). Sheffield City Museum.*

and farms provide the best examples of animal operated gins and tread wheels and the application of water power to industrial processes. It is not necessary to live in an industrial town to study industrial archaeology.

Work in the field of industrial archaeology will involve school groups in recording evidence of physical remains. This is the main object of industrial archaeology, to record before the evidence is swept away for ever by neglect and demolition. It is not the intention of industrial archaeology to convert Britain into a museum of obsolete industrial plant and techniques. It is essential to preserve the most significant artifacts of Britain's industrial past, but how can these be identified without the need for constant surveillance and recording? The need to record will provide the school

group with opportunities to acquire the skills of surveying and drawing plans and elevations. Machinery and plant may be located that equally require careful drawing and recording. Here the skills in graphic reproduction acquired in the school can be put to work. Sketches and measurements taken in field survey books can be translated into accurate and finished diagrams in the school drawing office. Recording will also require photographic skills. The need to photograph artifacts under poor lighting or in cramped conditions will enable instruction to be given in the techniques of establishing correct exposure and the use of flash photography. Tape recorders can be used in interviews with people who once worked in the industry or at the processes and craft skills. By such recording pupils can be given a sense of achievement and a feeling that

they are assisting in safeguarding part of our national heritage.

Completed records could be deposited with a local library or record office. There may even be opportunities for publication in a school magazine, local newspaper or even the periodicals of industrial archaeology groups or county and local historical societies. The school could also assist with the National Record of Industrial Monuments started in 1963 as a joint venture by the then Ministry of Public Buildings and Works and the Council for British Archaeology. The national centre for recording information was transferred in 1965 to Bath University of Technology. For the purpose of this national survey details are recorded on standard C.B.A. (Council for British Archaeology) cards which provide spaces for the recording of site location, type of industry concerned, the nature of the remains and any references to the site in published sources or records. Space is provided for sketches and photographs. The cards sent to Bath are copied and then returned to the sender. By this method it is hoped to build up an important reference archive. Some counties are better covered than others but in none is the survey complete and in some the coverage is woefully inadequate.<sup>4</sup>

The machinery and plant located in surveying will enable school groups to study problems of technology at first hand. Watermills, windmills and horse gins will provide lessons in power transmission at an elementary level well suited to those at an early stage in the study of technology. The choice of materials used to construct machinery will enable discussion of the characteristics of such materials and those of substitutes that might be used today. Much plant and machinery would be too large for the school to attempt to preserve but smaller items such as hand tools and moulds could form the basis of a small museum collection which could be used for

future teaching. Obsolete tools could in many cases be demonstrated in the school workshops. Models of buildings, plant and power transmission systems could also be constructed as additional exhibits and teaching aids. In this way survey work outside the school and final 'records' made in the drawing office, workshop, library and classroom are related.

Apart from physical evidence other sources can be located to provide additional information. This is particularly important in the case of sites that have been altered or partially demolished or where the machinery has been removed. Research must be resorted to in order to try to fill in the picture. The school library may be able to provide books giving generalised information about industrial processes or styles of building but for detailed local information a larger reference library will be necessary. Often the city or county record office will need to be consulted. At large reference libraries with good local collections or record offices large scale maps may be consulted. The enclosure maps, estate plans, tithe award maps and deposited plans — all manuscript map sources will provide detailed information mainly for the first half of the nineteenth century or earlier. Large scale Ordnance Survey maps of 6", 25" or larger scales are available for later periods. Local trade directories were published for a number of localities before 1840 and are issued regularly for most urban areas after this date, while local newspapers can provide a valuable source of information. Record Offices may have leases, estate records, local tax assessments and even company correspondence and books. County and city record offices welcome small school parties working on particular problems. It is however essential for staff to write beforehand so that appropriate documents may be extracted, and it is often possible for a member of the record office to talk to the children about the documents, their significance and how

they may be used to locate information. A full list of public record depositories in the British Isles is published<sup>5</sup> and can be consulted in most reference libraries or purchased from booksellers. Schools situated at a distance from record offices could have appropriate records photocopied cheaply so that they could be used in the school.

School parties can provide valuable assistance on preservation and restoration projects, but these are usually of too large a nature for the school to take full responsibility. In connection with the establishment

of the museum sites administered by the Ironbridge Gorge Trust, several school parties assisted. Pupils in the locality carried out restoration work at Bedlam on an eighteenth century blast furnace site, Stoke Heath Approved School provided help in reconstructing a facsimile drift coal mine complete with narrow gauge tramway along which trucks could be hand hauled, while boys from Rainsford School, Chelmsford laid track to restore a tramway at Blist's Hill.<sup>6</sup> Preliminary restoration work on a privately owned watermill was carried out by fifth form pupils from North Featherstone County Secondary School, Pontefract as part of their C.S.E. course work.<sup>7</sup> Local industrial archaeology groups will be able to provide information on preservation projects within their area where assistance may be required. On suitable projects some pupils may become enthusiastic enough to volunteer assistance at weekends, as work is more likely to be in progress at such times. The restoration of small items of machinery or the manufacture of missing or defective parts may be possible in the school workshops.

Museum visits can provide valuable assistance in the study of industrial archaeology. For schools in the London area an obvious venue is the Science Museum at South Kensington, which offers various facilities for school parties. For groups studying particular aspects of technology gallery lectures can be organised which in some cases include the running of actual machinery or detailed working models. The library of the Science Museum might also be able to assist with information not available from local sources. Birmingham, Manchester and Derby also have industrial museums maintained by the local authority, while local industries are often featured in more general museums e.g. Coventry (motor industry) Norwich (textiles and shoes). A number of major industrial sites have in recent years been restored and opened to the public as



*Polegate tower mill near Eastbourne, the central feature of a milling museum open to the public. (John Upton).*

industrial museums. Amongst the better known of these are:

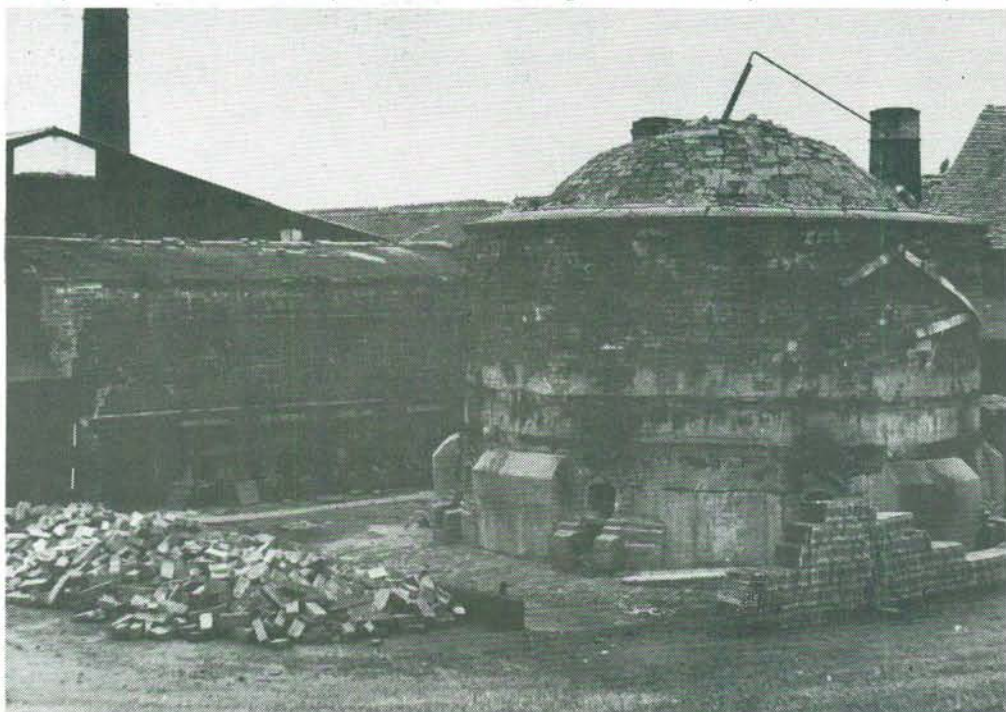
The Abbeydale Industrial Hamlet at Sheffield which is a restored water-powered edge tool manufactory.

The Ironbridge Gorge Museum which incorporates a number of industrial sites in the Severn Gorge near Telford in Shopshire including the first cast iron bridge (erected 1779) and the Coalbrookdale Works where Abraham Darby in 1709 first smelted iron using coke as a fuel.

The Kew Bridge Pumping Station with its collection of beam pumping engines assembled here by the Metropolitan Water Board.

The recently opened railway museum at York, numerous restored railway lines operated by steam, several maritime museums, the Tram Museum at Crich in Derbyshire and the Waterways Museum at

Stroke Bruerne, Northamptonshire provide generous coverage of many aspects of transport. Open air museums such as those at St Fagans (Cardiff), Avoncroft (Bromsgrove, Worcestershire) and Weald & Dowland (Singleton near Chichester, West Sussex) although designed primarily for the preservation of threatened buildings have developed displays of rural crafts, often using buildings erected for that particular trade. A few commercial companies such as Pilkington Brothers at St Helens in Lancashire have established museums to illustrate the history of the firm and its products. This list is nowhere near exhaustive and there are few museums in Britain that do not have some exhibits connected with local industry, trade and communications.<sup>8</sup> Museum visits must however be carefully planned with adequate preparatory work, specific items or areas designated for study at the museum, and



*Brick and tile kilns at Ware's works, Uckfield, Sussex — now demolished (John Upton).*

follow up activities based on the information obtained.<sup>9</sup>

Most schools will be content to use local museums but certain localities in the county are so rich in industrial sites of significance that school parties would benefit from a residential fieldwork course in the locality if this can be arranged. Likely areas, relevant to the work undertaken in school, will be suggested by consulting chapter 5 of the *Industrial Archaeologists' Guide* ('Some Sites Worth Visiting') or works listed in the *Project Technology Handbook 10* bibliography concerned with industrial monuments in particular regional areas. Two centres are listed below with the possibilities open to those operating from them:

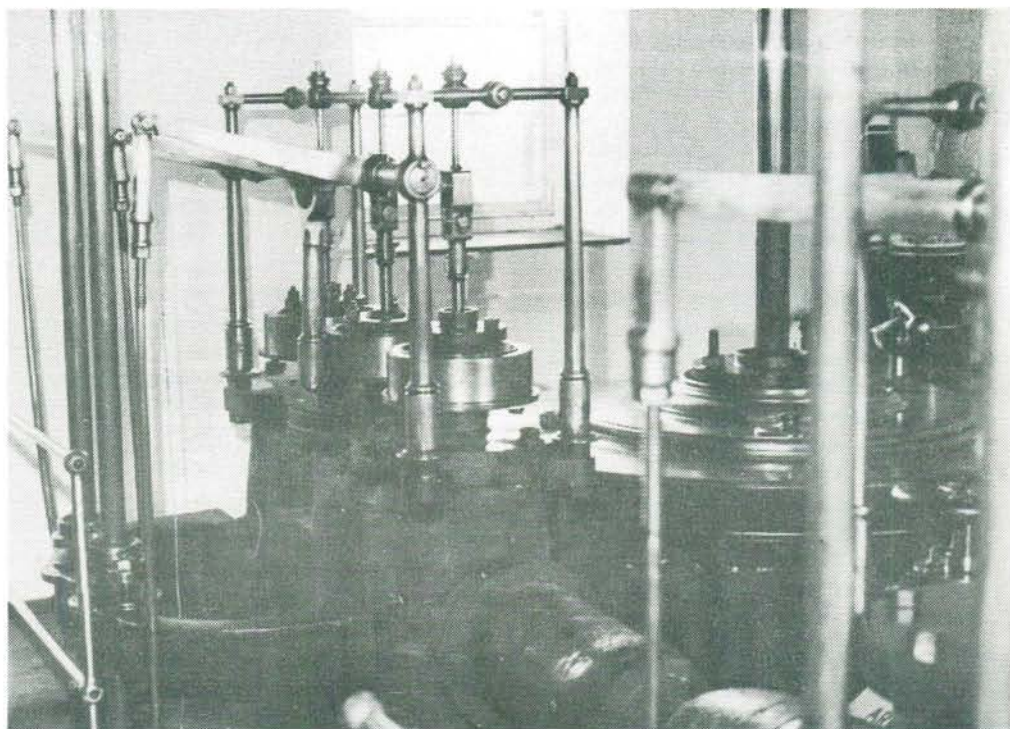
### 1. Matlock (Derbyshire)<sup>10</sup>

Visits could be made to Abbeydale (Sheffield) and the Tramways Museum at Crich. Textile mills established by Richard Arkwright at Cromford and Jeddiah Strut at Belper could be visited and also the associated housing and provisions made for the spiritual and material needs of the employees. A short walk from Cromford along the line of the Cromford Canal will provide examples of canal basins, warehouses, an aquaduct and an engine house with beam pumping engine designed to maintain water levels in the Canal by pumping water from the River Derwent. The Cromford and High Peak Railway opened in 1830 shows examples of inclined planes and their associated engine houses. Cheap but valuable explanatory leaflets with suggested walks and a description of the industrial sites to be



Machine for the production of land drainage pipes — mid-nineteenth century used at Ashburnham Brickworks, Battle, Sussex. (John Upton).





*Early nineteenth century beam pumping engine at Crofton, Wiltshire used to maintain water levels on the Kennet and Avon Canal. This engine is regularly steamed on public open days. (John Upton).*

seen are published by the Arkwright Society and are available from booksellers in Matlock.

## **2. Shrewsbury (Shropshire)**

The town itself has one of the earliest mills to use cast iron in its construction. This was a flax mill and stands in Castle Foregate. It dates from 1796. The Howard Street warehouse of the Shrewsbury branch of the Shropshire Union Canal of 1820 should be noted also. The Ironbridge Gorge Museum is within easy reach of Shrewsbury as is also the Ellesmere Canal at Chirk. This section of the Canal incorporates several major engineering works including a tunnel and two aqueducts, one at Chirk and the other at Pontcysyllte. The latter started in 1795 carried the the Canal 121 ft above the

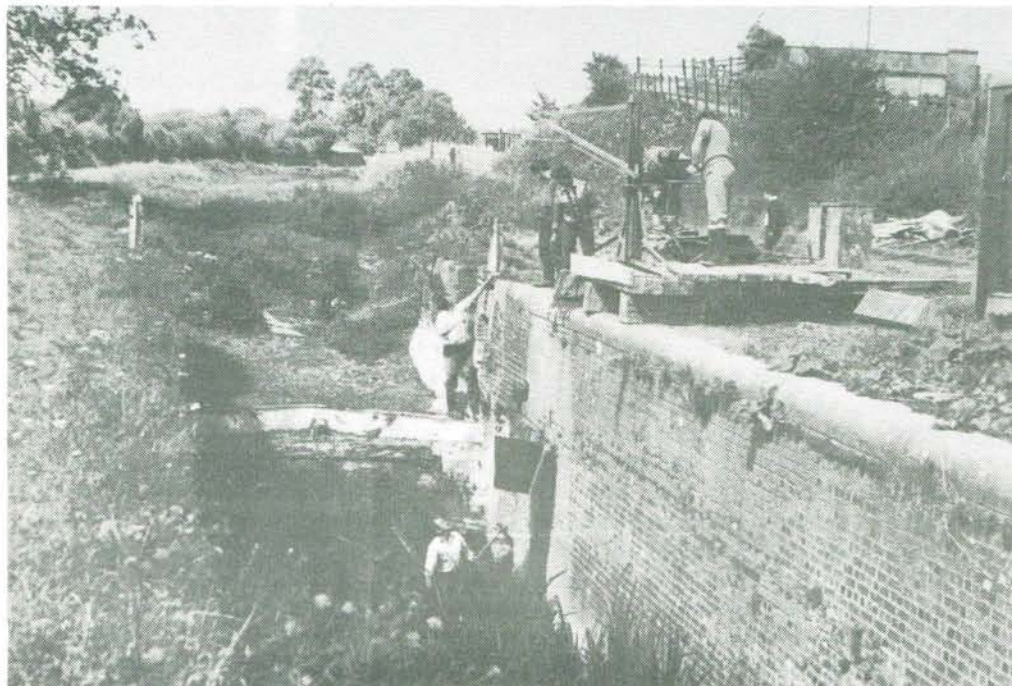
River Dee in a cast iron trough. Thomas Telford was the engineer of these works and also the improvements carried out between 1815 and 1830 to the London to Holyhead road (present A5) which runs through Shrewsbury.

The considerable interest generated by industrial archaeology is reflected in the range of teaching aids available. Apart from books there are the numerous pamphlets, guides and even teaching kits produced by museums. Filmstrips and slide sets are marketed by several producers and a list of these may be found in *Project Technology Handbook 10*. This list is not exhaustive and as it was published in 1973 does not include recently published items. For additional material the catalogues of the major distributors should be consulted but suitable items may well be listed there under the

social and economic history section rather than under technical studies. The B.B.C. in the Summer term 1974 screened four television programmes for schools under the title 'Out of the Past' concerned with industrial archaeology and issued associated pamphlets. Particular programmes in radio and television series may have relevance to industrial archaeology and thus it is always worth checking programme schedules as they are issued.<sup>11</sup> A number of 16 m.m. cine films are available and a range of these are listed in *Project Technology Handbook 10*. A. & C. Black publish a series of school textbooks on industrial archaeology. There are currently six titles in print covering *Cast Iron, Windmills and Watermills, Crossing the River, Roads, Canals and Railways*. The books are written by Christine Vialls and have a well illustrated but simple text calculated to appeal to children aged from about

9 to 12. They would therefore be very suitable for middle school use or for lower secondary age groups. Their aim is to open eyes, set young minds thinking and stimulate model making and experiment.

Industrial archaeology is an area of study that has many attractions for the teacher of Design and Technology. It offers opportunities for co-operation with other departments notably History, Geography and the Sciences and demonstrates the inter-relationships of a wide range of skills both academic and practical. It deals with concrete objects but stimulates intellectual activity by posing problems. Children can place themselves in the problem-solving situations faced by industrialists and engineers of past generations. It helps to explain the technological, economic and social factors that have influenced environment both in the past and the present, and by actively encouraging



*Clearing Great Bedwyn Lock on the Kennet and Avon Canal (August 1974) in connection with the restoration of the Canal (John Upton).*

its recording and preservation gives the school pupil interest in the conservation of an important area of Britain's heritage. All the advantages of flexibility are there to be exploited. Activities can be given an intellectual bias for more academically gifted children, or practical aspects can be emphasised. Examination boards are recognising the value of the discipline,<sup>12</sup> which can provide not only stimulation by its variety and breadth of field of study but can also promote interests which can be maintained in adult life.

## References

1. Schools Council, *Project Technology Handbook 10 - Industrial Archaeology* (1973), p.1.
2. Kenneth Hudson, *Industrial Archaeology* (2nd edn 1963), p.16.
3. Kim C. Leslie, 'The Ashburnham Estate Brickworks 1840-1968', *Sussex Industrial History* No.1 (Chichester 1970), pp.2-22.
4. A list by counties showing the number of cards submitted is published in Neil Cassons and Kenneth Hudson, *Industrial Archaeologists' Guide 1971/73* (Newton Abbot 1971), p.14.
5. The Royal Commission on Historical Manuscripts, *Record Repositories in Great Britain* (5th edn 1973).
6. D.W. Hutchings, 'Children help with Setting up Industrial Museum', *The Teacher* Vol.18, No.23 3 Dec. 1971.
7. Eric Holder, 'Industrial Archaeology', *Times Educational Supplement*, No.2976, 2 June 1972.
8. For lists of museums and their contents see the sections in Neil Cassons and Kenneth Hudson, *Industrial Archaeologists' Guide* and Kenneth Hudson, *A Pocket Book for Industrial Archaeologists*. Times of opening are listed in the annual publication *Museums & Galleries in Great Britain and Ireland*.
9. For valuable advice on museum and site visits see Madelaine Mainstone & Margaret Bryant, 'The Use of Museums and Historical Sites' in W.H. Burston and C.W. Green (eds.) *Handbook for History Teachers* (2nd edn 1972) pp.163-172.
10. An account of the fieldwork visit based on Castleton, Derbyshire by John Turner is to be found in the Inner London Education Authority publication *Design and Technology Journal*, Autumn 1976, pp.4-5.
11. The B.B.C. radio broadcasts for the 1976/77 season include schools programmes on steam power, Brunel, The first Thames Tunnel, The Engineers, The Railway Navvies, The Great Exhibition and the effect of industrialization on urban and rural landscape.
12. Schools Council, *Project Technology Handbook 10 - Industrial Archaeology* (1973) pp.22-3, lists a number of G.C.E. 'O' and 'A' level syllabuses in Technical Studies which involve aspects of industrial archaeology.