The aims and academic status of industrial archaeology

There seems to be fairly general agreement that the term 'industrial archaeology' was invented early in the 1950s by Donald Dudley, at that time Director of the Extra-Mural Department of the University of Birmingham, and afterwards Professor of Latin within the same university. Mr Dudley, however, made no claim to be an industrial archaeologist, and did no more than suggest that the academic and practical possibilities of something called industrial archaeology might be worth exploring. The subject's first real impresario was one of Mr Dudley's extra-mural colleagues, Michael Rix, who in 1955 wrote an article for *The Amateur Historian* which gave industrial archaeology, both as a name and as a range of study, to the world. Mr Rix, very wisely, made no attempt to define the subject, but made it clear that the material in which he was primarily interested belonged to the eighteenth and nineteenth centuries, the factories and mills, 'the steam-engines and locomotives that made possible the provision of power, the first metal-framed buildings, cast-iron aqueducts and bridges, the pioneering attempts at railways, locks and canals'. These, he felt, 'represent a fascinating interlocking field of study, whole tracts of which are virtually unexplored'.

Two comments could, with hindsight, be usefully made about Michael Rix's pioneering article. The first is that he made no attempt to suggest what form this 'fascinating interlocking field of study' should take, and the second that he assumed, rightly or wrongly, that industrial archaeology would necessarily be confined to what could be termed, in British circumstances, the period of the Industrial Revolution. Most of the controversy which has surrounded industrial archaeology since the publication of this pioneering article has centred on these two points.

In writing the first book to appear on the subject,[1] I myself refused to accept that industrial archaeology was necessarily and by definition concerned exclusively with the monuments of the Industrial Revolution.

> Everything has its birth and its old age and each industry has to be seen and studied against its own time-scale. In the case of the petroleum industry, for instance, the old and rare monuments date from the second half of the 19th

[1] *Industrial Archaeology : an Introduction* John Baker, 1963.

century. For atomic energy and for a number of plastics and synthetic fibres it is the 1940s that we have to consider. For iron bridges it is the middle of the 18th century. It is pointless and ridiculous to try to establish an arbitrary date which can be used to divide the old from the recent, the archaeologically approved from the archaeologically disreputable.

I went on to attempt a definition which I felt would not be unreasonably restricting to people who might feel drawn towards this new field of research: 'Industrial archaeology is the discovery, recording and study of the physical remains of yesterday's industries and communications.' This seemed to me then, and still does now, to say everything that needs to be said in the way of a definition, although subsequent experience suggests that it might have been wise to emphasise the word 'remains' and to use it frequently in one's writings, as a reminder of the essentially archaeological character of the work one was doing.

I certainly thought it advisable at that time, sniffing object-worshippers down wind, to give all possible support to the humanity and good sense of the founder and first editor of *Antiquity*, O. G. S. Crawford. 'Archaeology', he once wrote, 'is merely the past tense of anthropology. It is concerned with past phases of human culture.' I agreed completely with Crawford's insistence that the basis of culture is technology and I tried to make my position clear by saying that 'a good archaeologist must be interested in every aspect of the culture he has chosen to study – its technology, its social organisation, its political system. Otherwise, he cannot interpret what he finds, he cannot talk sense.'

In the third and extensively revised edition of the same work,[2] published thirteen years later, I suggested that industrial archaeology in Britain had passed through two stages of development and redefinition and was entering a third. Stage 1, I believed, had ended in about 1960. It had been characterised, I felt, by a notable crusading spirit. 'A small and curiously assorted body of pioneers devoted a great deal of time and energy to stirring up the public conscience about the rapid disappearance of buildings and machinery which document the history of British industry and technology, especially in the 19th century.' Some of these pioneers were undoubtedly sentimentalists and some had little knowledge of the workings of either industry or politics, but they believed in what they said and they performed an invaluable service in making the phrase 'industrial archaeology' known. Stage 2, which covered the Sixties and early Seventies, had three notable features – 'the creation all over Britain of amateur groups pursuing industrial archaeology as a hobby, the beginnings of a rudimentary National

[2] *Industrial Archaeology: a New Introduction* John Baker, 1976.

Register of Industrial Monuments, and the belated growth of academic interest in the subject', Stage 2 had passed into Stage 3 'at the moment when an increasing number of people begin to take stock of what has been achieved during Stage 1 and Stage 2 and to ask what it all means'. The bits and pieces, I felt, 'must add up to something they must contribute to the understanding of a wider field'. Industrial archaeology had entered into an inevitable period of heartsearching and quarrels. The honeymoon was over.

What began in 1963 as *The Journal of Industrial Archaeology* and ended ten years later as *Industrial Archaeology* was appropriate to industrial archaeology in Stages 1 and 2. This quarterly publication belonged to the subject in what might perhaps be called its describing years, when industrial archaeology still had a novelty value and when its practitioners were devoting themselves fairly wholeheartedly to amassing objects and facts, with little energy or inclination for philosophy. Neither the *Journal* nor *Industrial Archaeology* had much time for the cultural aspects of the subject. They reflected the point of view of people who felt that their work was urgent, because destruction was going on all around them and as much as possible had to be found, recorded and saved before the bonfires, the bulldozers and the scrap-metal merchants swept the remains of the Industrial Revolution out of existence. The psychology was not unlike that of a nation at war: 'We must win the war first and we can argue afterwards as to why it was worth fighting and what we ought to do after peace has arrived.'

When the successor to *Industrial Archaeology*, *Industrial Archaeology Review*, began its career in the autumn of 1976, it was vigorously attacked in a *Times Literary Supplement* review by Philip Riden (14 January 1977). His main reason for thinking little of the new venture was that it reflected what he called 'antiquarianism', that is, the pleasures of the collector, rather than the pleasures of the scholar. Industrial archaeology was, he felt, a shapeless heap, piece piled upon piece without discipline or pattern, a typical and valuable Stage 3 statement and one which quite a number of people might feel inclined to echo. In the course of an illuminating and not always good-tempered exchange of letters which went on for several weeks, Mr Riden was answered by, among others, Dr R. A. Buchanan, who struck a more hopeful note than the review which gave rise to the correspondence.

Industrial archaeology has suffered to some extent from the fact that much of its material can be and has been used by neighbouring disciplines – economic and technological history, post-medieval archaeology, vernacular architecture and so on – in supporting hypotheses and in illustrating generalisations. But industrial archaeology is beginning to perform this more

synthetical role for itself, and forthcoming issues of the *Review* will reflect this development of the subject.
(28 January 1977)

There are those who would consider such a statement over-optimistic. What it implies is, first, that industrial archaeology has accumulated a body of knowledge which constitutes at least the core of a subject or discipline; second, that it has developed, or is developing, certain methods of approach, rules of procedure, which are special to itself, and which are understood and followed by its practitioners; and, third, that, with its factual and methodological base secure, it is in a position to encourage outward thinking, that is, exploration of the links between industrial artifacts and the broader cultural development of society. What this might mean has been well described by one of Britain's foremost industrial archaeologists, Neil Cossons, the Director of the Ironbridge Gorge Museum Trust.

After insisting that it is essential, 'in reaching our own definition of the subject not to resort to excessive pontification or the setting of strict and rigid boundaries around something which is so new, so dynamic in character and in such a fluid stage of development'.[3] Mr Cossons goes on to express his own belief that 'industrial archaeology will define its own boundaries, techniques and disciplines, given time',[4] and then explains how he sees the vital matter of outward, contextual thinking.

He considers that the period of the Industrial Revolution 'provides the core area, the mainspring of industrial archaeology', but, he continues,

there is a diffuse penumbra, too, into which the industrial archaeologist, like the archaeologist of any other period, must go to provide a perspective and context for his main area of interest. Industrial archaeology spreads out chronologically, in terms of subject area and in terms of technique well beyond its obvious centre – hence the need for flexible boundaries. Like any other archaeologist (or historian) the industrial archaeologist must have an understanding of the antecedents of his particular area of study. Thus the evolution of wind and water power in the eighteenth and nineteenth centuries can only be fully appreciated in the context of much earlier developments. But to regard industrial archaeology as being concerned with only industrial activity within the last two centuries or so is also to reject the cultural definition. The industrial archaeologist, if he is to have any real

[3] *The BP Book of Industrial Archaeology*, David and Charles, 1975, p. 16.
[4] Ibid. p. 16.

understanding of the sites and artefacts of the Industrial Revolution, must look at the landscape in its entirety.[5] Industrial archaeology is in part a landscape study, and the industrial archaeologist cannot restrict himself wholly to the thematic approach. The Industrial Revolution created a new economy, a new landscape, a new way of life. In terms of the lives of all of us, as inhabitants of an industrial nation – the first industrial nation – it is the most relevant period of our past, not only because it is the most recent, but because the specific changes wrought during the last 2½ centuries provide the foundations of our present society and of all other industrial societies throughout the world.[6]

Mr Cossons believes that 'this one word "relevance" provides the key to the widespread growth of interest in industrial archaeology in recent years', and he is not referring, of course, only to Great Britain. The same consideration undoubtedly applies to all industrialised countries in some degree, although the time-span is rather longer in Britain than elsewhere and the quantity of available archaeological material is exceptionally large in relation to the area of the country.

Without disagreeing in the least with Mr Cossons's line of reasoning, one may perhaps be allowed to suggest that the monuments of the Second and Third Industrial Revolutions – the revolutions based on oil in the first instance and on electronics in the second – are just as significant and just as much in need of recording and safeguarding as those of the First. The tower from which the first American astronaut was launched into space in 1962 has recently been demolished, on the grounds that it was 'too expensive to maintain as an historical monument', which, in such a wealthy society, is hardly convincing. If it was right to campaign to save the Euston Arch, one of the most impressive reminders of the early days of railways, it is equally right to protest at the destruction of the spacemen's tower. In my view, not, alas, universally shared, the monuments of nineteenth century railways are no more and no less important than the monuments of twentieth century space-travel.

A second difficulty concerns a considerable proportion, possibly the majority, of the people who have been affected by what Mr Cossons has called 'the widespread growth of interest in industrial archaeology in recent years', the non-academics at the base of the industrial archaeology pyramid, the coolies who have carried out so many of the menial and

[5] Mr Cossons is a geographer by training and background, and the viewpoint which this provides is a valuable corrective to the purely historical and non-visual approach of so many industrial archaeologists.

[6] Ibid. pp. 16–17.

largely unpublicised tasks for the past twenty years. Industrial archaeology, like reading novels, is not simply an academic subject. It has become a matter of great and time-consuming importance to a wide range of people, from lorry drivers to architects and from plumbers to journalists. Industrial archaeology belongs to them just as much as it does to economic historians. They are very likely to become annoyed and rebellious at any suggestion that they should confine their interests to the survivals of the age of coal, iron, canals and railways. They are not preparing themselves to take examinations and not unnaturally want to make discoveries for themselves, not to be kept padding reverently round the same well-trodden pastures. With rare exceptions, these discoveries are now to be made in the places connected with the industries of the twentieth century, not of the nineteenth. The coolies may possibly be antiquarians, although it is difficult to be sure of this, but they expect to get pleasure and satisfaction from what they do in their spare time. If they fail to find this in one direction, they will certainly look in others.

The amateur–professional controversy has to be stated in plain terms. Has industrial archaeology reached the point at which it can afford to regard itself as a wholly professional affair, with no need of its unpaid enthusiasts? If it has, then bodies like the Society for Industrial Archaeology in America and the Association for Industrial Archaeology in Britain are hypocritical shams, ripe for early extinction. If it has not, then the needs and interests of the people who make up the bulk of the membership of these societies – not all the enthusiasts, of course, belong to societies – must be recognised and catered for. What is unpardonable and suicidal is any idea of a first and second level of membership, of officers and other ranks, a situation which is very close to being reached in Britain. The draft of the joint policy statement of the Association for Industrial Archaeology and the Council for British Archaeology, circulated among members of the AIA in Britain at the end of 1976, included a revealing and unfortunate sentence. 'In the study of industrial archaeology,' it said, 'practice has preceded theory, and voluntary enthusiasm has outstripped institutional organisation.' Was man made for the Sabbath, one is tempted to enquire, or the Sabbath for man? Are the spare-time industrial archaeologists to be reproached for their over-enthusiasm? Of course practice has preceded theory, if only for the reason that more people are interested in practice than in theory. The intellectual, the person whose life is dedicated to the objective analysis of facts, theories and attitudes, is a rare animal. But the sentence quoted above is singularly lacking in both grace and gratitude. Industrial archaeology may still be little more than a yard full of bricks from which nothing as recognisable as a house has yet been built, but a great many bricks have been made and carried there by

people inspired by 'voluntary enthusiasm' and by little else.

At this point it may be useful to mention the results of a brief questionnaire which I sent to eighteen of Britain's most prominent archaeologists during the summer of 1976, people concerned with the prehistoric, Roman and medieval worlds. They were asked:

1. Do you take Industrial Archaeology seriously?
2. If the answer to (1) is 'No', what would have to be done about Industrial Archaeology in order to make it worthy of serious attention?
3. We have now had 15–20 years of widespread interest in Industrial Archaeology, in this country and elsewhere. Do you think this interest has achieved anything socially, educationally or academically helpful, and, if so, what?

Thirteen of the eighteen replied, an unexpectedly high proportion, and their views may come as a surprise to many people, both inside and outside industrial archaeology.

Of those who replied, eleven said they did take industrial archaeology seriously, and two said they did not. There were, however, certain reservations which are most effectively and fairly presented in the actual words used.

'I admit to feeling that the title [industrial archaeology] is something of a misnomer in some cases, in that it often very properly employs historical rather than archaeological sources.'

'Yes, except when industrial archaeologists start taking themselves too seriously.'

'Yes. In theory archaeological field techniques could usefully be carried out on industrial sites, e.g. on sites inadequately documented.'

'Not personally, except where it is related to ethnology, e.g. the study of modern mills in "backward" areas.'

'Of course I take industrial archaeology seriously, as I take all aspects of archaeology. I think it was a slight mistake to call it industrial archaeology because it is only one aspect of the archaeology of the last 200/300 years, but it clearly made the public interested and this was a good way to do it.'

Three of the thirteen offered suggestions for improving the status of the subject:

'It still seems to lack an academic background, i.e.

integration with modern history, and it still seems to be an "amateur" study, carried out by people who just like it (cf. railway and steam traction enthusiasts). The interest is wide, indeed wider than archaeology, but not to the *same people*, as it should be.'

'There is no clear definition of "industrial archaeology" that distinguishes the subject as a discreet area of study, whilst serving as a useful umbrella term. I think that it is applied rather loosely to areas of study that are in my opinion more accurately described as history of technology, history of industry, local history, social history, etc. The "archaeology" part is now to my mind thoroughly misleading, and improperly defended.'

'It is desperately in need of redefinition and reorganisation. I.A. stands where conventional archaeology stood 100 years ago – largely dilettante antiquarianism, lacking professional and academic standards. In particular, if they are to justify the title "archaeologists", most I.A. enthusiasts, with a very few outstanding exceptions, must submit themselves to the disciplines of conventional archaeology.'

The archaeologists were inspired or provoked to write a good deal in answer to the third question. The achievement of industrial archaeology had, they felt, been remarkable in some ways, less impressive in others. Broadly speaking, it had done very well socially, moderately well educationally and poorly academically.

'*Socially*: as an active or passive leisure pursuit; improving social awareness.
Educationally: availability of and contact with the real thing is inevitably a powerful educational tool.
Academically: as an interdisciplinary area and involving both technical and academic skills, it lacks the cohesiveness of a traditional subject area and therefore has had a slower impact. Useful contributions are being made, but the potential may be restrained by present academic structures and less easy to quantify. Like any "new" subject, it is still breaking the "dilettante barrier".'

'*Socially*: yes, people are more interested in recent things that they can understand, especially machinery and technology.
Educationally: yes, in making people aware of their environment.

Academically: I'm more doubtful. It is particularly deplorable that in Birmingham of all places, I.A. is marginal in our modern history courses.'

'*Socially*: (no comment)
Educationally: it has already provided, in a number of areas which are lacking in interest national monuments of the traditional type, a nucleus of sites and buildings that can be visited by classes and groups and which provide a link with the immediate past of the community and are therefore readily understood.
Academically: it provides the background essential to a proper appreciation of the historical and social development of the country during the Industrial Revolution and, to a lesser extent, of the preceding ages.'

'*Socially*: appreciation of a wasting historical asset and heritage while there is still time to save a great deal.
Educationally: enjoyment and interest of life. There is enormous public interest and response.
Academically: the interest is largely local or, at best, national; not international.'

'*Socially*, *Educationally* and *Academically*. Many people who were born into and live in industrialised areas are becoming less inhibited about proclaiming that the area they live in and the industries associated with those areas do have a past, do have a "history" that people will be interested in, both in an academic and an entertainment/educative sense.
How much of this has to do with the industrial archaeology movement I am not sure. I think it has more to do with a loss of community identity; rapid changes in life-style, both personal and at work; television – nostalgia makes good television. I think this interest and awareness of our "industrial heritage" would have emerged in the last fifteen years whether it were called "industrial archaeology" or something else.
Whatever the process of evolution of the study has been, it has broken down some of the snob barriers between science and art, history and local history, etc., but there is still a long way to go before most schools and colleges really get to grips with the real concept of industrialisation and how it can be related to local studies and academic work at higher levels.'

'*Socially, Educationally, Academically* In the 1960s a lot of basic research and fieldwork was undertaken in Northern Ireland but for one reason or another it is only now that this is being written up. The resulting Stationery Office publication should have a considerable impact, particularly in the educational field, at all levels. The widespread interest in the subject should crystallise rapidly and with far-reaching results once the official publication sets the limits of the new field and brings it fully into public view.'

'*Socially, Educationally, Academically* I am sure it has done so. I would like to think that it has brought matters archaeological to a wider public than the often feverish devotees of everything earlier than 43 A.D. and nothing much later than 410 A.D.'

'*Socially, Educationally, Academically* Yes, in all these respects, but what is wanted, from my limited knowledge, is more field work – solid survey with excavations.'

'*Socially*: yes, greater awareness by amenity/preservationist groups, and to a lesser extent the general public of the importance of the industrial heritage.
Educationally: marginally. I.A. is in some areas a useful basis for local history studies. However, in general, it is badly taught.
Academically: hardly at all. Archaeology itself is only now coming to terms with its interdisciplinary nature, I.A. not at all. It is still ill-defined and subject to individual whims in its interpretation and application.'

'*Socially, Educationally and Academically* Viewed as an aspect of local history, I think the subject has proved of interest educationally. Divisive elements have tended to lessen the social and academic impact of the subject.'

If one reflects on these comments, two main lines of thought are apparent. The first is a general belief that industrial archaeology, however well or badly practised, has done a great deal to increase public interest in that aspect of history which is referred to as 'our industrial heritage', or 'our industrial past'. The second is that nobody really knows where to place industrial archaeology academically. The chief reason for this bewilderment and suspicion, it may be suggested, is that the wrong criteria are being applied, or, as one of our respondents more delicately put it, 'the potential may be restrained by present academic structures and less easy to quantify'.

One of the principal difficulties with which we are faced is linguistic. It is only during the present century that the word 'archaeology' has become identified with excavation, largely as a result of the remarkable discoveries made in Egypt and Crete by men who had to dig their way into history. As a result of this narrowing of meaning – before 1900 and even later, 'archaeology' was used in the general sense of 'tangible remains of the past' – anyone who claims to be an archaeologist and does not produce evidence of having excavated tends to be regarded as an impostor. What are called, confusingly and somewhat arrogantly, 'archaeological techniques' are for the most part excavation techniques. It is not difficult to identify and list them. They consist, in their logical order, of painstakingly stripping layer after layer of soil and debris from the site; meticulously observing and recording everything revealed by the excavation, in relation to the depth and physical context of whatever is found; subjecting objects to a range of laboratory tests in order to determine their age and composition; relating one's discoveries to the evidence already produced by archaeologists working elsewhere; publishing a description and interpretation of one's work in a form which is intelligible to other scholars and researchers.

In some cases – an early ironworks or pottery are obvious examples – all these techniques may be applicable, but for the most part the industrial archaeologist is necessarily concerned only with the last two. It is, it may be suggested, the fact that the first three do not form part of his world which causes him to be so often written off as a charlatan or dabbler, a person not entitled to the honourable title of 'archaeologist'.

What does not seem to be sufficiently realised or acknowledged is that industrial archaeologists, unlike Stone Age archaeologists, operate in a field in which there is a great deal of written evidence. They amplify and correct the record, but only in very rare instances do they create it. If he had the opportunity, every Bronze Age or Egyptian archaeologist, one supposes, would be delighted to interview the people whose artifacts he has discovered or to read their reminiscences, but the fact that he cannot do this does not, in itself, make him intellectually and academically superior. To the conventional archaeological techniques listed above, the industrial archaeologist can and should add a group of his own. He has an opportunity and duty to study and collect the observations and memories of people who worked on the premises with which he is concerned and who earned a living from the machinery once installed in them. He records, by means of photography, drawings and written descriptions, structures which are still standing, paying careful attention to the materials employed and to the technology involved. He has to familiarise himself with the full range of printed material, from trade catalogues to the reports of Government enquiries, which has a bearing on the site to which he is devoting his attention.

This specialist work is in every way as important and as professional as excavation. It can, like any other form of scholarly work, be done well or badly, but its aim can only be to improve our understanding of the past. This is what archaeology is about. To say, as one of the respondents did, that 'if they are to justify the title "archaeologists", most I.A. enthusiasts must submit themselves to the disciplines of conventional archaeology' is largely meaningless. Industrial archaeology, as I have indicated, demands a special range of disciplines, which overlap with those of 'conventional archaeology', but which are not and cannot be identical with them. The main purpose of the present book is to provide industrial archaeologists in a number of countries with the chance to make this fact clear and to illustrate the contribution they are making to a more comprehensive and more convincing awareness of the recent past. In the process I hope the truth will emerge that the activity of reconstructing working conditions from what remains of a factory is essentially the same as reconstructing the life of a prehistoric community from its rubbish dumps and the foundations and floors of its huts. In both cases, satisfactory results can be obtained only by marrying scientific investigation with a freely and vigorously functioning imagination.

The techniques appropriate to the study

In any field of investigation, the techniques employed are presumably selected and developed in order to meet two criteria: they should contribute towards a better overall understanding of the subject which is being studied and they should make it possible to extract the maximum amount of useful information from the historical raw material which is available. What they should not primarily do, except under very unusual political circumstances, is to demonstrate the manual dexterity of the investigator or his ability to make a particular piece of equipment, scientific formula, or system of organisation work satisfactorily and impressively. Techniques do not exist for themselves. They are for a purpose and before discussing the techniques it is as well to be agreed on the purpose.

What, in the case of industrial history, do we want to know? It is too facile to answer this question by saying that we are aiming at a more complete awareness and understanding of the industrial past. We have to consider what the elements of such an understanding might ideally be. There would seem to be four main headings under which we could usefully classify our needs. Different kinds of historian would probably list these headings in a different order, to indicate the emphasis of their work and the nature of their specialisation, but for our present purpose any concept of priority is irrelevant and unhelpful, since we are considering the complete picture, not individual parts of the composition. We could therefore specify our needs in something like the following form.

First, we have to know as much as possible about the conditions of work at a particular period, and about the attitude of the employers, workers and the general public to those conditions. Second, we require information about what the different parties – workers, owners, managers, financiers, investors – have got out of this or that process, plant or method of working, in the way of income, satisfaction, accidents, ill-health, standards of living. Industry, after all, is for something. It does not exist for its own sake or in a vacuum. Thirdly, we want to understand how the job was done, what the techniques were and how the machinery and equipment was used. Fourthly, we must be able to comprehend, both intellectually and emotionally, the scale of whatever

industrial operation is engaging our attention. Finally, we shall do our best to record or recreate the physical environment in which the work was carried out and in which the workers and their families lived.

How much of this is properly the concern of the industrial archaeologist and how much is better looked after by other breeds of historian is a matter for argument and possibly disagreement. At the moment it seems necessary to say only that the total aim of historical enquiry is two-fold, to bring ourselves closer to an understanding of what it was like to be alive at a particular period and, with the hindsight and perspective provided by the passage of time, to assess the significance of past events and achievements. To be of value, industrial archaeology must contribute to the realisation of one or other of these aims and, wherever possible, to both.

It is well to realise, however, that the industrial archaeologist, like the historian in general, may be forced to work within certain political limitations. The conditions of free enquiry which exist in Western Europe and North America are not typical of the world as a whole. In the Western world an accepted and widely used technique nowadays is to collect the reminiscences of veteran workers, in order to discover first hand the details about processes, machines, motivation and working conditions which might otherwise disappear unrecorded. This procedure is not encouraged in the Socialist countries, except under a fairly tight discipline. It is permissible, for instance, to ask an old worker purely technical questions – 'what kind of tool did you use to do that?'; 'when do you remember that machine being first used?'; 'how long did the bricks have to stay in the kiln?' – but not questions about attitudes or working conditions, unless the aim is to collect political ammunition. Once it has been officially decided that the past was bad, or at least selectively bad, and that the present is good, any kind of free-ranging enquiry is obviously full of potential dangers.

It should be mentioned, too, if not emphasised, that in most countries – by no means only the Socialist countries – there are many apparently inoffensive sites and structures which one is not free to photograph. In Britain and the United States, one is at full liberty to photograph almost anything, provided one does so from a point normally accessible to the public, but any attempt to take pictures of factories, bridges, railways, or aerodromes in, say, the German Democratic Republic, the Soviet Union, India or Greece may well result in serious consequences, including imprisonment or expulsion from the country.

In the present book one is writing from a British or American standpoint, which is as near to an historian's ideal as one is likely to get. To say that one is trying to do this or that, and that one should proceed along the following lines makes perfect sense within what is, for good reason, called the Free World. Within the majority of countries, how-

ever, it is likely to be regarded as a counsel of perfection at best and as wild, irresponsible day-dreaming at worst.

Having made this clear – and no previous book on industrial archaeology has ever put these blunt truths into print – one can proceed to discuss and examine what appear from their results to be the most fruitful techniques which have been used by industrial archaeologists and to relate them to specific examples and to the broad range of concepts and aims indicated above.

Superficially at least, the most straightforward type of industrial archaeology project consists of the preparation of a descriptive report on what can be seen on a site. In its simplest form, such a description would read:

Thwaite End Coke Ovens SD 494696. Remains of a bank of beehive ovens on east bank of canal.[1]
or
Former Bermondsey Leather Market (early 19th c.) 331796. Western Street, Bermondsey, S.E.1. Three-storey yellow brick and stone building, with giant Doric pilasters and entablature. Warehouses and remains of Brine House behind.[2]

Such a record, although not without its value, is obviously more useful if it is supplemented by some kind of visual material, in the form of photographs or a plan. As it stands, it provides no indication of the size of the building or the ruin, nor of its immediate environment.

A more satisfactory description, giving a brief history of what is on the site and adding details of the surviving buildings, is of the type now adopted as standard by the Historic American Engineering Record. Here is an example from the Inventory of the Lower Merrimack Valley, produced jointly by HAER and the Merrimack Valley Textile Museum in 1976.

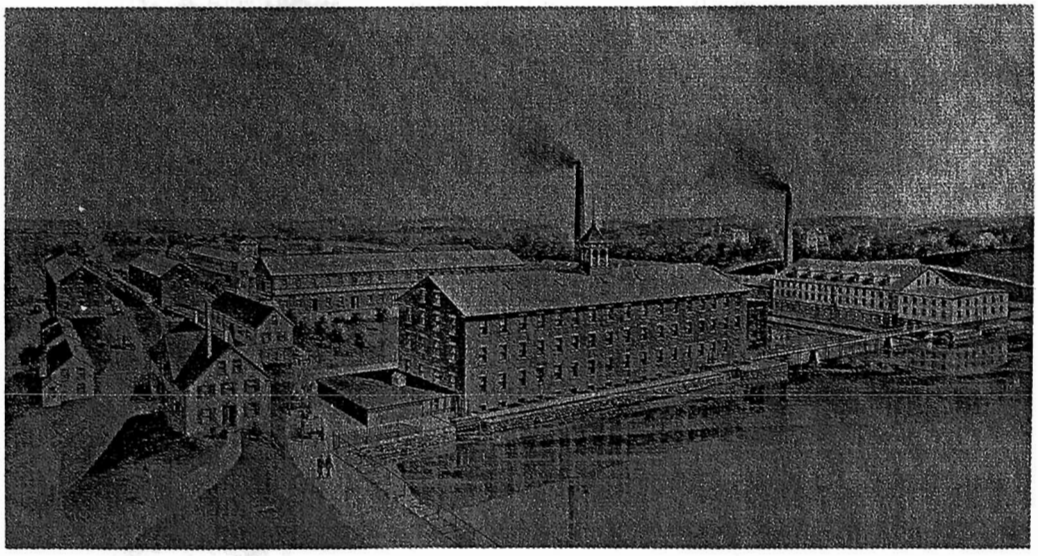
Ballardvale Mills	Lawrence
204 Andover Street	19 . 323000 . 472150
Andover	

The Ballardvale Woolen Mills were established in 1835 by John Marland, the son of an early Massachusetts woolen manufacturer, on the site of a saw and grist mill on the Shawsheen River. Marland was an ambitious manufacturer, and by 1848 he had erected two large mills,

[1] Owen Ashmore *Industrial Archaeology of Lancashire* David and Charles, 1969, p. 254.

[2] *Industrial Monuments of Greater London* compiled by John Ashdown, Michael Bussell and Paul Carter. Thames Basin Archaeological Observers Group, 1969, p. 49.

powered by water and steam, a sizeable storehouse, and several smaller frame buildings. In 1841 Marland imported English worsted machinery for the purpose of manufacturing delaines, a cloth woven with yarns of worsted and cotton. This was the first instance of American worsted making by power driven machinery, and was apparently not entirely successful. In 1857 Marland went bankrupt, and the mills passed under the control of Josiah P. Bradlee, a Boston merchant who was Marland's chief creditor. Under Bradlee's conservative leadership the company fell back upon the manufacture of flannels composed of a cotton–woolen blend. In 1872 the mills contained 13 sets of cards, 104 broadlooms, and employed 200 hands, making it one of the largest woolen mills of New England. The company went out of business in the 1950s and the buildings have been tenanted ever since. In 1872 power was by water (160 HP) and steam (100 HP). A masonry dam, 200 feet in length, built in 1835, provided about 12 feet of fall. None of the water wheels or engines have survived. The 1835 mill is intact, although the skylights on the pitched roof have been shingled over and the cupola has been removed. The mill is four stories high, brick, 150′ × 45′. The picker house, engine, wheel and boiler house which have been attached to the main mill have been removed. A wool storehouse, built in 1848, is constructed of uncoursed granite rubble and brick. About



Ballardvale Woollen Mills, *c.* 1900.

1880 an almost identical storehouse was built across the street from the 1848 structure. Two large wooden structures, about 200 feet to the north of the 1835 mill, which were used for tentering, are intact. In 1842 Marland built another large mill, the first floor of which consisted of random coursed granite rubble. The upper two stories were of wood. The mill had a pitch roof, with skylights and dormers, which have since been removed. The wooden parts of the mill have also been covered with asbestos shingles. The mill and wheelhouse, also dating from 1842, are largely intact, as well as the attached boiler-engine house (1842) and dyehouse (1871). (K. E. Foster, ed. *Lamb's Textile Industries of the United States* (Boston 1916), vol. II; HHEC; Insurance Survey # 788 'Ballardvale Mills', MVTM)[3] [HHEC = D. Hamilton Hurd (comp.) *History of Essex County* Philadelphia, 1887, 2 vols.]

This is clearly a much more satisfactory record than the two items previously quoted. We have the history of the mill's ownership and use; details of its power supply and machinery; a description of the buildings as they are today, with an indication of the changes which have occurred on the site in more recent years; measurements; and a note on the sources used. An engraving of the mill complex as it was in about 1900 brings the written description alive and allows us to see the various buildings in relation to one another.

Having said this, one might usefully point out what we are not told and what we can only guess at from the information provided. We know practically nothing about the interior of the mills, the way in which the space on each floor was divided, the lighting and ventilation, the sanitary and heating arrangements, the general condition of the premises. We are left ignorant of the balance of the labour force between men, women and children, at different periods, of where the workers, the owner and the management lived, of labour recruitment and labour relationships during the working life of the mill. We have no idea as to whether, by comparison with other textile enterprises in the district, Ballardvale was considered a profitable, well-run, well-maintained mill or whether it had the reputation of a good or a bad place to work. The firms which have rented space in the buildings since the 1950s, when the original company went out of business, are left anonymous.

[3] *The Lower Merrimack Valley: an Inventory of Historic Engineering and Textile Sites.* Sponsored by Merrimack Valley Textile Museum, North Andover, Massachusetts, and Historic American Engineering Record, National Park Service, Washington DC. Directed and edited by Peter M. Molloy. Historic American Engineering Record, National Park Service, United States Department of the Interior, 1975, pp. 7–8.

This is in no way to accuse either the author or the editor of incompetence. It is simply to show how much more information one requires in order to be able to know and understand the history of the Ballardvale Mills. There is, of course, no end to an historian's possible demands. One kind of historian, for instance, may be interested to know if there were ever any strikes at the mill and, if so, what the causes were. Another may wish for details of the sickness rate among workers there. Without wishing to appear a purist, one could reasonably say that the industrial archaeologist is under no obligation whatever to provide such information. He should, however, be aware that these are important factors in industrial history and he should be on the lookout for any archaeological evidence which might be relevant to them. Do the buildings appear to be unusually badly lit or damp, for instance? Is the ceiling height exceptionally low? Does the stone or brickwork have a heavy coat of soot on it, indicating that the pollution of the area from the factory smoke-stacks was particularly severe? These are archaeological details and the wide-awake, imaginative archaeologist will note them instinctively. If they are not observed and no record is made of them, all trace of them disappears for ever if, as not infrequently happens, the building is burnt down or demolished a short time after the survey has been made.

The circumstances of any archaeological project must to some extent condition the amount and type of information that can be extracted from it. The HAER surveys are carried out with facilities better than anything so far available elsewhere in the world. The Lower Merrimack Valley inventory, for instance, from which the extract concerning the Ballardvale Mills was taken, had the full-time services for several weeks of the curator and administrative staff of the Merrimack Valley Textile Museum, which is quite possibly the best of its kind in the world, together with the help of experts from the Historic American Engineering Record and of paid, experienced researchers and fieldworkers. This situation, which has been repeated several times during the past five years in different areas of the United States, has never occurred at all in Britain, which has a good claim to have pioneered the study of industrial archaeology and which had nearly ten years' start over America. Work in Britain is carried out almost entirely by individuals, usually operating from a university or a museum base, or by local voluntary groups. Very little in the way of supporting funds is available and there are those who would consider the British achievement under these circumstances to be nothing short of miraculous. The industrial archaeology 'professional' in Britain hardly exists, with a mere handful of people in academic posts who are able to devote most of their time to the subject, rather more in museums and perhaps four in various Government institutions. Whatever the situation may be elsewhere, industrial

archaeology in Britain is very much a spare-time and amateur affair, and its results and techniques have to be judged against this background. This is not to say, of course, that the work done by amateurs need be sloppy or lacking in system. With archaeology as with golf, the more one practises and the better one's training, the more pleasure and satisfaction one is likely to get from it.

For all but a very few amateurs – the word is used in no derogatory sense – the study of industry, transport and technology is bound to be mainly a branch of local history. Time and money could hardly make it otherwise. Before industrial archaeologists became at all numerous, Britain had a well-established tradition of using and sometimes exploiting the energies of amateur local historians and excavation-archaeologists. By the 1950s, if not earlier, it was fairly generally, if not universally accepted that people working in their spare time could obtain a great deal of useful information which could be digested and eventually published by professional scholars and writers and, in a few cases, by particularly talented and determined amateur researchers themselves. It is indisputable that in Britain, as a result of all this activity and mutual help, both the knowledge gap and the psychological gap between amateurs and professionals were a good deal narrower in 1955 than they had been twenty years earlier, a fact which was particularly important in the specialised field of industrial archaeology, where there was an enormous quantity of nineteenth- and early twentieth-century industrial material in the process of being swept away during the rebuilding and modernisation which was taking place during the post-war period. Without the on-the-spot knowledge and, even more important, the presence and the enthusiasm of local people, it would have been quite impossible to have discovered and recorded this great mass of buildings and machinery at all, before it was scrapped or bulldozed out of existence. The fact that much was missed and that much of the recording was done inadequately are matters for regret, but only the most vindictive or dog-in-the-manger critics would claim that, if the work could not be carried out to the highest academic standards, it would have been better not to carry it out at all.

But one should never allow proper standards to fall out of sight. There are some very wise words on the point from one of the greatest of our local historians, the veteran W. G. Hoskins. Writing at a time (1959) when industrial archaeology was still very much in its infancy, he insisted that 'there is no excuse for amateur work being bad' and, after noting that the amateur, who is in the game for pleasure, can bring to his labours a zest and a freshness of approach which the overworked professional can rarely achieve, he explained why the amateur historian should take his hobby seriously and never stop widening his horizon and improving his technique.

> Primarily I regard the study of local history and topography as a hobby that gives a great deal of pleasure to a great number of people, and I think it wrong to make it intimidating, to warn them off because they have not the training of the professional historian. It is a means of enjoyment and a way of enlarging one's consciousness of the external world, and even (I am sure) of the internal world. To acquire an abiding 'sense of the past', to live with it daily and to understand its values is no small thing in the world as we find it today. But the better informed and the more scrupulous the local historian is about the truth of past life, the more enjoyment he will get from his chosen hobby. Inaccurate information is not only false; it is boring and fundamentally unsatisfying.[4]

The point could hardly be better made, but Dr Hoskins is concerned with the situation in Britain. In other countries, and especially in the United States, there is quite a different consideration and one of the greatest importance, to be observed. There is a growing surplus of trained professionals seeking employment and strongly disinclined to allow the bread to be snatched from their mouths by amateurs. The United States attempted to deal with the problem during the Depression years of the 1930s by hiring unemployed architects and photographers to produce work for the Historic American Buildings Survey, which was then in its infancy. The superlatively good drawings and photographs from this period, now safely stored in the Library of Congress, were done by experts who desperately needed the work. They set both a standard and a precedent which have been carried over into America's industrial archaeology period, and many of the beautiful measured drawings to be found in HABS's cousin, the Historic American Engineering Record, have been made by architectural and engineering students and recent graduates who have taken part in officially sponsored surveys as paid helpers and have been glad of the money. There is also in America a category of persons known as historical archaeologists, who are also to be found in some profusion in the labour market. They, like the more traditional history graduates, also see industrial archaeology as their preserve.

Given this situation, and funds to provide at least seasonal employment, it would be surprising if the level of recording in American surveys were not high. The HAER inventories, from which the Ballardvale entry was taken as an example, are printed direct from HAER record cards. The reproduction of this particular card shows the edge-punching which allows the information to be retrieved and sorted electronically.

[4] *Local History in England* Longman, 1959, p. 4.

The cards used for industrial monuments surveys in other countries, notably Britain, France, Denmark, Sweden and West Germany, vary greatly in the quality and quantity of information they contain. Each country tries to learn from another's mistakes and it has been Britain's misfortune, in this, as in many other aspects of the national life, to have been the first in the field. In every Western country apart from the United States, the record cards have been completed piecemeal by volunteers who have sent them in as and when they have felt inclined. The quality is necessarily very uneven, and, looking at the national areas as a whole, there are some patches which are relatively well covered and others which are deserts. It has become clear that there is no substitute for the American method of descending on a fairly compact and cohesive region – the Lower Peninsula of Michigan, the Mohawk–Hudson area, the Lower Merrimack Valley – and, with a well-equipped and varied team of experts, blitzing it with all the financial and technical resources at one's command. The results of the survey can then be brought together, edited and published quickly – facsimile typescript is perfectly adequate for the purpose – so that the work can be in the hands of anyone to whom it will be useful within two years or less of the fieldwork being carried out.

Presented in this way, the material is cumulative in both its effect and its value. In the Lower Merrimack volume, for instance, there are about 300 entries for individual sites, together with a number of well-reproduced pictures and maps, a bibliography and a general introduction describing the industrial development of the region. In five precise,

HAER inventory

HAER INVENTORY

1. NAME OF STRUCTURE: Tower Hill High Pressure Stand Pipe
2. DATE: 1896
3. NATURE OF STRUCTURE: Reservoir
4. INDUSTRIAL CLASSIFICATION: 310
5. LOCATION: STREET & NUMBER: near intersection of Hillside Ave. & Yale St.
CITY OR TOWN: Lawrence
COUNTY: Essex
STATE: MA
6. USGS QUAD MAP & UTM GRID REF: Lawrence 19.321000.473045
7. OWNER OF PROPERTY: City of Lawrence
ADDRESS: Lawrence, MA 01840
8. CONDITION: X EXCELLENT GOOD FAIR DETERIORATED RUINS UNEXPOSED ALTERED X ACCESSIBLE TO PUBLIC

9. DESCRIPTION & BACKGROUND HISTORY: NUMBER OF STRUCTURES, DIMENSIONS, FABRIC, STRUCTURE & FORM, SURVIVING MACHINERY, FITTINGS AND EQUIPMENT, APPROX. AREA OF SITE; ALTERATIONS, PRESENT USE; ENGINEER ARCHITECT DESIGNER, IMPORTANT EVENTS & INDIVIDUALS.

The Lawrence high pressure stand pipe was constructed in 1896 to supply water to areas in the neighborhood of the reservoir as well as the business and mill district of Lawrence, which required high pressure water for fire prevention purposes. The stand pipe itself is steel, 102 feet high and 30 feet in diameter, with a capacity of 528,768 gallons. It has an 8 inch overflow pipe which conducts excess water back to the reservoir. The tank is enclosed by an octagonal tower which is 157 feet in height from the foundation to the top of its octagonal turret roof. The lower 27 feet of the tower consists of random coursed granite blocks, and the remainder is of brick. Above the level of the stand pipe there is a balcony, which is covered by the chateau style roof sheathed in copper. Beside the octagonal tower is a round stair tower which is slightly shorter than the main structure. This stair tower has a round chateau style turreted roof. Narrow windows with semi circular arches are placed at intervals throughout the height of both the octagonal and round towers. The stand pipe was designed and constructed by Arthur D. Marble, the city engineer. Marble also constructed the tower. George G. Adams of Lawrence was the architect of the tower. Albert F. Noyes was consulting engineer.

10. PHOTOGRAPHS & SKETCH MAP ON REVERSE SIDE

11. RELATED SOURCES OF INFORMATION: HISTORICAL REFERENCES (PUBLISHED ARTICLES, MANUSCRIPTS, REPORTS, DRAWINGS, PHOTOGRAPHIC RECORDS)
CONTACTS (NAMES & ADDRESSES OF ANYONE WITH EYE-WITNESS ACCOUNTS OR RELEVANT INFORMATION); TAPE RECORDINGS

Maurice B. Dorgan, History of Lawrence, Massachusetts (Cambridge, Mass., 1924)
The Engineering Record, vol. 39, No. 17, 25 March 1899, pp. 376–7.

12. DANGER OF DEMOLITION OR DAMAGE: YES X NO
NATURE OF THREAT:
13. PRIORITY: 3

14. EXISTING SURVEYS AND DATES: NHL NR HAER HABS STATE COUNTY LOCAL OTHER

15. INVENTORIED BY: YOUR NAME: Peter M. Molloy
ADDRESS: 800 Mass. Ave. North Andover, MA 01845
AFFILIATION: Merrimack Valley Textile Museum
DATE: 11/1/75

PLEASE RETURN TO THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, WASHINGTON, DC 20240

factual and readably concise pages we have the rise and fall of the textile and related industries, the archaeology of road, water and rail transport, and the painful adaptations of a nineteenth-century industrial area to the new conditions of the twentieth. Some of the details provided add up to a microcosm of what has taken place over a much wider area, illustrating the not-to-be-forgotten fact that the great advantage which the professional historian or archaeologist has over his amateur colleagues is his ability to see the wood for the trees, to understand the significance of what is under one's nose.

> In Amesbury the carriage builders converted their shops into automobile body factories after 1900, enjoying considerable success until the 1920s, when the competition from the auto body makers of the mid-West became too intense. The automobile industry disappeared from Amesbury after 1930, with the exception of one firm which survived as a manufacturer of window channels.[5]

This is local industrial archaeology trimmed, shaped and in a meaningful context. The wide focus of the paragraph just quoted narrows and sharpens into the detailed entries on the Walker Body Company and the Briggs Carriage Company.

It is possible, but as yet unfortunately rare, for this kind of detailed recording to be carried out by government bodies who, especially at the local level, might seem particularly well placed to undertake such work. What has been achieved in the German Federal Republic by the Landeskonservator Rheinland, is an indication of what might be successfully undertaken elsewhere. The work has been undertaken systematically, with the support and staff of the Planning, Historic Monuments and Cultural Departments of the Land Government. Two of the eight volumes which have so far appeared are concerned with the Arbeitersiedlungen – workers' housing estates – built by the Ruhr and Rhineland industrialists during the late nineteenth and early twentieth centuries for their employees. Like all the items in this series, the reports are splendidly produced, with almost all the plans and illustrations one could ask for, except that there are no photographs of the interiors of the houses, a curious oversight which robs the record of much of its potential human quality. The omission is a strange one, as is the failure to provide any dimensions for either the houses as a whole or for the individual rooms. Why, one wonders, were these far from difficult tasks not carried out? Were they felt to be irrelevant or perhaps an intrusion on the privacy of the tenants? In looking through the otherwise excellent reports one feels the lack of this information very badly.

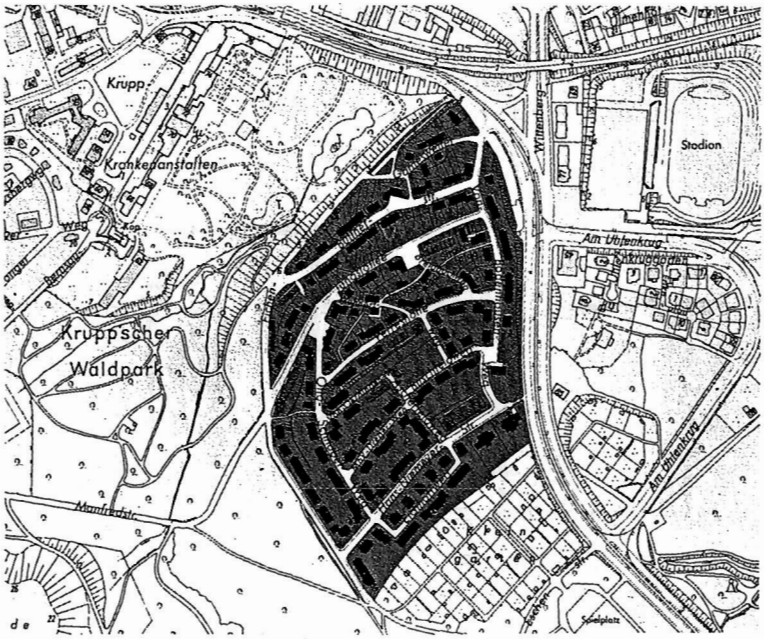
[5] *The Lower Merrimack Valley*, xiii.

It is nearly always the case, with any industrial archaeology report, that the tone and emphasis, what is included and what is left out, depend a great deal on what sort of person or body is responsible for the work. Geographers are likely to stress landscape and environment, economic historians return on investment, technical historians function, architectural historians style and construction, social historians community associations and planners and conservationists what is and might be protected, restored or used for some other purpose. If the report is read by someone for whom it is not primarily intended, what the author would regard as the wrong questions are almost certain to be asked.

The surveys published on behalf of the Landeskonservator Rheinland have been drawn up by people concerned primarily with town planning and with the establishment of conservation areas. The research therefore tended to sift out and discard information not felt to be relevant to this self-imposed discipline and we are presented with entries arranged as follows:[6]

Krupp Estate Altenhof II
Conservation area contains Dwellings for pensioners and invalids from the cast-steel works. An annexe to Altenhof I on the east side of the Kruppscher Waldpark.
Limits of the conservation area Eichenstrasse,

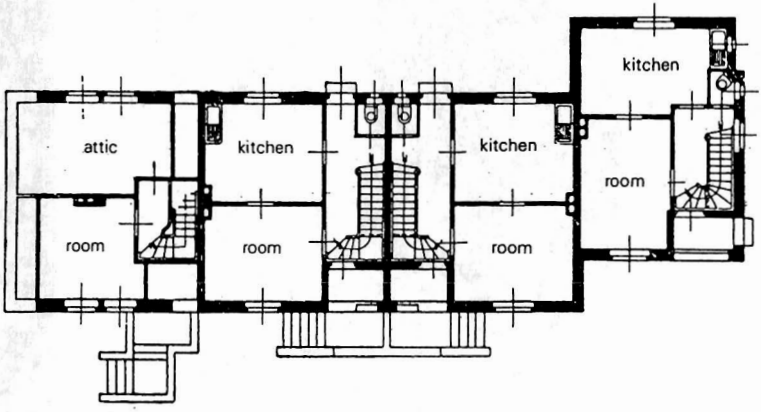
6 The translations here and elsewhere in the book are the author's.



Altenhof II. The shaded part represents the conservation area.

Gebranderstrasse, Hans-Niemeyerstrasse/Eichhoffweg.
History The estate was financed by a grant from Friedrich Alfred Krupp, made in 1892. Building began in 1893, under the direction of Robert Schmohl, and between then and 1914 Altenhof II was extended several times. The area to the west of the Kruppscher Waldpark, Altenhof I, was built in two sections, the first in 1893 and 1896 and the second in 1899–1907. The residential area to the east of the Park, Altenhof II, was linked in 1907 with the hospital and convalescent home buildings on the west side of the Park along Karl-Bersau Strasse (formerly Agathastrasse). Between 1938 and 1948 the hospital was enlarged by taking in the old people's home and the Widows' Home which formed part of Altenhof I.
Characteristics The strongly controlled straight-line pattern of the early Krupp estates (Westend 1863, Schederhof 1872–3, Kroneberg 1872 and so on, which no longer exist) had already been toned down and made less military in the planning of Altenhof I, which was given curving streets and a variety of romantic, garden city type houses. The newer part of Altenhof II follows the contours of the hill in a carefully thought out and pleasant manner. The so-called 'cottage system' of Altenhof I, with individual houses built in the 'old German', half-timbered style, accommodating from one to three families, mellows in Altenhof II into houses built in small terraces. The 'picturesque' façades of Altenhof I have been simplified into the 1 and 1½ storey plain rendered walls of Altenhof II.

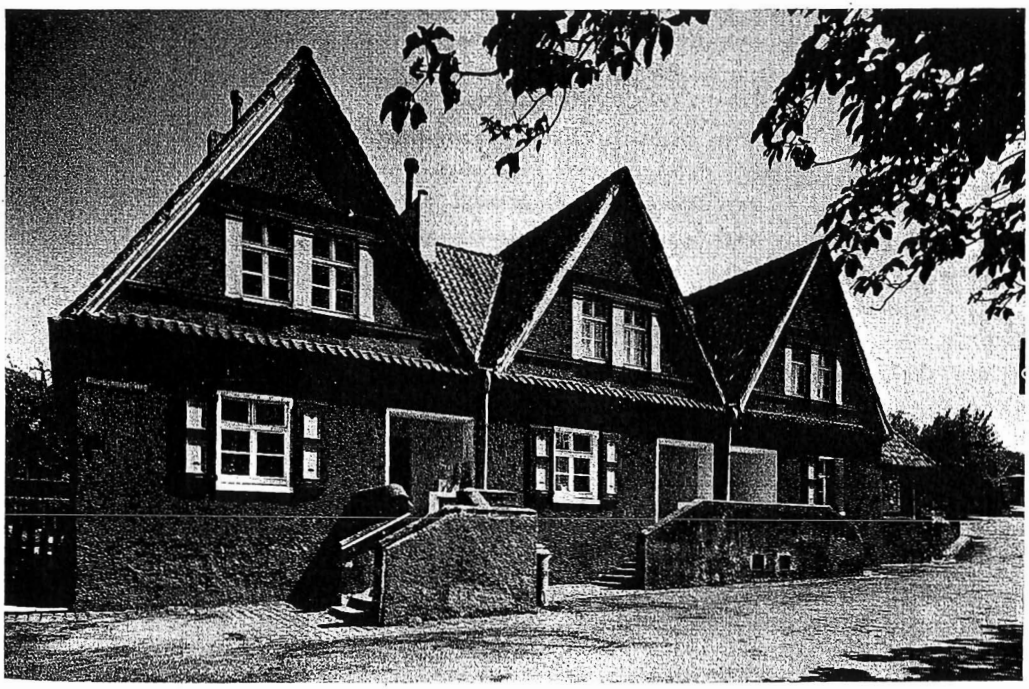
Plan of typical room layout.



Condition in 1972 The Altenhof II estate has for the most part survived exactly as it was built. The following houses do not form part of the original buildings, but their designs reproduce very closely those of their neighbours: 136 Büttnerstrasse; 7–17a, 41–45 Jüngstallee; 2 Otto-Schnabel-Weg; 15–21 Verreshöhe; 14 Wehnertweg; 2–8 Hans-Niemeyerstrasse; 19 Eichhoffweg; 9 Von-Oerding-Weg.

The information here is useful and without a doubt accurate, but it is unlikely to satisfy anyone who is interested in the costs and materials of housebuilding, in domestic amenities (how were these houses lit and heated?), or in such social considerations as the rents paid by the tenants and the proportion of their income which this represented. The houses are observed and recorded as the planner sees them, from the outside or from the air. We can see from the photographs and from the plans that the accommodation was seemly and probably comfortable, but not generous – a kitchen, a living room and a lavatory on the ground floor and two bedrooms upstairs, the standard working-class home of the period. There was almost certainly a cellar, too, although we are not shown or told this.

But here, as with the Lower Merrimack Valley inventory, the whole is greater than the sum of the parts. However partial or professionally



Altenhof: exterior of houses, the ground-floor plan of which is shown on page 24.

coloured the individual entries may seem to be, taken together as a group they add up to a valuable picture of the estates which the paternalistic German industrialist was building for his workers during the three-quarters of a century before the First World War. They show in particular how much the coal and steel magnates, led by Alfred Krupp, were influenced by Ebenezer Howard's book, *The Garden City of Tomorrow*, which appeared in 1898, and how their earlier ideas about workers' 'colonies' were modified in accordance with Howard's ideas. They show, too, how the rise in land prices which took place after 1900 persuaded the industrialists that they had to give up their garden-city ideals and enter the less inspiring new world of large multi-storey blocks, which would bring a more satisfactory return from each square metre of ground.

If the techniques employed to meet the particular goal an author sets himself are adequate for that immediate purpose, it is difficult to criticise them on the basis of quite a different set of criteria. Any technique can be evaluated only in relation to its purpose. In the case of an industrial archaeology project, an important part, perhaps the main part, of that purpose may be to arouse public or official support for the conservation of what is on the site. In that case, a report or article will be effective and professional to the extent to which it is able to make clear why the site is important and what its outstanding features are. Putting this another way, we could say that two kinds of report are called for: the first will have a flat, even flow and tone and the second will contain a good deal more light and shade. Both, however, may be of either poor quality or high quality, according to the skill and knowledge of the author.

The American urban and industrial historian, Randolph Langenbach, is much and rightly concerned with the key question: 'Must we destroy our past in order to renew our cities?' He has illustrated this with reference to one of the grandest of all America's industrial creations, the great Amoskeag mills at Manchester, New Hampshire, and in his selection of photographs and language he has gone quite deliberately for the total impression, in order that as many people as possible can understand in what way Amoskeag is important. The technique and the aim are in no way sensationalist. What Langenbach is saying, in effect, is that the total effect, the poetry, is what matters. He quotes Professor Kevin Lynch, of Massachusetts Institute of Technology, in support – 'Many objects which we are accustomed to call beautiful are single purpose things, in which, through long development or the impress of one will, there is an intimate visible linkage from fine detail to total structure'[7] – but he could equally well have used the wise words of the Poet Laureate, Sir John Betjeman, who made known his view, in 1963,

Amoskeag, Manchester, New Hampshire. The Amoskeag Millyard buildings were construct over a period of 75 years from 1838 to 1915. At its peak, the millyard compl was the largest in the world, extending along both banks of the Merrimack River for mo than a mile. In 1915 it w producing cloth at the rate of 50 miles an hour. By the mid-1960s, the property was in the hanc of more than 40 differen owners.

Aerial view of the site, showing the surviving housing and factory buildings.

Typical Amoskeag architecture.

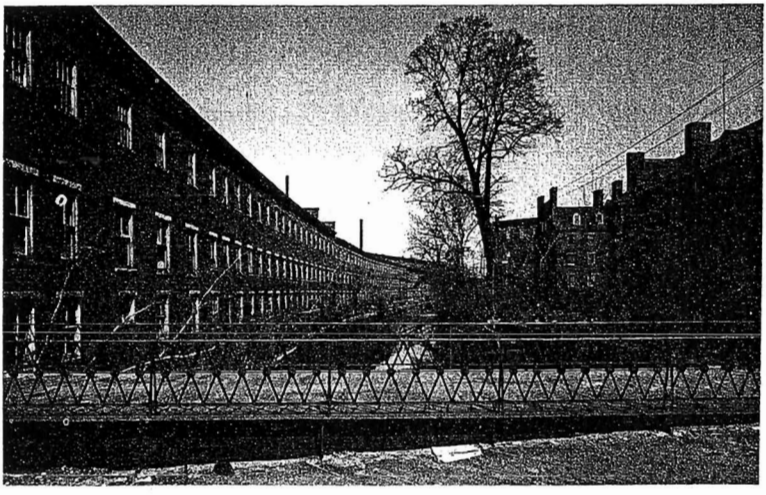
[7] In *Manchester : Downtown Plan* 1967, p. 6.

that 'industrial archaeology is an essentially poetic subject, although there is likely to be no shortage of dull, uncomprehending people like economic historians yapping round its skirts'.[8] The point here is not to foment war between poets and economic historians, but to indicate that there is more than one way of approaching and appreciating the past, whether that past happens to be Victorian industrial structures or Bronze Age megaliths. A strongly developed poetic imagination is, in

[8] Review of Kenneth Hudson, *Industrial Archaeology : an Introduction* in *Geographical Magazine*, June 1963.

Amoskeag, Manchester, New Hampshire.
The Amoskeag Millyard buildings were constructed over a period of 75 years, from 1838 to 1915. At its peak, the millyard complex was the largest in the world, extending along both banks of the Merrimack River for more than a mile. In 1915 it was producing cloth at the rate of 50 miles an hour. By the mid-1960s, the property was in the hands of more than 40 different owners.

Aerial view of the site, showing the surviving housing and factory buildings.



Typical Amoskeag architecture.

any case, no disadvantage to an archaeologist; without it, indeed, he may and does make serious scientific blunders.

But, given his aim, Langenbach will naturally choose suitable words and pictures to illustrate the general thesis. He will say, for instance:

> The few pieces of heavy machinery remaining at Amoskeag give an indication of what an enormous and important industry the plant once housed. In the interiors of the buildings, as well as on the exteriors, quality of design and precision of craftsmanship extend to the last detail. More than thirty years after the company's demise, a visitor can sense the pride its people must have had in their work and environment.[9]

and

> Urban renewal plans in Manchester involve providing access to certain buildings in the Amoskeag millyard, as well as creating parking space where there is none now. Both the canal buildings and much of the river façade would be demolished, and both canals filled in, destroying forever the unity and impact of one of the most powerful urban scenes anywhere in the world. Amoskeag can be saved only through a drastic redefinition, in human terms, of the goals of city development – a redefinition that is equally necessary for all American cities.[10]

It would surely be to degrade the archaeologist's function if he is to be regarded as a mere collector of evidence, to be handed over cold and intact to those whose business is to integrate such evidence into a readable and stimulating account of some period in the human past. Few archaeologists would concur in such a limited and uncreative view of their work but it is regrettable if at some times the emphasis on accurate, detailed recording has led to a failure to see the wood for the trees and to writing which is unnecessarily dull and pedestrian.

One of the most thoroughgoing and creative attempts to explore the complex reality of industrial archaeology was made in Belgium in 1975, in the form of an exhibition organised by the National College for Architecture and the Visual Arts, in collaboration with the History of Architecture Department of the University of Florence. Called *The Landscape of Industry*, this lavishly prepared exhibition and its equally sumptuous catalogue-raisonné concentrated on the evidence provided by the North of France, Belgium and the Ruhr and attempted to answer three questions – what do we actually see when we stand in

Bois-du-Luc, Belgium. Row of miners' houses, constructed by the Société des Charbonnages de Bois-du-Luc et d'Havré. The workers' settlement, begun in 1838 and completed in 1853, was still in excellent structural condition when restoration and modernisation began 150 years later.

Harvard Alumni Bulletin 13 April 1968, p. 27.
Ibid. p. 28.

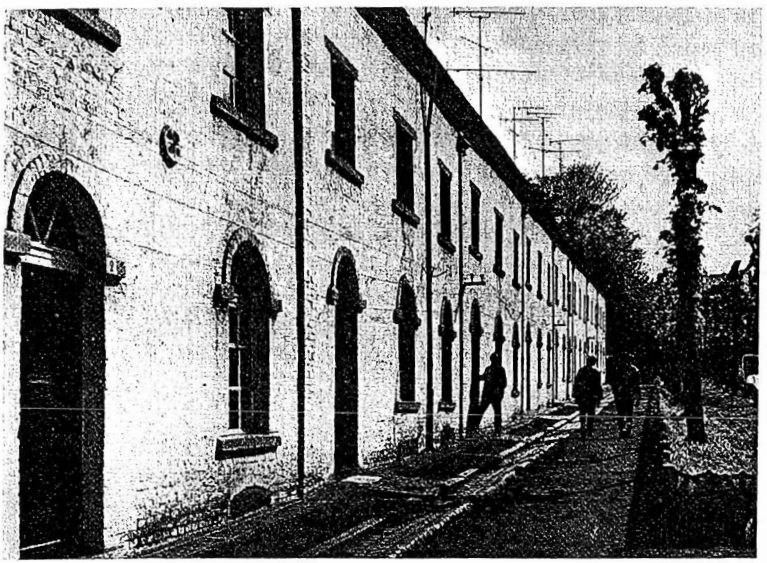
front of one of yesterday's breweries, coal-mines or canal-locks; how do we understand and communicate their position in time, what preceded and prepared the way for them and what came after them; how, 'within the context of a reality which it is difficult to investigate', do we follow 'a disciplinary route of no small complexity, from economic history to geography, from the history of the workers' movement to the history of urbanisation, and from the history of technology to the history of science'. Somehow, it was concluded, 'the physical evidence, those rare but still readable signs on a constantly changing industrial landscape must be given their true significance'.[11] Properly viewed in the landscape and in its historical context, every industrial monument was 'a witness to civilisation'.[12]

So, in its words-and-pictures survey of the former mining village at the Bois-du-Luc colliery, near Houdeng, constructed between 1838 and 1855, the Exhibition was particularly concerned to explore the place of coal-mining in not only the landscape and Belgian history but in the national conscience and psychology. In restoring the 222 houses of the estate, as a project by the National Housing Institute, many obstacles had to be overcome, some subtle, some crudely commercial and political.

In Belgium there is a widespread tendency in political and official circles to advocate the demolition of all buildings whose 'economic cycle' is over. To consider houses (and

[11] *Le Paysage de l'Industrie* Brussels: Editions des Archives et d'Architecture Moderne, 1975, p. 32.

[12] Ibid. p. 35.



Bois-du-Luc, Belgium. Row of miners' houses, constructed by the Société des Charbonnages de Bois-du-Luc et d'Havré. The workers' settlement, begun in 1838 and completed in 1853, was still in excellent structural condition when restoration and modernisation began 150 years later.

by extension the town and urban life) as consumer goods inevitably leads to breaking all visible links with the past, and hence with the future, and to throwing the individual back on his own resources in a universe that is in continuous upheaval. In Belgium as well as in Germany, the inhabitants of workers' housing estates have always preferred the maintenance and re-development of their dwellings to the solutions offered by contemporary town planners.[13]

The Great Laxey waterwheel. Page from account by Anders Jespersen.

There are those who would say that *The Landscape of Industry* is not primarily interested in industrial archaeology as such, but with a different subject which might for want of a better phrase be described as environmental archaeology, or perhaps the study of industrial monuments in the landscape. To this, two answers suggest themselves. The first is that now, in 1978, it is very difficult for anyone, industrial archaeologist or not, to avoid thinking in environmental terms. In the early 1920s when the Newcomen Society was founded, possibly, but not today. The second reply is that in indicating a range of possible approaches to industrial archaeology, one is not asking all things of all people. One is simply seeking toleration, mutual understanding and, ideally, co-operation between people of different skills, experience and temperaments.

Some industrial archaeologists have essentially technical minds and their insight into history comes through their understanding of the machinery and tools of the past. One such person is the internationally famous Danish molinologist, Anders Jespersen. Jespersen found no difficulty at all in producing a 100-page account[14] of the Great Laxey waterwheel in the Isle of Man which, apart from a very brief historical introduction, was devoted entirely to the construction and functioning of the wheel, as an engineer had seen it. By means of detailed calculations and discussions with engineering colleagues, he worked out such details as the speed and output of the pumps and was able to find an explanation of a hitherto unsolved problem of great importance to a specialist in waterwheels, 'Why did Robert Casement[15] choose a pitch-backshot wheel for his job, and not an ordinary overshot wheel? The construction is almost identical to that of an overshot wheel and at first sight it seems odd that the water is made to change its direction by 180°, when it could just as well have been allowed to continue its flow without changing its direction.'[16]

[13] Ibid. p. 92.

[14] *The Lady Isabella Waterwheel of the Great Laxey Mining Company, Isle of Man, 1854–1954* Virum, Denmark: published by the author, 1954. For an illustration of the author's method, see page 32.

[15] The engineer responsible for the design and installation.

[16] Ibid. p. 57.

This degree of technicality is to be found – and welcome – in many reports which are clearly within the field of industrial archaeology, although it might be fair to say that they do not exploit all its possibilities. The *Bulletin of the Historical Metallurgy Group* comes closest, perhaps, to the kind of report which is clearly expert and authoritative, which is likely to satisfy at least the more conservative elements of archaeological opinion, but which makes very few concessions to demands that the site

The Great Laxey waterwheel. Page from account by Anders Jespersen.

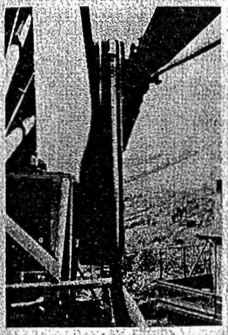
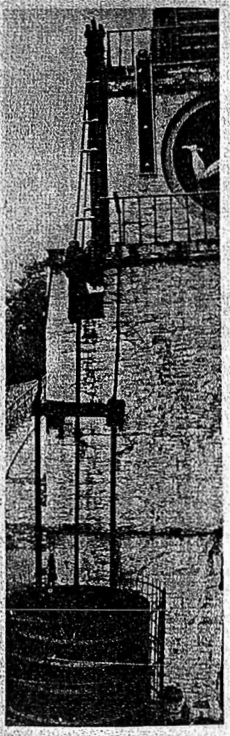


Fig. 142. The crank, position 12 o'clock. Looking South.

Below: fig. 143. The balance box, position 3 o'clock.



the balance box. The appropriate values are:

Symbol	Pump	Balance box
$\mathcal{E}$	362000 kgm = $\mathcal{E}_e$	163000 kgm = $\frac{\mathcal{E}_e}{2}$
t	11.75 sec	11.75 sec
s	3.06 m	3.06 m
P	106400 kg	53200 kg

but:

$\mathcal{E}_e$ = 326000 kgm = $E_e \times 2t$

E_e = 13880 kgm/sec = $\frac{\mathcal{E}_e}{2t}$

so we have:

Pump: $E_\vartheta = \frac{\mathcal{E}\pi}{2t} \sin\vartheta = \frac{E_e \times 2t \times \pi}{2t} \sin\vartheta = E_e \pi \sin\vartheta$

E_ϑ = 13880 x π sin ϑ = 43600 sin ϑ kgm/sec

Balance box: $E_c = \frac{\mathcal{E}\pi}{2t} \sin c = \frac{E_e \times 2t \times \pi}{4t} \sin c = E_e \frac{\pi}{2} \sin c$

E_c = 21800 sin c kgm/sec

The graph, below, is plotted from these two equations with points found at 10° intervals.

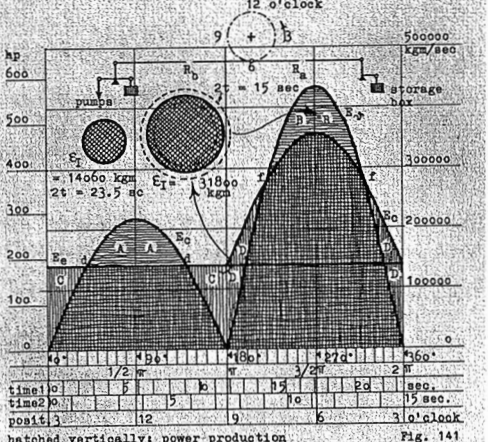


Fig. 141

hatched vertically: power production
hatched horizontally: power consumption
hatched diagonally: momentum of Waterwheel when completing one revolution within time 1) and 2) respectively
→ direction of movement

The maximum power to be transmitted is $E_{\pi/2}$:

$E_{\pi/2}$ = 43600 sin $\frac{\pi}{2}$ = 43600 kgm/sec = 582 hp !!

In the graph, fig. 141, the counter balance or storage box is drawn from the base line from 3 to 9 o'clock, but from 9 to 3 o'clock it is situated on top of the straight effect line, E_e, indicating the Waterwheel, as the energy, stored in the box, is now aiding the Wheel in forcing the pumps. As the scales are kgm/sec along the Y-axis and sec along the X-axis, the areas inside the curves are YX or kgm/sec times sec = kgm or energy, $\mathcal{E}$.

The area below E_e is $\mathcal{E}_e$, and hatched vertically, and so is the area below the E_c curve from 9 to 3 o'clock.

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should be presented in its social or human context. If Langenbach can be taken as an example of industrial archaeology warm, then the *Bulletin of the Historical Metallurgy Group* is assuredly industrial archaeology cold.

M. Davies-Shiel's report on Stony Hazel High Furnace[17] is representative of the editorial requirements and style of the periodical in which it appears. To the Historical Metallurgy Group, archaeology means first and foremost excavation, with no essential differences of approach or working methods, whether the subject is a seventeenth-century furnace site in Sussex or the metallurgical aspects of Chalcolithic copper working at Timna, Israel. In the case of the Davies-Shiel article, the problem to be solved by excavation was mainly one of chronology, explained by the author in these terms:

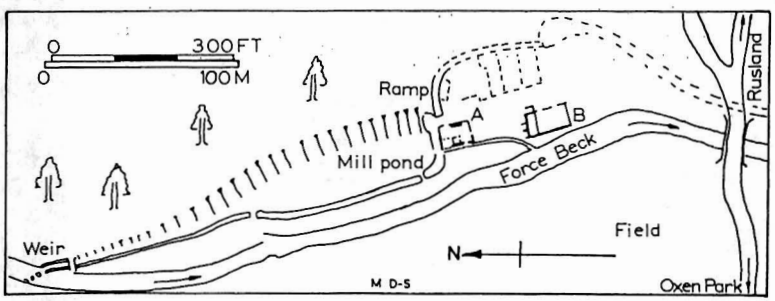
> Documentary evidence shows that the site was first in private hands, then belonged to the Cunsey Company until at least 1755, when it was made over at a valuable sum to the Duddon Company. Although Harrison, Ainslie & Co. bought up Duddon in 1818, the forge was only made over to a private band of locals in 1822 at a near-nominal amount. It may still have been working in 1833.
>
> If the use of iron ore in the hearth was to obtain partial oxidation of the cast iron, when was that process introduced here? Schubert intimates that, although the method was an English one, it had been forgotten until a Samuel Lucas introduced the method in 1804. The ramp and bin appear to be part of the original fabric of the building complex of 1718. The site calls for further careful excavation to answer these problems.[18]

Hearth plan in above floor and section on A–A.

This is an author in the happy position of being perfectly clear as to the purposes of the study, using accepted archaeological techniques in order to test the initial model, and falling into no temptation to worship

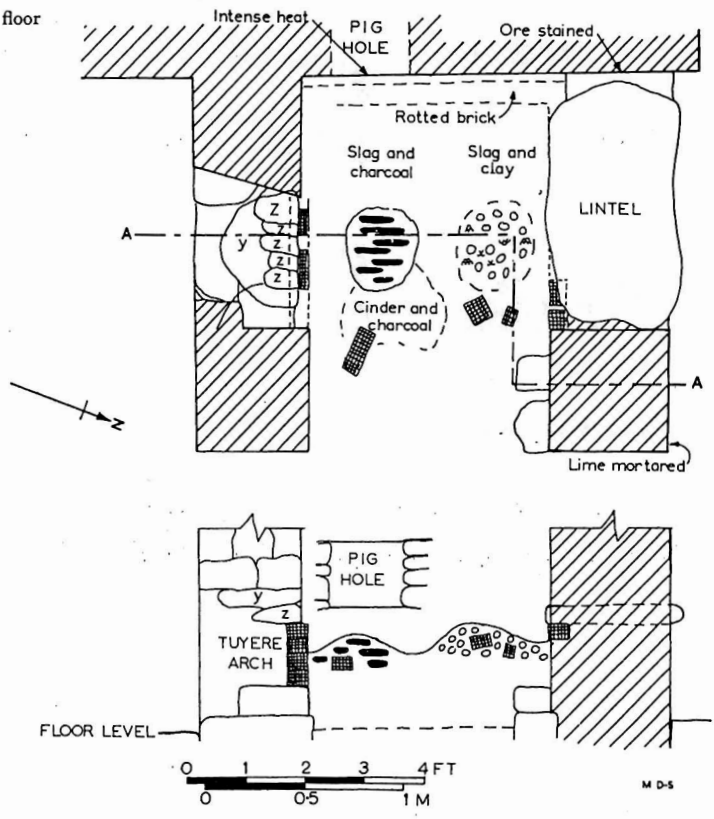
[17] 'Excavation at Stony Hazel High Furnace, Lake District, 1968–1969; an interim report', *Bulletin of the Historical Metallurgy Group*, Vol. 4, No. 1, 1970.

[18] Ibid. p. 22.



Plan of Stony Hazel High Furnace, Lake District, as revealed during excavation.

the strange gods of sociology, social history or economic history. It could be suggested that what we have here is either an archaeologist working in the metallurgical field, or a metallurgist working in the historical field, rather than an industrial archaeologist. The difference is an important one. At his most creative, the industrial archaeologist is the person who has constructed a complete historical model which he proceeds to check against the available archaeology. 'This,' he says, 'is what I believe it was like to own a woollen mill and to work in one in Manchester, New Hampshire in 1870. I will now see how I can check or modify this by studying the remains of textile mills, housing, and canals in the area. In the process I may well discover that life and work here in 1870 were different in several respects from what I had originally imagined. The model, in that case, will require adjusting and reshaping.' In the course of his work, such a researcher will consult as wide a range of printed sources as he can, make plans and drawings, take photographs, talk to such people in or formerly in the industry as may have useful first-hand information to communicate. He will do his best to make sure that the record of what he finds and thinks is stored where other people can locate and use it. He will, naturally, try to carry out



Hearth plan in above floor and section on A–A.

the work as quickly, efficiently and cheaply as he can, and if photogrammetry, for instance, seems to be the only way of making a visual record of a building in the time available, or with the money available, he will apply that technique to what he is doing.

Creative work in the sense in which the word has just been used is, of course, an ideal which is not always realised. As in any branch of archaeology there is much good, solid, reliable work done of more limited scope. It calls on the faculties of careful observation, mistrust of any speculation which does not appear to be firmly rooted in fact, great respect for procedures, for neatness and for accuracy, and conscientious attention to any previous reports of work on the site or similar sites. The results are evident in many of the learned journals and translations of the county archaeological societies. The brilliant paper on Roman or medieval archaeology, illuminated by outstanding intuition and insight, is necessarily rare. Industrial archaeology does no worse and in some respects a good deal better. One should not be deceived into thinking an article is good, simply because it employs the correct scholarly language and is well sprinkled with agreeable-looking plans and drawings of a familiar type.

Plan of building A.

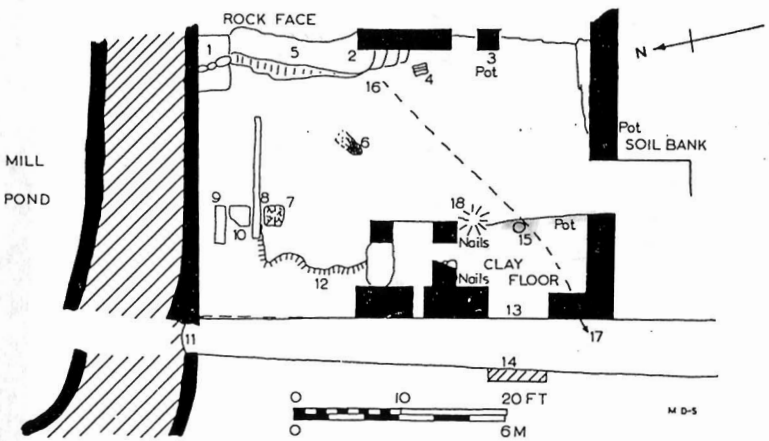


Fig. 2 – Plan of building A

1 Ore bin
2 & 3 Buttresses
4 Remains of wooden box containing finely powdered hematite ore
5 Natural rocky ledge which has been turned into a staircase leading up the bank
6 Broken hammer-head in central floor, used as an intermediate anvil
7 Anvil base sunk vertically into the ground and made of a single large log
8 & 9 Wooden baulks, sunk horizontally into the composite slag-ore floor
10 Exceptionally hard charcoal/slag area
11 & 12 In these areas the dam had previously burst and undermined the hard slagged floor crust, leaving a ragged edge
13 The wheelrace (11–17) varies from 3 feet at the dam to 5 feet width at point 13 where it appears the bellows waterwheel was situated
14 [Not identified in original article.]
15 Deep hole at the end of the waterwheel shaft
16 & 17 Between these two points a drain crosses the floor
18 Pile of pure charcoal apparently dumped ready to put into the hearth