
AUSTRALIAN SOCIETY FOR HISTORICAL ARCHAEOLOGY

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Contents

I.	Editorial;	3
	The Protection and Preservation of Archaeological and Portable Relics. John Wade.	
II.	News Items; General	7
III.	Excavation News; The Commissariat Store, Brisbane	9
	Ian G. Sanker.	
IV.	Book Reviews	11
V.	Report on the Seminar on Industrial and Historical Archaeology conducted by the N.S.W. National Trust, Goulburn, 23 - 25 February, 1979	15
	Jane Lennon.	
VI.	The Institution of Engineers and the Australian Heritage	17
	D.A. Cumming and P. Sydenham	
VII.	Light Railways	25
	K. McCarthy	

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Kate Holmes, Windsor Barracks - The Guard House

I. EDITORIAL

The Protection and Preservation of Archaeological Sites and Portable Relics.

We are presenting as the editorial in this issue the following background paper by John Wade, who would welcome comments to be incorporated into an expanded version to be delivered at the Museums' Association of Australia Annual Conference at Perth on September 1st. His address is: Museum of Applied Arts and Sciences, 659 Harris Street, Sydney, 2007.

The recent conference at Goulburn brought together more than a hundred delegates to discuss "Archaeological Sites in Australia - their significance, identification, recording and assessment". Present not only were professionals working in this and related fields, but also interested members of the public who came to learn about an area where the community is sadly under-educated.

The conference highlighted the inadequacy of our present management policies for archaeological sites, and the legislation covering preservation of cultural relics. This is not to say that individual sites and relics are not safely preserved and well-managed, but that the present management and legislation is not sufficient in itself. The proliferation of legislation and the proliferation of bodies to deal with Australia's cultural heritage indicates the enormous interest in this area, but may also inhibit our ability to coordinate limited and scattered resources.

Delegates passed resolutions along the following lines:

- * affirming the importance of industrial and archaeological sites as part of the national heritage
- * urging each State government to enact protective Heritage legislation
- * encouraging the establishment of groups in each State to survey and record industrial and archaeological sites
- * pointing out the inadequate legislative protection for portable relics.

The impetus of the Goulburn conference cannot be allowed to falter. It was agreed at the conference that all participants should receive a copy of the ASHA Newsletter, and that this Society coordinate efforts, act as a forum for discussion, and keep people and governments informed of developments. ASHA will not be the only body responding to the need for a coordinating role; the Australian Council of National Trusts set up a committee to monitor the efforts of the National Trusts, and in NSW, non-government organizations have formed a new group, the Council of Heritage Organizations (COHO), to discuss matters of common interest.

The conference raised in particular the questions of the protection and preservation of archaeological sites and relics. While the appreciation of historic architecture and natural landscape is comparatively well advanced, the same is not yet true of industrial sites, artificial landscape, and portable relics.

Legislation is not yet sufficient to ensure preservation in these areas. The Australian and some State Governments have introduced legislation to protect land sites and shipwrecks. The Australian Heritage Commission Act, 1975, has legal force only over Commonwealth property. The N.S.W. Heritage Act, 1977, applies to all land in N.S.W., and is worth closer examination here.

The N.S.W. Act does not cover adequately portable relics. In Section 57, a person is prohibited from *excavating* a building, work, place or relic to which a conservation order or instrument applies, but the law does not seem to prevent him from *removing* a relic on the surface, such as a steam boiler, stamper battery, bottle or tombstone — provided he does not have to excavate to do so. There is nothing to stop anyone removing such artefacts from the surface of a site, provided that they are not buildings or trees. This apparent shortcoming of the Act needs to be rectified.

Section 139 of the Act prohibits excavation of *any* land, whether subject to a conservation order/instrument or not, "for the purpose of discovering, exposing or moving a relic ... except in accordance with an excavation permit." While applicants for excavation permits must consult with the Heritage Council over what they intend to do with the excavated material, the Council has no legal control over the finds. In the N.S.W. Act there is no provision for the registration and subsequent custody of excavated material. This is in contrast to the National Parks and Wildlife Act which vests any non-European material (i.e. Aboriginal, Chinese, Phoenician, etc) in the Crown, and makes The Australian Museum the legal repository of this material. The Heritage Act makes no similar provision; the material remains the property of the landowner (although the Heritage Council may impose conditions on an excavation permit, or refuse to grant an excavation permit). It may be necessary in these circumstances for the Government to resume land which is to be excavated in order to ensure that relics become State property.

The Act also provides (Section 146) that a person must notify the Heritage Council if he discovers or locates a "relic", which means "any deposit, object or material evidence relating to the settlement prior to 1st January, 1900 ... not being aboriginal settlement".

Unfortunately, the provisions of the Act are not well known, in spite of the Heritage Council having produced a pamphlet to explain it. Bottle collectors and other site looters will go on locating rubbish dumps with their metal detectors and probes, without notifying the Heritage Council, without appreciating the damage their digging is doing, and probably without realising that what they are doing is immoral as well as illegal.

The legislation is impossible to service, let alone police, in view of the small staff in the various Government departments which administer the heritage legislation, and in view of the general lack of awareness among the public of the value of archaeological artefacts for historical research. The market will continue to support illicit diggers of (undamaged) stoneware and glass bottles from rubbish dumps until the bottle collecting fraternity can be educated to appreciate the archaeological and historical viewpoint. An attempt to do so, at the forthcoming National Bottle Show in Wollongong, will be opportune.

The Government can take a lead with its own professional diggers, such as the Department of Main Roads, and those of the statutory authorities, like the Water Board. By tradition, finds made in these circumstances seem to be vested in the workmen, the foremen, and the architects or engineers responsible for the job. This is an area where the Government has control, and in which it could educate its employees to comply with the moral and legal provisions of the law. Sites of interest — for instance the one in Mary Ann Street, Ultimo, mentioned in the last *Newsletter* - could be referred to the Heritage Council for investigation, and the archaeological finds turned over to the Heritage Council for allocation to a suitable museum.

The role of museums in this area warrants examination. At present, the protection and preservation of objects *in situ* is not policed or funded adequately. It is hardly surprising then that local and State Museums have taken it on themselves to protect them, by removing objects to the "safety" of the museum. In the new Heritage climate, this must be regarded as a temporary measure. Museums are playing a useful role in preserving these items, but they must remember that it is done in the national interest. The artefacts and machines on a site can lose much of their importance if removed to a sterile museum environment, far from their place of use. Eventually some of these items may be returned to their original position, or to a site which recreates that kind of environment, or to a local museum, provided that protection of the relic can be guaranteed.

Local museums at present tend to be set up in a nice historic building, furnished with the trappings of a folk museum which illustrate a romantic view of a lost way of life. While this is commendable, it should not be allowed to become universal. Local historical societies might be better advised in some instances to concentrate on the acquisition, preservation and interpretation of one or more important historical archaeological sites in their vicinity.

In Britain, home of the industrial revolution, there are many historic site museums, and Australia's industrial past is significant enough to justify the existence of museums of this type here, to give a more balanced view of the past. Funds directed towards the running of small country museums could well be spread also among historic site museums.

This is not to suggest necessarily a further vast development of museums in Australia, when funds for these institutions are limited, but rather a rationalisation of existing resources and an expansion into areas of new initiatives. An Australian Museum Commission, recommended in the Pigott Report of 1975, could well be the answer to co-ordinating this development.

Museums would also become natural repositories for excavated archaeological material, or for material which cannot viably be preserved *in situ*. Museums would also take a leading role in archaeological research. Some State museums, for instance the Queensland Museum and the Western Australian Museum, spring immediately to mind as institutions which have collected material illustrating the industrial history of their respective states. Excavated material could, at the discretion of the Heritage Council, be allocated to particular museums, for its preservation, research and reference value, and possible display to the general public.

II. NEWS ITEMS: GENERAL

Acknowledgment

- The Committee and Members of A.S.H.A. are extremely grateful to Professor Robert L. Schuyler for his generous offer to include our Society in the list of Organisations and Societies which benefit from royalties paid from the sale of his book. Our first royalty of \$AUST.93.58 was received in February.

- Australian Pottery in the 19th and early 20th Centuries by Marjorie Graham is due for publication by the David Ell Press in association with the Women's Committee of The National Trust of Australia (N.S.W.) in July 1979. To coincide with this publication an exhibition of Early Australian Pottery will be held in the St. James' Room, David Jones' Elizabeth Street store from Tuesday 24th July until 4th August.

(A review of this important book will appear in the next ASHA Newsletter)

- N.S.W. Council of Heritage Organizations (COHO)

Growth in the number of heritage organizations over the past few years has created a need for a body with a co-ordinating role. For this reason representatives from eight kindred organizations met in October last year at the Australian Museum to discuss areas of common concern and ways of improving liaison. ASHA was represented by the President, Kevin Fahy.

At a second meeting held in February at the National Trust Centre, it was decided to call the group the N.S.W. Council of Heritage Organizations, known by the catchy acronym "COHO". It is intended that COHO will reduce duplication of effort, help in development of policies on important issues and assist heritage organizations in their efforts to influence Government.

An attempt has been made to avoid creating another bureaucracy - the structure of COHO has been kept as simple as possible. No constitution is to be drawn up and representatives will share such duties as chairing meetings and letter-writing. It is important to note that COHO decisions, or the votes of representatives, are not binding on individual organizations. Hopefully, however, COHO policies will be adopted, when relevant, by each organization.

Several issues have been examined by COHO in its first two meetings: shortcomings in the Heritage Act relating to the preservation of historic relics; a proposed kit to improve the standard of collection records in small museums; the need for conservation facilities for marine archaeological material; and problems concerning preservation of historic cemeteries.

* * * * *

Things we want to keep - Our Natural Environment:

WORLD ENVIRONMENT DAY JUNE 5 1979

- "Sydney Unearthed" - At The Macleay Museum, University of Sydney, in late September there will be an exhibition for all interested in the history of our first city, from its prehistoric origins up to our era of present day skyscrapers.

In conjunction with the opening will be the launching of a book, *10,000 Years of Sydney Life*, to which a team of experts in varying fields, including Anthropology and Archaeology has contributed. The book will be well illustrated with at least 80 or 90 outstanding plates.

The Museum is open to the public; All Enquiries 692 2274.

- THE BLACKSMITH: The First Worker in Iron

An exhibition from the Museum of Applied Arts and Sciences, Sydney.

In early July 1979, for approximately four weeks, the Museum will be launching its third travelling exhibition, and the first organized by the Transport and Engineering Department and the Special Exhibitions Department.

The exhibition will range from the origins of working with 'Black metal' to contemporary Australia. It will include Mythology, Early History, The Industrial Revolution, Convict Australia, The Gold Rushes in Australia and After, and The Blacksmith's Art.

After its official opening at the Museum, this exhibition will be on view to the public for five weeks at the Museum. It will then travel to all the major factory sites in the Sydney metropolitan area.

This itinerary, organized with cooperation from the Labor Council of New South Wales, is an attempt by the Museum to become more accessible to the average working person.

The exhibition is expected to be on the road for an initial six months. After that its itinerary will be subject to the demands that are made to see it.

G. Imashev

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A.S.H.A. Newsletter

A.S.H.A. would be grateful to receive from individuals or Societies any items relating to Historical and/or Industrial Archaeology which would be of interest to our members for inclusion in our Newsletter.

III. AN HISTORICAL ARCHAEOLOGICAL INVESTIGATION OF THE COMMISSARIAT STORE, BRISBANE

by Ian G. Sanker, Curator of Industrial Technology, Queensland
Museum

The Queensland Museum recently carried out an historical archaeological investigation of the Commissariat Store in Queens Wharf Road, Brisbane, from November, 1978 to mid-January, 1979. The Store is the second-oldest surviving convict-built building in Brisbane, the two lower levels being completed in 1829. A third level was added in 1913 with associated raising of the roof. The building has foundations of hammer-dressed Brisbane Tuff (a volcanic ash), followed by two courses of chiselled sandstone. The walls up to the 1913 section are constructed of hammer-dressed tuff with corner stones, pillars, sills, and lintels of chiselled sandstone. A sand-lime mortar is used. The top floor is constructed of cement-rendered brick. The roof was originally of shingles, but is now of corrugated iron.

The investigation followed an invitation from the Department of Works which is carrying out restoration work on the

Store. This work is directed at the removal of many later additions, returning the structure to nearer its original form, and at stabilizing the fabric. Michael Quinnell, Curator of Anthropology and Archaeology, directed the investigation and Ian Sanker, Curator of Industrial Technology, was co-ordinator. Museum staff and non-museum volunteers assisted.

Documentary sources were checked to establish the known history. Building survey plans dated 1838 and 1840 were located in State Archives. Unfortunately, the timing of the investigation required work to start rapidly and the full and detailed history could not be established before commencement.

The investigation began with a building survey and establishment of datum points for control and measurement, carried out by the Department of Surveying, Queensland Institute of Technology. The ceiling of the lower level was removed and a considerable amount of debris recovered for later examination. The wooden floor of the lower level was progressively raised. The floor area was gridded by stringlines into 1 metre squares and these were excavated individually. Material from the various layers encountered was sieved and sorted. The following generalized section was recognised, although it was not present in complete form over the entire area and localized variations were present:

Friable soil with straw

Flood silt (believed from 1893 flood; form of deposit indicates wooden floor was in position at time of flooding)

Mortar layer (setting for flagstone floor with impressions of flagstones)

Rock fill

Clayey layer (artificial)

Bedrock.

A most significant discovery was the location of a previously-unknown system of brick and stone drains, at a level beneath the flagstone-mortar layer and excavated into phyllite bedrock. These are constructed with brick bottoms and sides and stone upper courses over most of their length. They were covered with large sandstone slabs. A main drain is centrally located and extends from the back to the front of the building and continues in the direction of the Brisbane River. Two shorter drains extend at right angles to the main drain, close to the back and front walls. Four brick traps were present at the four ends of the cross-drains. It is believed that these may have connected with surface drains on the flagstone floor, as remaining flagstones and mortar flagstone-impressions indicate a different direction of flagstones in line with the brick traps. These different alignments extend to the eastern and western end walls.

Numerous artifacts were recovered from various layers. Material from the top layer included a very large number of nails, iron, glass bottles and fragments, china coins, buttons, cartridge cases, clay pipes, matches, office equipment (pens, nibs, pins, paper clips, paper fragments, string, tape), together with numerous bones and oyster shells. The flood silt layer contained little material. The soil-filled drains yielded a large amount of china and glass fragments and clay pipes. A leg iron was recovered from the top of the rock-fill layer, near the south-west corner of the building.

A considerable amount of sieving and sorting still remains to be done on the material recovered before a full interpretation of the investigation can be made and a final report prepared.

IV. BOOK REVIEWS

- CAPTAIN RICHARDS' HOUSE AT WINTERBOURNE by Graham Connah, Michael Rowland, and Jillian Oppenheimer. Published by the Department of Prehistory and Archaeology, University of New England, Armidale, N.S.W. *Price \$6-95 including postage.*

What makes this book immediately interesting is that it is sub-titled 'A Study in Historical Archaeology', and there are not as yet too many of those around. Historical archaeology in this sense refers to a particular combination of investigation methods combining the more usual searching through land grants and title deeds, early maps, estate papers and government records on the one hand with a very careful study of any buildings or traces on the landscape that actually survive, on the other. Add some early morning low-level flights over the same structures to get aerial photographs which often tell you a lot more about what was once there and has since been reduced to below-ground foundations than ordinary photographs do, and some vivid interviews with older folk who remembered the buildings nearly seventy years before, and you are beginning to get somewhere near the interesting multi-pronged attack that the historical archaeologist launches upon his target.

In fact I should add that in Australia today historical archaeology specifically implies recent times, that is to say after the coming of Europeans to Australia. The sort of multi-pronged approach I mentioned above is common to all forms of archaeological enquiry, whether in prehistoric or historic periods of time, with emphasis on different types of evidence - environment, physical features, artefacts used or written historical sources according to what is available and relevant in any particular study. The only difference if one studies an archaeological site in 19th century Australia - say a homestead or a mining site or perhaps an old stock-route, or paddle steamer sites on an inland water system - is that there are usually - not always but usually - a lot more different kinds of evidence that can be put together. There is still the evidence of vegetation and landscape, buildings, tools, bottles and ornaments used on the site - the artefacts beloved of archaeologists - the bones of butchered animals and shells brought up with sand used in making or bonding bricks; but as well there may be a wealth of written evidence, from personal diaries, or notebooks with daily accounts jotted down, to paddle-steamer time-tables and lively newspaper accounts of a Sunday excursion down the river.

This sort of study, of course, is still a bit new to Australians. Indeed the whole idea that Australia has any archaeology apart from the long and dignified prehistoric tradition of its own aborigines takes many people a while

to get used to. Usually it is not until we stand a little apart from aggressively 20th century crowds in Port Arthur, and come to comprehend the human implications of that forbidding pile of man-hauled stone and brick that we begin to perceive the gulf of technological advance since then as revealed in the structures themselves.

In fact in the short period of nearly 200 years which historical archaeology in Australia spans, there have been at least three major technological phases which in conventional archaeological terms would once have probably qualified as ages.

The earliest phase of human and animal power alone, the second phase from about 1850 when the use of steam power became widespread and transformed industrial buildings as well as consumer products and a third stage when the coming of motor transport about 1930 equally transformed marketing patterns and, in turn, the distribution of sites and structures around the Australian countryside.

Often in the landscape of the earlier settled districts, you can see the archaeological imprint of each of these phases superimposed on the landscape in a single region - once you learn to read the signs.

But back to Captain Richards, that worthy seaman who in 1838 swallowed the anchor as they say and retired to build himself first, probably a little house then a very much grander stone house in New England for self, young wife and daughter, there to enjoy some 13 years of pastoral life as a squatter until his death in 1851. This house he called Winterbourne, after his home village in Wiltshire, and it is this house and its surrounds, one of the oldest - and also one of those in the worst state of repair - that forms the subject of this lively and readable book.

There is quite a lot of information about our Captain William Richards - I say "our" because the record is sometimes blurred by the fact of other contemporary Capt. Richardses in the Navy. He was in the Royal Navy during the Napoleonic Wars and then entered the not unprosperous business of convict transportation to the colony, with wool, flax, cedar, tanbark and especially whale oils and whale bone as a return cargo in his ship the "Roslyn Castle". He prudently surveyed prospects in New England before taking up his squatting run, and probably built a simple slab hut in 1838 before the substantial stone one was begun about 1844 a few years later. Travellers in the district in the 1840s comment on the excellence of the property and the charm of the lively Mrs. Richards. Even more interesting are the records of the stock run on the estate which survive in the Commissioners reports for 1846, 48 and 50.

So what can archaeology add? Well, first a detailed survey of the house itself and the methods of its construction, which Graham Connah suggests, not surprisingly, derives from English forms. His discussion of the form of Winterbourne, with its central corridor and symmetrical ground plan is interesting, and obviously needs input from a really good local regional survey. One hopes the team will be able to complete this in due course so that Winterbourne is seen in context.

It also adds hints of the earlier structure surviving under the existing stone building, but alas, hints only. Timber buildings can disappear with very little trace, and so far there is little definitive here. A number of artefacts emerged both from the limited excavations undertaken and from surface scatter around, and these are discussed in detail, although a selection only.

In fact Graham Connah makes clear that his main interest in the study is rather the piecing together of different kinds of evidence than the specific use of archaeological techniques - excavation for example - alone. This is what he says in the preface....."Historical archaeology is a new field of interest in Australia and this book aims to demonstrate the varied paths of inquiry by which we can build up history on a subject for which no history exists. We have used archaeological field research, study in historical archives and libraries, oral tradition and comparative museum data to piece together a picture of early European settlement in a particular part of Australia."

In the result it seems to me there are some excellent individual items. The study of the house is meticulous, the aerial work interesting, the artefact study useful (showing incidentally one kind of clay pipe widespread in the colony from Flinders Island to Port Arthur, Elizabeth Farm to New England about 1840) and the oral history interviews extremely revealing.

What has yet to come I think is precisely the knitting together chapter which integrates the total study. We do need to know how these segments do contribute to the whole, since that is what we set out to seek.

Now although this is a comparatively fundamental lack, I think it is a particularly interesting one and illustrates a very basic feature of the combined historical archaeological study. Dr. Connah and his team are not alone in their difficulty - one of the first studies in this subject on Port Essington found the same difficulty in combining in that instance two classes of evidence - namely artefactual and documentary, and I have certainly found the same sorts of problems in writing up other sites of this kind in NSW and Tasmania.

The difficulty is that both the scale and the viewpoint of these different types of evidence vary enormously - the concept of an ethnic tradition in house construction for example, is on a very different scale to the discovery of a single clay pipe perhaps belonging to the Captain himself. The detailed memory of an elderly lady concerning a place she lived in as a child is of a very different nature to the broad generalities of normal archaeological inference, and so on. Perhaps the most specific example of this lack of comparability can be seen in the fact that while the authors wished to stress the Richards occupation of the house as its major theme, and did so in the literary references, the archaeological and oral material inexorably deals with the total history of the site - its occupance as an entity, so that attempts to distinguish Captain Richards and his family as individuals in the archaeological record as opposed to the documentary are mostly frustrated.

This is not always the case in historical archaeological studies and there are some very interesting projects beginning elsewhere in Australia which should throw further light on this kind of theoretical issue - for example, an isolated gold mining community with good documentation of individual families where it just may prove possible to tie together individual houses with individual families. By and large however, like all branches of archaeology, historical archaeology deals with communities, groups and occupances rather than with individuals - hence at least some of the problems with Captain Richards. These and other similar problems by the way, have been considered in some depth in an extremely important new book from the United States on Historical Archaeology, edited by Robert Schuyler, who in one paper examines in detail the difference between the I or individual oriented class of evidence of personal historical writing, which he calls emic, and the more objective class of artefact and environmental evidence, which he calls etic. For those who wish to pursue these not uninteresting issues, the Schuyler book is also a must.

Meanwhile Captain Richards' House at Winterbourne remains one of the pioneering publications of Australian sites, and for this alone the authors are to be congratulated. Add to this the fact that it is written to be read (one does sometimes wonder) and is constantly stimulating and interesting. The New England Department of Prehistory and Archaeology is away to an excellent start.

J.M.B.

ROOTS AND BRANCHES ANCESTRY FOR AUSTRALIANS by Errol Lea-Scarlett (Collins), 1979, 232 pages, illustrated, hardcover.

An enormously readable and entertaining book packed with practical information ostensibly aimed to the family historian or, dare I say it, genealogist, a term which the author, following on St. Paul's advice, suggests should be offered to the computer for annihilation. Anyone interested in historical research in Australia will find this guide to the labyrinth of official archives such as government, church and military records, not to mention libraries as well as historical and genealogical societies, invaluable in their quest. A nomination for the AUSTRALIANA book of the year.

V. REPORT ON THE SEMINAR ON INDUSTRIAL AND HISTORICAL
ARCHAEOLOGY CONDUCTED BY THE N.S.W. NATIONAL TRUST,
GOULBURN, 23 - 5 FEBRUARY, 1979

The seminar was in three major sections - statements on the significance of the remaining physical evidence of our history; descriptions of recording programmes already under way and their successes and problems and a series of case studies.

There was constant emphasis by all speakers that the highest priority should be for recording and survey, rather than for excavation. The only essential digging at this stage is in building restoration, but this must follow after documentary research has failed to provide the answers for the accuracy of the restoration; hence the need for excavation at Bowen's Landing Site, Risdon Cove, at Port Arthur, at Kingston on Norfolk Island compared to some of the digging for digging's sake which occurred at Hill End.

Site visits were organized to Gulson's Brickworks, established in 1884 and one of the few family operated works still remaining; to Windy Willows Brewery complex, which was established in 1836 but it has lost its original function and the building shell is being rather unsympathetically restored while the machinery is all gone (in fact, the beam engine from the brewery is now in the Museum of Applied Arts and Sciences, Sydney); and to disused lime kilns at Kingsdale, the second largest one in N.S.W. Unfortunately these site visits lacked real educational value because there was no interpretative material given to the seminar participants; there should have been historical notes on the development of each of three industries in Goulburn and in N.S.W. and more importantly, a description of the process of brick-making, brewing and lime burning and how it occurred at each of the sites visited.

Discussion after the site visits centred around the need to preserve items of industrial heritage in situ and that museum collections should be from salvage archaeology prior to destruction of a site. It was also agreed that the best way of seeing an industrial site preserved is to ensure the continuing use or function of that site.

The seminar passed five resolutions:

1. To prepare a statement of the significance of historical archaeological sites as part of Australia's national heritage.
2. To establish lists of industrial archaeological sites in each State and to establish committees for this work in each State.
3. To urge the adoption of a national policy on movable objects especially as we are approaching our bicentenary; (this policy was outlined in the report on "Museums in Australia", 1975)

4. The Newsletter of the Australian Society for Historical Archaeology (A.S.H.A.) will continue to act as a technical forum.
5. A handbook for uniform recording of different types of industrial and historic sites which should be preserved.

The seminar ranged over a variety of topics and lacked focus: at times it was concerned with historic sites, at other times with historical archaeology (one of the techniques to be employed in historic site preservation) or more specifically with one of the branches of historical archaeology, that of industrial archaeology. At no stage in the seminar were terms defined and there was a lot of interchange of and substitution for terms during the course of the seminar, which highlights the need for a common terminology to be adopted Australia-wide.

There was much discussion on the need for uniform recording techniques and the South Australia contingent presented the simple, but effective computer printout of their industrial sites register compiled by the Aboriginal and Historic Relics Administration (Department for the Environment) and the Engineering Heritage Sub-Committee of the Institution of Engineers. They foreshadowed a uniform recording process and format for H.A.E.R. - Historic Australian Engineering Record - which they hope to set up formally at the next national conference of the Institution of Engineers.

For those professionally involved in historic preservation and/or for those who had attended the December 1974 Conference on Historical Archaeology, the seminar was mostly "déjà vu"

and set no new initiatives in motion. However, as the seminar was open to the general public, especially active National Trust members, it had a positive educative role.

Australian Council of National Trusts sponsored a one day workshop on industrial and historical archaeology on 26 February immediately after the main seminar and attended by 18 National Trust delegates.

However, it was not followed from the outset as it was questioned whether the National Trusts should be each doing their own thing in their own State compared to looking at thematic sites across the nation as the Institution of Engineers sub-committees on bridges, machinery, etc. are doing.

There was a lot of discussion on the need for uniform site recording and forms so that sites could be included without modification on the A.H.C. Register of the National Estate. It was decided that there should be a national computer-based inventory prior to establishing a register of the most significant sites.

The meeting formed an Archaeological Sites Co-ordinating Committee of six persons including myself, to produce a report for the September/October meeting of the A.C.N.T. on the present position of historic archaeological site recording in each State and to recommend future action for such work.

Jane Lennon

16/3/1979

VI. THE INSTITUTION OF ENGINEERS AND THE AUSTRALIAN HERITAGE

The forthcoming conference on Engineers and the Environment to be held in Canberra on June 20-22 is a timely reminder of the increasingly significant contribution being made by members of the Institution of Engineers and their colleagues in the conservation of European sites and relics.

The following papers by two of those prominent in this field show something of the scope of material generally covered by their Engineering Heritage Committees.

Engineering Heritage and the South Australian Scene

by D.A. Cumming

The pioneer white settlers of the colony of South Australia intended to make their living by agriculture, i.e. wheat, sheep, cattle. They did not originally intend to develop manufacturing industries except to supply local needs. However, in the early years, the Colony was saved from financial ruin by the discovery of minerals, particularly copper, although others played a significant part. Eventually as the needs of agriculture increased, means of transport by land and water, and also agricultural and mining machinery became important industries. South Australia now has an interesting engineering history and a substantial number of important historical relics and sites.

Much of this history and many of the sites have been protected or at least guarded by the National Trust of South Australia, which was established by Act of Parliament for "the preservation and restoration of buildings of architectural, historic or scientific interest, the protection of scenic beauty, and for the conservation of land, flora and fauna".

More recently the Australian Heritage Commission has been established as a statutory authority under the Australian Heritage Commission Act of 1975, as the policy advisory and administrative body for the Federal Government on the "National Estate". Its responsibility is limited by the Act to responsibility for "places" and its advice is given to the Federal Government and their agencies.

Under the South Australian Heritage Act 1978, the appointed Minister has powers in relation to items which are

- (a) part of the physical, social, or cultural heritage of the State, and
- (b) of significant aesthetic, architectural, historical or cultural interest:

Item means any land, building or structure.

Important engineering items are preserved in a number of museums, including:-

- (i) The Birdwood Mill Museum
- (ii) Mile End Railway Museum
- (iii) St. Kilda Electric Traction Museum
- (iv) Pichi Richi Railway Preservation Society
- (v) Numerous museums sponsored by the National Trust of South Australia.

TELECOM has its own museum in Adastra House and a number of other government organisations are preparing museum displays.

Not much is left of the early milling machinery, but a substantial number of mill buildings are still in moderately good repair; including Nixon's Mill at Mount Barker (1843), Normanville (1850), Encounter Bay (1851), Middleton (1855), Gawler (1855); Hart's Mill now the Adelaide Milling Co. at Port Adelaide has operating a single central motor and a complex rope drive to the rollers.

Numerous mill buildings were built, but never had machinery installed; these include Callington (1850) used as a blacksmith's store, Currency Creek (1860) used as a sawmill, and Quorn (1879) used as a general store and now an art gallery and restaurant.

The first wharfs in South Australia were built by the South Australian Co. at Port Adelaide in 1840, although no relics of this remain. This was followed by jetties at Glenelg, Semaphore (1880) and Largs Bay (1882), as well as numerous country jetties including Port Elliot (1854), Port MacDonnell (1861), Beachport, Rivoli Bay and Port Germein (1881-83).

Early work on roads included the construction of the first road to Port Adelaide and its wharf, the Mount Barker road with its Toll House and Gate (1841), and the road to Glenelg.

At Glen Osmond the mine and smelter were commenced in 1846 as the first mineral mine in Australia. The quarries on the opposite hill were an early source of stone for building and road making. A major tunnel blast created a lot of interest; the presence of the quarry led to proposals for an early railway along Glen Osmond Road.

The first major mine was at Kapunda in 1842, followed closely by Burra in 1845, and eventually Moonta-Wallaroo in 1861. These mines kept South Australia solvent in poor seasons and created considerable industrial activity including the firms of Hawke & Co. (1865) in Kapunda, and James Martin and May Bros. at Gawler. James Martin built a number of boilers including one at Leigh Creek Coal Mine, a lot of mining equipment and a number of railway engines and other rolling stock. They supplied iron work for bridges including the Port line railway bridge over the River Torrens (1875), various bridges on the Strathalbyn to Goolwa line (1880) and replacement parts for the Murray Bridge ordered in 1865 and finally erected 1875-79.

Railway activity in South Australia started with the Goolwa to Port Elliot horse-drawn railway in 1854, followed closely by the steam-powered railway from Adelaide to Port Adelaide in 1856. Two early stations at Alberton and Bowden have been modified, but are still well preserved. This railway was extended to Dry Creek and to Gawler in 1858. Smithfield railway station with its building floor at track level is a good example of early country stations. After the River Torrens railway bridge, the next major bridge was over the River Light south of Kapunda. The first bridge (1860) on this site was of timber and after having been weakened by termites was replaced by a bow string girder bridge in 1875, and subsequently by a steel plate girder in the Webb era (1922). The heavy stone abutments of the first bridge are still prominent. Other major railway bridges of the 1880s include two at Hamley Bridge and one at Currency Creek. The only bridges still standing unreconstructed from this era are on the Port Augusta - Hawker line over the Willochra and Wirreanda Creeks, and two at Woolshed Flat: some of these were strengthened with timber trestles.

Port Elliot was always a disappointing port in spite of the breakwater (1854) of 7 ton blocks, quarried from the local headland, and the obelisk (1852) and flag pole to assist navigation.

Victor Harbor was developed in 1879 to replace Port Elliot, its facilities were eventually extended by the breakwater (1882) 12 ton blocks and the screwpile jetty.

In the meantime aids to navigation had been steadily developed under the Trinity Board and subsequently the Harbours Board at Port Adelaide. The first light was a fine masonry tower at Cape Willoughby (1852) on Kangaroo Island, it was followed by Troubridge Shoal (1855) - a tower of cast iron segments erected on timber piles and with prefabricated timber cottages.

Other towers followed including the first Cape Northumberland (1858), Cape Borda (1858) - the only square tower in this state, Tiparra Reef (1866) off Moonta, and the first Port Adelaide light (1869) - a steel tower on caissons which replaced the original light vessel. After construction of the Wonga Shoal lighthouse this tower was moved to Neptune Island in 1902 where it still stands. Other important towers on the classified list of the National Trust, and hopefully under the protection of the Australian Heritage Commission are Point Malcolm (1878) at Narrung a lighthouse for navigation on Lake Alexandrina and Albert, Corney Point (1882) and Point Lowly (1883) and Cape de Couedic (1909) was the last of the masonry towers. Associated with these lighthouses are a number of jetties, aerial-cableways, stores and cottages which form part of a complex.

Turning to navigation on the River Murray which started in 1853 with the "Mary Ann" whose square boiler is still preserved at Mannum, two paddle steamers exist, the "Marion" (1897) at Mannum and the "Industry" at Renmark. The "Captain Sturt" built in Cincinnati, USA, was transhipped to Mannum where it was assembled and launched; it subsequently assisted in the construction of the barrage and is now moored at Goolwa. There are two other privately owned paddle steamers and a number of hulks.

Major wharfs were built at Goolwa (1856 on), Milang, Mannum, Morgan (1882) and Murray Bridge (1886). Minor wharfs were built at Renmark (1902), Bowhill (1906) and Taillem Bend (1912).

The development of the river swamps was stimulated by Governor Jervois soon after 1880, and led to a series of earth training banks, drainage ditches and pumps. The beginning of the irrigation areas is marked by the Tangye Pump (1892) purchased from England by the Chaffey Bros. and the "Eliza Jane" boiler held at Renmark. Important landmarks are the pumphouse at Lyrup (1896) and the chimneys of the pumphouses at Pyap (1894) and Waikerie (1894-95). The Humphrey pistonless gas-powered pump (1926) at Cobdogla is uniquely important. A column of water was sent oscillating in a large U-tube to give a four-stroke action. Unfortunately the gas producers have been destroyed, but there are many items of auxiliary equipment still in good condition.

Representing the same era are items such as the Loveday Pump House and its steam engines from Thompson of Castlemaine, Victoria, also a pair of Hawke & Co. boilers, some Worthington diesel engines from Waikerie and the steam engine and centrifugal pump at Berri river bank.

The water supply in early Adelaide was taken from the Torrens River in the Parklands. Thorndon Park reservoir (1856) was the first major engineered source, being supplied by a weir in the gorge of the Torrens River. The first weir was washed away; it was then rebuilt and raised in 1879 to pass water through the aqueduct to Hope Valley. Another monument to this first engineered water supply is the octagonal valve house at Kent Town. A series of dams followed including Beetaloo (1885), Happy Valley (1892), Nectar Brook (1896), Bundaleer with its fine aqueduct in 1898 and Barossa which was the first concrete arch dam (1899). At Semaphore the Blackler Street Water Tower was built in 1880 to maintain water pressure in the area while the Jervois swing bridge was opened for shipping, thus interrupting the water mains. A second swing bridge was the Robinson Bridge at the docks. There are only two opening bridges left in South Australia, viz. the lift span at Paringa (1913) and the bascule at Birkenhead (1942).

Other major engineering features in the Port Adelaide area are Fort Glanville, built in 1878, and armed with two ten inch muzzle loading guns and two flanking 84 lb. guns, and Fort Largs armed with two nine inch muzzle loading guns. These were replaced in 1887 with two breach loading six inch guns from Sir William Armstrong, U.K., and again with more modern weapons in about 1908.

The Time Ball Tower was constructed in 1874 to provide accurate time for ships chronometers. A black ball was hoisted to the masthead and released at the correct hour by an electric pulse from the observatory.

Important mines in the State include the Bremer at Callington (1850s), Kanmantoo, Strathalbyn, Talisker (1862), Reedy Creek, Lady Alice (1871) on Humbug Scrub, Montacute, Mount Pleasant, Verdun and Balhannah.

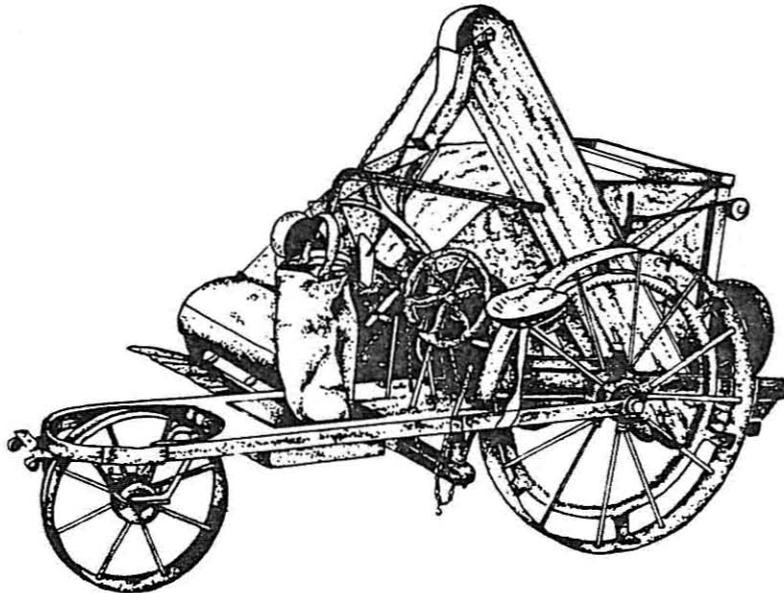
Goldfields include Echunga, Tarcoola, Teetulpa and Waukeringa. Echunga is the only known example of hydraulic sluicing; gold batteries still exist at Tarcoola, Mount Pleasant and Peterborough.

Coal was first discovered at Copley in 1883 when excavating for the Railway Dam. The main field was discovered further North at Leigh Creek, and a shaft was sunk in 1895 which was worked between 1905 and 1910. Much of this coal was taken for smelting copper at Blinman, though some was taken to Adelaide. One important relic of this operation is a boiler manufactured by James Martin of Gawler.

This account leaves little space for the agricultural machinery which was developed in this state and did so much to revolutionise agricultural practice. Many towns had their agricultural implement firms including David and John Shearer of Mannum and Kilkenny: Horwood Bagshaw, Smith of Ardrossan and Anders of Freeling were among the many others.

This is a very sketchy account of some of the large amount of engineering heritage material in South Australia which needs identification, evaluation and protection.

The author wishes to thank the numerous people who have supplied the information which has been incorporated in the Institution's Heritage Records, which formed the basis of this paper.



Ridley Stripper.

Australia's Technological History is Worth Preserving

by P.H. Sydenham

Engineering and technological achievement reveals itself as unique man-made rearrangements of naturally available resources. This creative effort seldom reproduces Nature, the end product of it being civil works, structures and machines which have been executed to fulfil a given task at a given time by ways not existing naturally.

The design and implementation of these works are always compromises made to suit the times. As abilities improve, as new materials become available and as more knowledge is discovered, the means to fulfil a stated aim change. Technology has a great social impact on the society of the time.

History of technology and engineering is the discipline that delves into these processes, a discipline that also enhances national pride and assists proper understanding of the place of technology in the scheme of things.

In general the Australian attitude to objects and works no longer useful is that they are of nuisance value only and must be removed from existence as soon as possible, a process enhanced if a financial return is offered for the scrapping process.

Occasionally a class of object from the past captures the imagination and interest of the public and its history and preservation is then provided for. Early transportation is the obvious example of historic artefacts (the Institution uses the term "Relics") being preserved.

The historic value of plant, equipment and civil works is too often not recognised. An important pumping station in the outskirts of Newcastle recently lost its pump to the scrap merchant; a nineteenth century dividing engine in Melbourne went the same way.

The current apathetic mood toward historical engineering relics probably can be traced to the fact that Australian technology has always been largely of a derivative kind. The tendency has been to buy in know-how and ready-made products from other Nations; little national attachment develops for products made elsewhere.

But to believe we have been a totally derivative technological culture is untrue. Throughout all of our history many notable world inventions have originated in Australia. Here are a few -

Ridley/Bull stripper	1843
Harrison commercial, mechanical, refrigeration	1851
Bland 'Atomic' steam-driven airship (model)	1852
Higham/Gwynne/Wolseley mechanical shears	1868-1877
Smith stump-jump plough	1876
McKay stripper-harvester	1884
Hargraves discovery of principles of flight, radial engine	1890s
Potter, Delprat, de Bavey flotation processes	prior 1910
Taylor header harvester	1913
Rocla concrete pipes	c 1920
Hastings Favelle high-rise tower crane	c 1950-60

No doubt research will uncover many more as we learn of achievements long forgotten.

Another reason for recognizing that early Australian technology is important and interesting is realised when we remember that Australia was a work-place for real application of many new requirements made possible by the 19th Century Industrial Revolution - gold and winning of other minerals used the latest Northern Hemisphere technology. Communications also made use of the most modern techniques available at any time. In most cases new technology in Europe found application in Australia within a very short time indeed. Here is an ad hoc list of some first uses of technology in Australia.

Locally built ship, 10 tonne	1789
Magnetic observatory, Rosbank, Hobart Town	1840
Weather observatory, Williamstown, Victoria	1853
Telegraph link, Melbourne to Williamstown	1854
Government owned railway (first in British Commonwealth) NSW	1855
Domestic underwater cable telegraph link, Tasmania	1859
Engineering course, Melbourne University	1860
International submarine cable link, Java to Port Darwin	1871
Telephone link, Yanga Station, NSW	ca 1877
Telephone exchange, Melbourne	1880
Gas engines and electric generators, South Head Lighthouse	1883
Telephone trunk line, Tasmania	1888
Steam car built in Australia by Thompson, Victoria	1896
X-ray in medical use at Newcastle Hospital	1896 (?)
Powered air-flight (man-carrying)	1910
Radio-telephone link to England	1930

With a little delving it is clear we possess an interesting technological heritage, especially if we add in several globally important relics which have been brought into Australia by enlightened persons in earlier years. The Boulton and Watt beam steam engine in the Sydney Museum of Applied Arts and

Sciences (it is a joy to behold!) is probably one of the oldest intact commercially useful steam engines in existence (manufactured in 1785 and acquired for Australia in 1880); the Holmes magneto-electric generator stored at ETSA in South Australia is one of two of the first generators to be used in lighthouses - it dates from 1867 (acquired around 1956).

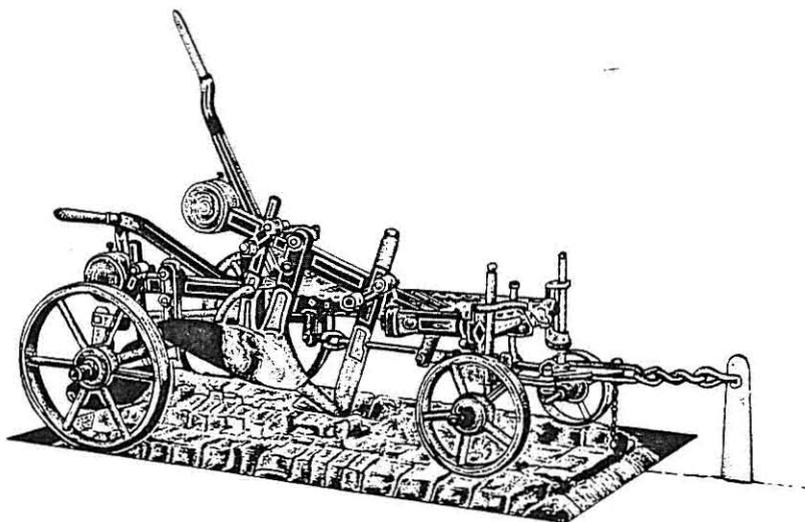
Engineering relics are as important a part of our heritage as the early buildings that are now accepted as worth preserving. Already, of course, many important relics may have gone. What happened to Shearer's 1896 steam waggon that plied from Mannum to Adelaide? Where is the second de Mentla's 1883 magneto-electric generator from the Macquarie Lighthouse? Does the second Thomson 1896 steam-car that went to Tamworth Shire Council around 1901 still exist? Where is the Watt grass-hopper beam engine that Ridley brought to Australia for his own use in the 1830s?

The engineering profession is built upon its past achievements and experiences. It is, therefore, proper to research its foundations, to display its works of the past and to document its existence. Overseas museums of technology are as popular as art galleries!

Peter Sydenham of the Newcastle sub-committee of engineering relics reports that in 1974 the South Australian Division of the Institution of Engineers, Australia, formed a sub-committee on "historical engineering relics", urging other divisions to do like-wise. At present, at least five of the eight Divisions have followed suit. These groups are currently developing networks and mechanisms to care for relics and sites existing within their geographical regions. More advanced groups are now labelling important relics to inform their owners of the value of the item. Cooperation with the Australian Heritage Commission is underway. It is hoped to establish national coordination of these sub-committees in the near future.

The problems they face are how to cope with the large numbers of relics emerging, how to classify these in a national cataloguing scheme, how to restore and preserve important items and sites so that the general public can begin to learn of the important part technology played in the development of the Australia of today.

Stump-jump Plough.



VII. LIGHT RAILWAYS

by K. McCarthy

This paper is presented in four parts:-

1. An attempt to define the term "Light Railways".
2. The anatomy of light railways.
3. Brief histories of several N.S.W. light railway systems which have been researched in some detail.
4. A bibliography of books and articles which have been prepared on Australian light railway systems.

* * * * *

Light Railways, Railways and Tramways

It is impossible to define firm parameters which can clearly divide these three rail transport areas into compartments. The British "Light Railway Act of 1896" was initiated to free railway construction in certain cases from the expensive fetters of the safe working demands which had evolved during the 19th century to make the British "heavy" railways the safest in the world.

This "Light Railway Act" simplified the method of wayleave or property acquisition, allowed a minimum of safe working devices by "one engine in steam" or "train order" operation, thus clearing the way for railway branches to small towns and villages not served at that stage by "heavy" railways. This Act did not open the flood gates to light railway construction in Britain, for during the same year of 1896 the well known "Red Flag Act" was repealed which was celebrated by the first London to Brighton motor car rally on November 14th of that year.

The resulting rapid development of road vehicles quickly removed the need and the economic advantages of "light" railway extensions in Britain. Thus this "Light Railway Act" was initiated too late to be of much advantage to the railway scene.

The following light railways were constructed under the provisions of the Act in England, Scotland, Wales and the Isle of Man:-

Lynton & Barnstaple	1ft 11½ in	1898
Vale of Rheidol	1ft 11½ in	1902
Welshpool & Llanfair	2ft 6 in	1903
Leek & Manifold Valley	2ft 6 in	1904
Campbeltown & Machrihanish	2ft 3 in	1906
Ashover Light Railway	1ft 11½ in	1925

Many more such railways were opened prior to the passing of the Act:-

Festiniog	1ft 11½ in	horse 1836, steam 1863
Isle of Man Railway	3ft 0 in	1873
Manx Electric Railway	3ft 0 in	1893
Snowdon Mountain Railway	2ft 7½ in	1896
Talylllyn	2ft 3 in	1865
Corris	2ft 3 in	horse 1836, steam 1863
Festiniog & Blaenau	1ft 11½ in	1868
Glyn Valley	2ft 4½ in	horse 1870, steam 1886
Ravenglass & Eskdale	2ft 9 in	1875
Southwold	3ft 0 in	1879
North Wales Narrow Gauge	1ft 11½ in	1877

The whole subject of light railways is a paradox and the foregoing list amply illustrates that fact.

Ireland constructed 16 substantial light railways but were spared the various gauge complications of England and Wales. The heavy railways of Ireland were constructed to the 5ft 3in gauge and the light railways to 3ft gauge.

The Anatomy of Light Railways

Light railways are generally:-

1. Built for freight and industrial purposes
2. Constructed to a narrow gauge
3. Worked by steam traction
4. Display little evidence of safe working procedure
5. Cheap to construct
6. Easy to maintain
7. Declining in use and importance
8. Traverse short distances

.....but again the paradox appears. There are exceptions to all these points.

1. Freight and Industrial Purposes. The greatest concentration of light railways in Australia is found in Queensland where the cane fields are linked with the mills by 2 ft gauge systems. Similar railways were used on the cane fields in N.S.W. on the Tweed, Richmond and Clarence Rivers, but these have been

gradually replaced by road transport between the 1950 s and 1970 s. The Queensland networks are found along the coastal strips from Nambour in the south to Mossman, 1,100 miles to the north.

The Victoria and Macnade Mills in the Ingham area boast a shared network of 221 miles of track with the longest regular journey amounting to 48 miles. Approximately only 10 steam locos are now in regular use on these 2ft gauge railways, most haulage being now handled by modern fleets of narrow gauge diesel units. Many mills, however, have one steam loco tucked away for historical purposes.

A much longer steam hauled line operated until the end of 1963. This was constructed to the narrow 1ft 8in gauge and extended 70 miles from the Sons of Gwalia mine at Leonora W.A.. This railway carried firewood to the mine boilers. While Leonora could claim to have one of the longest and narrowest gauged light railway lines it had the shortest and smallest electric street tramway. A 3ft 6in gauge steam tramway linked Leonora with Gwalia between 1903 and 1908 when a lone electric tramcar replaced the steam stock. A power house fire closed the electric service abruptly in 1915, but limited operation using a truck on tram wheels continued until the closure in 1921.

Prior to the construction of good roads most of the freight lines also conducted passenger services. The 26 miles, 2ft gauge steam railway which linked Goondah station on the main southern N.S.W.G.R. line with the Burrinjuck Dam construction works between 1908 and 1928 owned three commodious passenger cars which were often attached to the rear of goods trains carrying construction materials to the dam site.

The grandest narrow gauge general carriers were found in Victoria and Tasmania. The broad 5ft 3in gauge railways of Victoria were costly to construct and operate in rough country. At the turn of the century four steam worked railways were built in Victoria to the 2ft 6in gauge linking Wangaratta to Whitfield 1899-1953, Ferntree Gully to Gembrook 1900-1953, Colac to Crowes 1902-1962, Moe to Walhalla 1908-1954. These amounted to 121 miles of route worked by 17 large tank locos of the 2-6-2T Baldwin design and two 2-6-0 -0-6-2 Garratttype engines.

These railways were built to main line standards. The reopened segment of the Gembrook line in the Dandenong Ranges, known as "Puffing Billy" is an outstanding surviving example of Victoria's light railway era.

The other remarkable light railway network linked Zeehan in south-western Tasmania with Williamsford. This 18 mile, 2ft gauge line was known as the North East Dundas Railway. The undertaking worked from 1898 until 1932 and during its brief working life employed an unusual articulated Hagans steam locomotive while the first two Garratt units were constructed for this railway. In addition to the N.E. Dundas line the Zeehan town was served by a 2ft gauge street tramway operated by conventional steam locos.

The isolated Western Australian towns of Broome, Carnarvon, Derby, Onslow, Roebourne, were linked by light railways to the local jetties. These were operated by the Public Works Department and were constructed to the 2ft and 3ft 6in gauges, some being converted to the latter as traffic improved. The first of these was opened in 1898 (Carnarvon) and some sections are still in limited operation.

2. Narrow Gauge. Just as "heavy railways" in Australia were plagued with three main gauges of 3ft 6in, 4ft 8½in and 5ft 3in, "light" railways dimensions were also varied.

1ft 6in:- Skipways in most small metalliferous mines
1ft 8in:- Cable hauled coal loader at Ball's Head, Sydney NSW
The Sons of Gwalia firewood railway, Leonora WA
2ft 0in:- Tunnel construction railways
Sugar mill railways
Most colliery skipways (Illawarra)
Kalgoorlie Goldfields. Lake View and Star Mine
Tasmanian mining railways. Alexandra-Rubicon, Vic.
Kiama gravel railway NSW
Newnes shale mine tunnels
Irvinebank and Stannary Hills Railway Qld.
Douglas Park to Cordeaux Dam NSW
Goondah to Burrinjuck Dam NSW

N.B. The Australian 2ft gauge lines used 61cm gauge stock. The surplus World War I light railway equipment was generally 60cm or 1ft 11½in gauge.

2ft 3in:- Skipways in the Newcastle NSW region
2ft 6in:- Cobar NSW firewood railway. Buderim Tramway, Qld.
Victorian narrow gauge lines, VR gasworks
Munro timber railway at Hampton Qld. Tyers Valley Vic.
3ft 0in:- N.S.W. PWD construction lines. Hume Weir
Walsh Island industrial railway, Newcastle NSW
Mortlake Gasworks NSW. Thomson Valley Tramway Vic.
Powelltown Railway, Vic. SECV Morwell Vic. (90cm)
Britannia Creek Railway, Vic.
Metre:- Hartley Kerosene Works, NSW
3ft 4½ in:- Clark & Pearce's Tramway, Alexandra Vic.
3ft 6in AI & S colliery underground lines
Cockatoo Island NSW

- Fyansford Cement Works, Geelong
Timber Railways Northern NSW
Victorian Irrigation & Rivers Commission
Railways (Hume Weir)
WA Jetty Tramways
Noojee Railway, Vic.
Sorrento Tramways, Vic.
Noonday Creek Railway, Forrest, Vic.
Wandong Timber Tramway, Vic.
- 3ft 8½in:- Mt. Pleasant Colliery Tramway, NSW (Horse then steam)
Mt. Keira Tramway NSW (horse)
Katoomba Coal Coy. NSW
- 4ft 8½in:- Colliery Railways, NSW. Newnes Shale Railway NSW
Breakwater Railways, NSW
Bargo to Nepean Tramway NSW
Mackay Harbour Board, Qld.
Lilydale. David Mitchell Timber Tramways Vic.
- 5ft 3in:- McIvor Timber Tramway, Vic.
Benwerrin Tramway, Vic.

This list is far from exhaustive, but it is presented here so that the various gauges used in light railway construction can be appreciated.

3. Steam Traction. Australia's first light railway was the funicular between the AA Coy. Cooks Hill pit at Newcastle and the loading staith on the Hunter River. This commenced operations in 1831 and seems to have worked on the principle of the loaded wagon going down hill hauling up an empty truck on the adjacent track by chains. In 1835 a convict powered railway was established in Tasmania linking a sheltered port to the penal settlement at Port Arthur.

Conventional railway development was launched in Australia with the 5ft 3in gauge horse line in South Australia between Port Elliot and Goolwa in 1854. By the time this network was converted to steam traction in 1885 the route mileage had expanded to 77 miles linking Victor Harbour with Strathalbyn. Port Melbourne was linked with Melbourne by a steam railway of the same gauge in 1854 to be followed by the 4ft 8½in gauge Sydney to Parramatta steam operation in 1855. The steam working between Adelaide and Port Adelaide commenced in 1856 on 5ft 3in gauge tracks.

Narrow gauge light railways serving industries, jetties and mines generally developed in the 1870 s but not until the 1880 s was steam traction introduced to these undertakings. Horse, man and gravity power being the general traction modes prior to that decade.

The last new main line steam locomotive in Australia entered service on the Queensland Railways in 1953. During 1952-3 the last new steam engines were delivered to the 2ft gauge light railways in Queensland. This batch of 8 locos was constructed by the Bundaberg Engineering Works to John Fowler of Leeds design and specifications. These were known as the "Bundaberg Fowlers".

The first Australian built diesel locomotive was a 6 wheel unit manufactured by Kelly & Lewis of Melbourne in 1935 for the 2ft gauge Alexandra to Rubicon railway in Victoria. This engine is now preserved at Alexandra while an identical second loco built for that railway by the same firm in 1936 is preserved in Sydney. Petrol and diesel locomotives have gradually taken over the main line operations on the cane fields railways since the early 1960 s. As mentioned earlier only about 10 steam locos are now in regular operation on these railways.

The conventional steam locomotives on 2ft gauge lines in Australia ranged from 5 tons to about 18 tons in weight. The Tasmanian Railways' 2ft gauge Garratt engines weighed 33 tons -10 cwt while that railways 2ft gauge Hagan articulated loco amounted to 37 tons 6cwt in steam.

The good sugar seasons of recent years have resulted in the conversion of the last large fleets of steam engines by diesel units. At the same time the Sydney firm of E.M. Baldwin & Sons of Castle Hill perfected the design of a double bogie (B + B) diesel hydraulic machine weighing almost 40 tons. These have found favour on the larger Queensland undertakings while the first of several has already been exported to Fiji.

Unconventional steam locomotives of the Shay and Climax designs also found favour on the Australian light railways but a similar unit built in Sydney for the Rhodes Timber Coy. near Taree in N.S.W. known as "The Final Flutter" was a dismal failure.

Cable haulage in collieries with skips fastened to the wire rope by "fisher clips" was supplanted by the 1960 s, generally by belt delivery systems. Not until April 4th 1976 was the 1ft 8in gauge coal loader railway owned by Coal and Allied at Ball's Head jetty in Sydney closed for conversion to belt loading. This undertaking was the last example of conventional cable tramway technology in Australia, and possibly in the world outside San Francisco, U.S.A.

Battery powered electric locos are still regularly used in tunnel work, especially by the MWS&D Board in N.S.W. on sewer construction. A small 1ft 6in gauge electric locomotive is preserved in the Cobar Mining Museum, having only recently been retrieved from abandoned workings. Larger mines supplied power to their electric units through tramway type overhead wires while surface light railways at Cockatoo Island N.S.W., Broken Hill N.S.W., Bulimba Power House Qld. and East Perth Power

House W.A. (all 3ft 6in gauge) ERS* & Cobar N.S.W. (4ft 8½in) collected power from overhead wires using pantographs, or trolley poles. The B.H.P. Company worked their iron ore and limestone quarries at various locations in South Australia with 3ft 6in gauge electric engines collecting power from overhead wires by pantographs while the State Electricity Commission in Victoria has a large network of 90cm gauge electric railways using heavy locos linking the brown coal open cuts with power houses in the Yallourn-Morwell region.

4. Safe Working. The larger light railway systems on the Queensland cane fields are worked under sophisticated "centralised train control" methods with the orders being transmitted by radio. Since the introduction of mechanised cane harvesting the timing of the milling operations has become critical. Hand cut cane sticks could be held on the light railway wagons for a considerable time before deterioration accelerated, but the smaller pieces of mechanically harvested cane rapidly falls in sugar content.

The more substantial light railways such as the N.E. Dundas line in Tasmania, the Burrinjuck line in N.S.W. and the 2ft 6in gauge Victorian Railways undertakings were controlled by conventional signals and staff and ticket tokens on single track sections. The Kiama gravel tramway was one of the few light railways to be duplicated for most of its length.

Other similar railways seemed to get by with "one engine in steam" or with signals limited to locations where "heavy" railway routes were crossed on the level.

5.&6. Cheap to Construct, Easy to Maintain. As in all engineering projects cheap construction generally leads to expensive maintenance. Light railways were no exception to this rule. As light railways are generally constructed in an environment which does not require rapid speed, the road bed can generally traverse the natural grade of the country thus avoiding high embankments and deep cuttings, while sharper and more frequent curves can be tolerated by such a light railway. Locomotives on the large Victorian and Macknade sugar mill system at Ingham Qld., however, haul loads up to 600 tons per train and the standard of track and roadbed construction in such cases must be comparable with main line railway standards.

Loco and carriage dimensions on a 2ft gauge line are generally set at 7ft as the extreme allowable width, 6ft to 6ft 6in being the usual width for large coaches, locos and wagons. Baldwin locomotive No. 24 built in 1919 for the 2ft gauge Sandy River and Rangeley Lakes Railroad in Maine was specified with a tender width of 84 inches. This was taken by the manufacturer as being 8ft 4ins, and this overwide vehicle was the cause of several spectacular derailments on that railway due to instability caused by water surge.

* *Electrolytic Refining & Smelting Company, Port Kembla, NSW.*

Thus structures such as bridges and cuttings must be almost as wide for 2ft gauge railway construction as for the larger conventional railways. The main saving occurs in width of roadbeds and embankments.

7. Declining in Use. Light railways in Australia have ranged from short horse worked lines similar to the type once used in brickworks and on building construction sites to the large networks as used on the canefields. The short railways of the type mentioned above have now been replaced by tractors, fork lifts and shuttle cars, all being road and not rail vehicles. The cane field railways of Queensland, however, are not declining. Over 300 locos still work on some 2000 miles of 2ft gauge track in that state. As poorly patronised 3ft 6in gauge branch lines of the Queensland Railways have been closed there have been several instances in the cane field areas where the gauge on these abandoned lines has been narrowed to 2ft to give adjacent isolated light railway systems physical connections.

In collieries, however, mechanisation generally brought a change to belts and rubber tyred shuttle cars or the old 2ft gauge skipways have been converted to 3ft 6in gauge operated by diesel flameproof engines.

8. Traverse Short Distances. The large distances travelled by trains on the cane fields, and the firewood railway serving the Sons of Gwalia mine in Western Australia have already been mentioned in this paper. Some other aspects must be mentioned here.

The earliest railways in some areas, such as the Illawarra Region in N.S.W., linked mines with jetties, particularly when the mines were developed prior to the construction of the trunk government railway. The last operation of this nature was that between the Wallarah Colliery and Catherine Hill Bay near Newcastle N.S.W.. This railway was replaced by a belt system after December 1963.

Just prior to the opening of the Daradgee Bridge over the North Johnstone River at Innisfail in Queensland during 1924, passengers on the main line 3ft 6in gauge trains had to tranship around the bridge site on the 2ft gauge trains of the Goondi and South Johnston mills.

During World War II the US Army authorities discovered that if several gaps between the isolated 2ft gauge cane railways were linked an alternative railway system would be available for emergency land transport if the main North Coast railway was damaged by enemy action. The outcome of the Battle of the Coral Sea changed the fortunes of the Allies and the need for an alternative rail link in the area did not eventuate.

Until the 1930s many contractors employed light railways and skips in conjunction with horses and scoops for excavation work. These tasks are now carried out by bull dozers, front end loaders and tip trucks. When one traces the history of early narrow gauge locos it soon emerges that these changed hands just as tractors and specialised construction material does at present when one major construction job is completed and the equipment is dispersed at auction to other jobs.

Some light railways in N.S.W.

Corrimal. The Corrimal Colliery was opened as the Broker's Nowe Mine in 1885 with a tunnel into the main seam on the escarpment some 400 ft above sea level. A self-acting incline dipped from the tunnel mouth to the 100 ft contour and the 2 ft gauge tracks extended eastwards to the Bulli Road with horse traction. From that point horse drays carted the coal to Wollongong Harbour.

The isolated N.S.W.G.R. Illawarra line between Clifton and Wollongong opened on June 21st 1887 and the completion of long tunnels enabled the northern connection to Waterfall and Sydney to be opened on October 3rd 1888.

The Corrimal Colliery was then able to rail its coal direct to the Sydney market, as well as through the Southern Coal Coy's jetty at Port Kembla from 1889. In 1890 the horse worked section of the railway between the N.S.W.G.R. and the foot of the incline was converted to standard gauge and connected to the Illawarra line.

The colliery operated five steam locos between 1890 and 1965 on this standard gauge section. In 1906 a 91ft uplift was encountered in the seam, so a new entrance tunnel was driven into the escarpment one mile to the south of the incline top. A 2ft gauge steam worked railway was constructed along the 400ft contour linking the new entrance with the original mine yard.

Between 1906 and 1964 four small steam locomotives hauled the coal skips along this mountainside railway. In 1955 a new incline, constructed to the 3ft 6in gauge, was opened between the "new" mine entrance and the foot of the old incline, replacing the surface 2ft gauge tracks.

The Australian Iron and Steel Company purchased the Corrimal Colliery in 1964 and during the following year tunnels were completed linking the workings with the adjacent Mt. Keira - Mt. Kembla mines. This enabled coal to be removed through the Mt. Kembla entrance (Kemeira) and the Corrimal light railway systems to be closed.

Cobar. The copper seams at Cobar were discovered in 1869 and by 1871 the first methodical extraction commenced. The Great Cobar Company started operations in 1878 and during 1882 this company ordered material to enable 10 miles of

2ft 6in gauge railway track to be constructed eastwards from the mine and smelters to transport firewood for the boilers at the plant. This railway was available for traffic in July 1883. In the six months to June 1884 31,000 tons of firewood was delivered on this light railway. By 1888 some 20 miles of track were in use served by 3 jackshaft drive Fowler steam locomotives.

The mine stopped production in 1889 but with the arrival of the N.S.W.G.R. standard gauge line from Sydney in 1892 mining activity revived. From that time coke and coal replaced firewood as the fuel, but the firewood railway was used intermittently until 1897. During 1902-3 the light railway was dismantled.

A new Great Cobar Copper Company was formed in 1906. The works were modernised and the 4ft 8½in gauge branch and works sidings were electrified and operated by two locomotives. The results of the mine were never as rewarding as expected, but the 1914-1918 conflict enabled the undertaking to return reasonable profits. The fall in copper prices which followed the end of hostilities caused the mine to close in 1920.

Catherine Hill Bay. During 1873 a new coal company, known as the New Wallsend Coy. started mining operations at Catherine Hill Bay south of Newcastle. Production ceased temporarily in July 1875 with the loss of the company's ship. The workings were abandoned in March 1877.

The Wallarah Coal Company formed in 1888 revived these workings and in the following year constructed a 4ft 8½in gauge steam railway from the pit along the beach to the jetty, sheltered by a headland, 2 miles southwards. By February 1890 this railway was operated by two Fowler steam locos, a further similar engine from the same source was delivered in 1906. Over the 73 years in which the railway operated 8 locos worked the line, a maximum of four being in use at any one time. The railway closed in December 1963, being replaced by a belt loader system along the jetty, entering the mine by way of a new tunnel at the end of the jetty.

Kiama. In September 1876 the Robertson Basin at Kiama was opened to provide shelter for steamers on the Illawarra coastal trade. At this period the prosperity of Kiama was based on the dairy and gravel trade.

The crushed stone was delivered to the harbour on horse drays and because of the lack of harbour side store bins the horses and drays formed an endless procession along Terralong St. Kiama when a ship was taking on cargo in the harbour. To reduce the wear and tear on the local road surfaces Kiama Council constructed a 3ft 6in gauge tramway from the wharf to the main Pikes Hill Quarry along Terralong St. during 1884-6. A six wheel steam loco, delivered from John Fowler of Leeds, made trial runs along the line in December 1886.

The N.S.W.G.R. Illawarra line reached North Kiama (Bombo) in 1887 and gravel quarrying activities moved northwards to the area adjacent to the new railway terminus. The Kiama tramway did not commence commercial operations and during August 1889 the council decided to dispose of the assets. The rails were lifted in November 1889 and the loco sold during 1890.

During 1893 the N.S.W.G.R. extended the Sydney railway through Kiama to Bomaderry and following the financial recovery after the economic depression of the early 1890's the main Kiama quarries reopened using horse and dray transport to the harbour and the railway goods yard.

State Metal Quarries purchased the Pikes Hill industry in 1911 and opened a 2ft gauge light railway during 1914 along Terralong St. to the harbour with a branch line in Manning St. to the N.S.W.G.R. yards. During its operational period six steam locos provided the motive power in addition to a petrol-electric unit employed in the quarry after 1927.

The Stevens-Bruxner government of the 1930 s sold State Quarries to Quarries Ltd. in 1935 and the branch tramways to the goods yard was closed. Water shortages during the late 1930 s caused the tramway to close during prolonged spells during the 1938-1940 period. The final demise resulted from the requisitioning of the last gravel ship "SS Bombo" by the navy in March 1941.

Warragamba Dam and other Water Board Constructions.
The Sydney MWS & DB used light railways on most of its major dam construction projects. Between 1902 and 1907 a 2ft gauge steam railway linked quarries near the top of Bulli Pass with the dam wall at Cataract. Other material was delivered from Campbelltown Station on Road trailers hauled by steam traction engines via Appin.

The Cordeaux Dam construction occurred between 1918 and 1926. The N.S.W.G.R. built a short siding southwards from Douglas Park Station and a ropeway spanned the adjacent Nepean River Gorge. A 2ft gauge steam railway linked the ropeway with the dam along the Mt. Keira Road.

The Avon Dam (1921-27) was served by road vehicles and aerial ropeways but the adjacent Nepean Dam (1926-35) employed a standard gauge light railway between Bargo and the dam wall using a former Sydney steam tram motor as motive power.

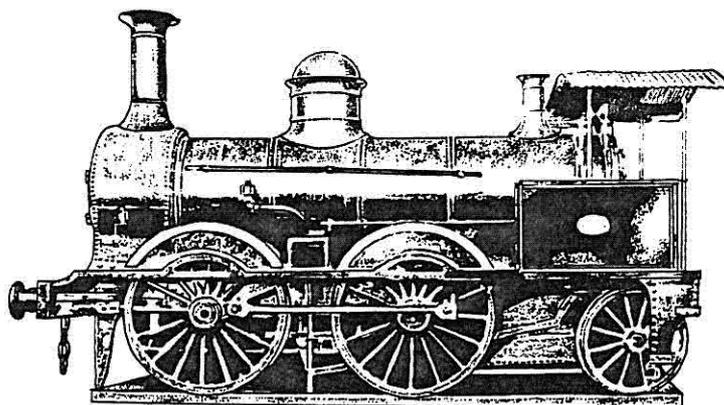
Due to the financial depression the Woronora Dam project was carried out in two stages, 1927-30 and 1935-41. 2ft gauge light railways served by small skips were used at isolated locations along the pipeline while similar lines at the dam wall were powered by small internal combustion engined locos.

The giant Warragamba dam construction spanned the years 1948 to 1960. A 12 mile aerial ropeway delivered the gravel from McCann's Island near Penrith and light railways were only used on the construction terraces at the eastern wall of the gorge to manoeuvre materials under the hooks of the two cableways which spanned the site.

These railways were built to the 6ft, 2ft, 3ft and 4ft 8½in gauges to suit rolling stock already on hand or planned for future projects. The 2ft gauge tracks were worked by internal combustion locomotives from the Woronora Dam while three large "Planet" diesel locos were imported for the 4ft 8½in gauge tracks.

Resumé, A very brief paper such as this can only attempt to clarify the mechanics of light railways and the various reasons for their existence. To conduct further studies one must extend investigations to include the social and economic development of the communities and industries which the utility served. By just exploring the routes of the railways there is a wealth of information awaiting the researcher at the sites of temporary towns and villages established to house the workers and their families and middens left at the construction or timber getting sites.

The Cobar firewood railway is particularly interesting. Due to the low rainfall of that area and the very slow rate of decay, the region is rich in relics, even though the railway closed almost 80 years ago. Camp sites of the timber cutters are readily identified, their garbage middens are rich in relics, accident sites along the railway are easily seen due to broken chains, axle box covers and other such items littering the area. At several places the imprint of the rails and sleepers are still clearly seen in the earth as if the action of the sun and the resulting shadow of the relics produced a photographic negative on the soil.



Class 1 Locomotive built by Stephenson in 1854 for the N.S.W. Government Railways.

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- Tullah Tramway-Tasmania. A.R.H.S. "Bulletin" April 1960.
- Abbreviations:- LRRSA Light Railway Research Society of Australia.
PO Box 290 BURWOOD. NSW. 2134
ARHS Australian Railway Historical Society.
PO Box E 129 ST. JAMES NSW 2000.
ARHS Bookshop. Belmore St. Surry Hills NSW
"Trolley Wire" Sydney Tramway Museum Magazine.
G.P.O. Box 103 SYDNEY. NSW. 2001.

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	PAGE
CONTENTS	
I. Editorial	3
Science in Archaeology	
John Wade	
II. News Items: General	5
III. Industrial Archaeology in Britain	9
Sybil Jack	
IV. Book Reviews and Notices	16
V. Practical Experience in Building Conservation	22
Clive Lucas	
VI. The Restoration of Historic Gardens	26
James Broadbent	
(Reprinted by kind permission of Australian Parks and Recreation)	
VII. Thorpe Water Mill .. A Tasmanian Restoration Project	34

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I. EDITORIAL

Science in Archaeology.

One of the great archaeological books of the 1960s was *Science in Archaeology*, edited by Don Brothwell and Eric Higgs, and published by Thames and Hudson in 1963. But only two of the 54 chapters were devoted to prospecting - "Magnetic Location" and "Resistivity Surveying".

Technological advances, and press publicity to create a wide popular market, have brought the metal detector within everyone's grasp. And grasping people all over the world have been using their metal detectors to locate buried treasure. One recent advertisement points out the advantages of one machine's dual detection system, audio and visual; turn down the audio and read the dial, which "doesn't give your find away when you (sic) hot onto treasure!"

This year, wide publicity was given to a lump of gold from the Hill End goldfields north-west of Bathurst, N.S.W. Finding the gold is fair enough, but Hill End is a protected Historic Site, and the use of metal detectors is liable to lead to a rash of illicit digging on this and other historic sites.

The dump looting fraternity has been on to the possibilities of metal detectors for some time. It is folly to pretend that they will not continue to do so, or that legislation alone will curb their activities. There are two courses open to the preservers of our heritage, a programme of public education in the use of these devices, and the demonstration of their value as tools in legitimate archaeological research. Through these avenues, it should be possible to harness some of this amateur work to productive, scientific ends.

The responsible use of metal detectors is the subject of the editorial and an article in a new British archaeological publication, Popular Archaeology (reviewed below). Part of the article is worth quoting to an Antipodean audience:

"Although to some people archaeology is represented by Tutankhamun's tomb, the Acropolis or the Pantheon, there is now a far greater awareness of the importance of Britain's archaeological heritage."

These seem strange words to us; any Australian who has been to the Roman villa at Fishbourne or the industrial complex at Ironbridge would be well aware of the importance of Britain's archaeological heritage. It seems like a case of not appreciating what is in one's own backyard.

Fortunately, the tide is turning. In Sydney this year the scientific rescue excavation of the old gaol buildings in George Street received good press reports, and the Minister for Planning and Environment made a timely pilgrimage to the site to give the work the official stamp of approval. We have even seen an article

in the women's section of the Sydney Morning Herald on one young woman's archaeological career.

We have also seen an exhibition mounted by the Director of the Macleay Museum, Dr. Peter Stanbury, devoted to archaeological research in the Sydney region. The exhibition was marked by the publication of a book of essays on the subject, with authors from a wide range of fields.

This publicity for archaeological work must be encouraged. Popular attitudes have to be changed, and this will only come about by bringing archaeological work more to the notice of the public.

J.W.

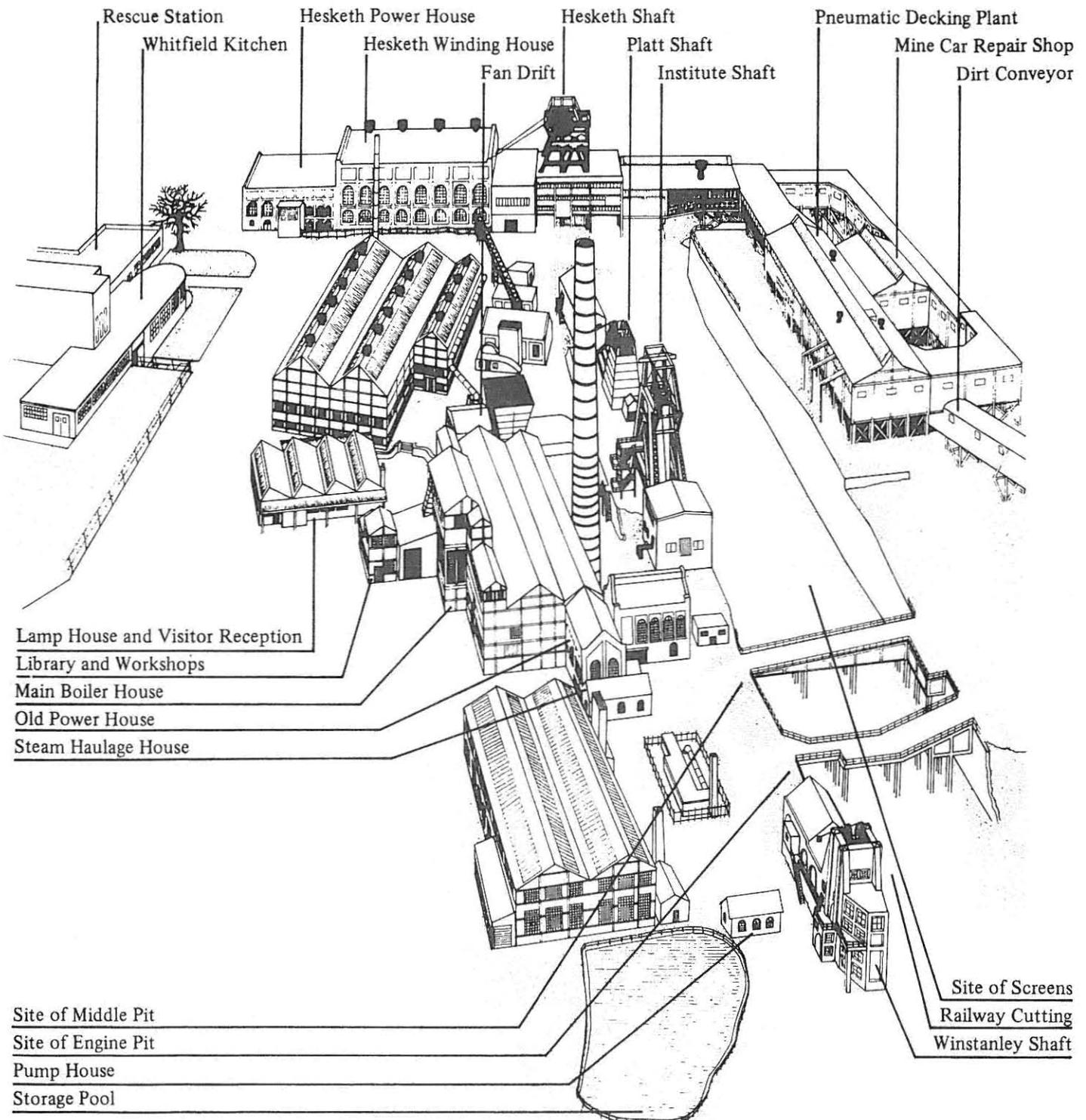


Illustration from the Chatterley Whitfield Mining Museum

II. NEWS ITEMS: GENERAL

Announcement

A new university course, believed to be unique in the South East Asian region, is planned to commence at the University of New South Wales in 1980.

It is the Master's Degree by course-work in the specialized field of Building Conservation.

Conducted in the Graduate School of the Built Environment, which is part of the Faculty of Architecture, it will offer architects and other professionals a highly concentrated programme of training and research in preserving, restoring, reconstructing, adapting and otherwise treating old buildings to give them new life, usefulness and value.

Building conservation itself is not new to Australia, but great changes in the building industry have made conservation a ripe field for expert specialization.

An awakening of interest in the heritage of the past, new State and Federal heritage legislation, and the slump in new building work - these changes have meant that more and more old buildings which formerly would have been demolished are being kept, either to continue in their original functions or to be adapted for new uses.

Whilst some of these structures have architectural, historical, scenic or community significance, the majority of buildings being re-cycled have none: they are merely second-hand.

These two very different kinds of old structures - those having heritage importance and those which are just sound building stock - need different conservation approaches. Both conservation approaches begin with the need to understand, evaluate and respect the special qualities of a building, so that whatever is valuable about it may be properly integrated into its future. This is the basic philosophy of the new course.

The programme will include architectural history, conservation management, analysis and documentation of old structures, a wide range of relevant studies such as conservation law and community attitudes and a graduate project. But the heart of the course will be its extensive coverage of the technology of building conservation.

Most of the teaching will be done by practising professionals, many of them from other states, and it will be remarkably cross-disciplinary. There will be architects and engineers, builders and historians, archaeologists and administrators, economists and lawyers, tradesmen and psychologists - to name just some of the lecturers' expertise.

The course is designed to be offered over two half-year sessions of full-time study (about 18 hours per week) or over four half-year sessions of part-time study (about 9 hours per week).

Admission to the course is open to applicants who have completed at least a four-year full-time university course in an appropriate discipline. Enrolment will be limited to about twelve students, and competition for entry is expected to be strong.

Further information may be obtained from Professor J.M. Freeland, Head, Graduate School of the Built Environment, P.O. Box 1, Kensington, N.S.W. 2033. Telephone 662 2301.

* * * * *

The History Department of the W.A. Museum has recently been involved in two historical archaeological investigations. Both were financed by Australian Heritage Commission grants.

1. Convict "Fence" - Canning River

There is a long row of poles in the Canning River near Perth which are known as the "Convict Fence". They were, it was claimed, erected by the convicts to act as a barrier to keep open a route for timber barges. David Hutchison reviewed existing research and saw the need for a more thorough study. Ms Dianne Davidson was employed and a joint paper by Hutchison and Davidson is now at press and will appear in the W.A. Museum Records.

2. Dampier Archipelago

Over recent years David Hutchison has been asked by Hamersley Mining Co. and by local residents of Dampier to investigate several historic sites in the Dampier area - mostly on islands. These were F.T. Gregory camp site (Hearson Cove 1861); Whaling tryworks (Malus Island ca 1870); graves and rock 'engravings' associated with pearling site (Dolphin Island, ca 1865/75); a pastoral settlement (West Lewis Island, ca 1880).

The Australian Heritage Commission granted \$5,000 in 1978/79 and \$15,000 in 1979/80 to finance a survey. Mr. Jack McIlroy, who has had several years' experience in archaeological work in England, was appointed temporary research officer for 8 months and Mr. John Patterson was appointed field assistant for 4 months.

Field work has been completed and the reports are now being written. A new pearling site was discovered on Gidley Island in the course of the field work.

D. H.

* * * * *

Rogers Pottery at Ipswich.

Bulldozing during late October for a new development at Ipswich, thirty kilometers south-west of Brisbane, revealed the site of the nineteenth century pottery of R.H. Rogers & Co. Rogers were known as manufacturers of bricks, garden pottery and household redware. Little could be done to save the site, but sherds were collected from the surface, and marked ones indicated the name of the pottery.

J. W.

* * * * *

Garden History Society.

As a result of a conference held in Tasmania recently, an Australian Garden History Society was set up ... details may be obtained from Mr. Chris. Betteridge, c/- Australian Heritage Commission, Telephone 237 9111.

* * * * *

A.S.H.A. Post Box R.S.V.P.

As a joint exchange of information we have decided to set up a Post Box for those of our members who wish either to obtain or to impart information. We shall be interested to have your comments on this venture. The first of our R.S.V.P. items appear below:-

1. Weighbridges.

Dr. Denis Cumming, of the Department of Civil Engineering, University of Adelaide, Box 498, G.P.O. Adelaide, 5001, would like information on weighbridges throughout Australia, particularly any manufactured by a firm other than J. Hawke of South Australia.

2. Newcastle Industry.

Miss Damaris Bairstow c/- Department of Community Programmes, University of Newcastle, is seeking information on 19th century industry in Newcastle and the Lower Hunter Valley for a thesis in Historical Archaeology.

3. 19th Century Commercial Building Construction.

Professor Emery Balint of the School of Building, University of New South Wales, Box 1, P.O. Kensington, 2033, requests information on 19th century building construction for identification and recording of types, trends and phases of development. Background information on the study may be found in the report by Balint and Howells submitted to the Australian Heritage Commission in 1977.

4. Industrial Sites.

The National Trust (N.S.W.) Industrial Committee is completing its preliminary survey of Industrial Sites in N.S.W. Any information, photographs, etc. of industrial relics or sites would be gratefully received by the Chairman, National Trust Industrial Archaeology Committee, National Trust Centre, Observatory Hill, N.S.W. 2000. So far over 1,000 sites have been listed in this survey which aims not only to record sites and relics but to assess their significance, especially in establishing priorities for detailed recording and preservation.

* * * * *

Exhibitions

10,000 Years of Sydney Life.

An exhibition on the prehistoric and historic archaeological discoveries of prehistoric and historic Sydney, mounted by

Peter Stanbury and the staff of the Macleay Museum at the University of Sydney, and designed by Brian Bertram.

Hours 8.30 am - 4.30 pm weekdays until 30 November 1979.

Centenary of the Sydney International Exhibition.

A display which recreates some of the excitement of Australia's first International Exhibition, held at the Garden Palace in the Sydney Domain 1879-1880, at the Museum of Applied Arts and Sciences, Harris Street, Sydney. Among the exhibits on display are some from the original exhibition, souvenirs, photographs and drawings which reconstruct the extraordinary event in the Domain, which was visited by over a million people, and which brought to the fore the wide range of new technology which the Victorian era enshrined in a series of international exhibitions. The Sydney International Exhibition introduced and propagated a wide range of new technology to the Australian colonies, based mainly on steam power, and at the same time was a showcase of Colonial products, from "Eucalypto liqueur" to disinfectant, from needlework to painting, from stoneware bottles to bridges. Illustrated 54 page catalogue \$3.50.

Hours 10 - 5 Monday to Saturday, 1 - 5 Sunday, until 24 November 1979.

J.W.

* * * * *

RISDON COVE 1980

Risdon Cove is the site of the first European settlement in Tasmania. Euroaustralian occupation began in 1803 and continued throughout the 19th and early 20th centuries.

This season's excavation will take place from mid-January until the end of February. The project is being organised in co-operation with Service Civil International* who also have information on overseas excavations.

If you wish to participate (minimum period 3 weeks), please write for further details to:

The Director,
National Parks and Wildlife Service,
Box 210,
Sandy Bay,
TASMANIA, 7005.

Don't forget to let us know your vacation address!

*S.C.I., c/o Bini Travel Agency, 150 Collins Street, Hobart.

III. INDUSTRIAL ARCHAEOLOGY IN BRITAIN

Industrial Archaeology is booming in Britain. To the overseas visitor used to more meagre fare, the impression is at first almost overwhelming. When enterprising holiday travel firms find it worthwhile to include a selection of tours on industrial archaeology in a popular brochure, when Exmoor and Dartmoor in their popular 'guided walks' routinely include walks to remote sites of interest to industrial archaeology, the subject has clearly passed the 'take-off' point. Handy, pocket-sized guides to specialised fields within the subject, such as lock-gate gearing, can be found on the shelves of the average W.H. Smith's. These happy circumstances have not been achieved without considerable hard work and publicity in which local radio stations and local newspapers have played a not inconsiderable part. The regular featuring of items about industrial archaeology on local stations such as BBC, Radio Brighton or the local newspaper such as the Hastings Observer heightens local awareness, support and interest particularly where actual and ongoing projects concerning local landmarks are concerned. These of course have been supplemented by local evening education classes, university residential extension courses and practical fieldwork training by adult education classes - all of which Australia also has - but which in Britain has already generated a remarkable level of general expertise and willingness to participate in essential local work.

Other means of publicity which have been surprisingly successful include one devised initially by the Bristol Industrial Archaeological Society (disarmingly known as BIAS) in which members of the association regularly conduct guided walks to points of interest for the general public, and sell copies of the detailed walks for individuals to follow on their own. Other societies have taken this up and even London Transport has its own small guide to London's Industrial Archaeology with instructions on how to get there available for 10p (about 20c).

While some of these schemes have been remarkably successful financially (particularly the BIAS walk pamphlets) hard work by enthusiasts has, in general, to be matched by some financial resources. Most curators or wardens of operating specialist museums such as Morwellham or Wheal Martyn frankly admit that the fees charged for entry could not possibly in themselves cover the running costs, let alone other expenses. The financing of the projects is often bewildering in its variety and nature. The total effect is Heath Robinson in the extreme, displaying remarkable ingenuity and complete lack of homogeneity. I quote from a recent Association for Industrial Archaeology Bulletin on the excavation at Scots Pit Swansea:

'The Prince of Wales committee has given the society £40 towards its work and the school leavers aged 16-19 have been engaged under the Youth Opportunities Programme Work under three supervisors on completing the excavation ... Glamorgan/Gwent Archaeological Trust will assist the society in directing the work of the team whose salaries will be met by the Manpower Services Committee. Volunteers are still required however...'

At least the range of possible sources, while in some ways it appears inefficient, has the merit of ensuring that no single rejection by a committee with one particular outlook can condemn a project to oblivion. The persistent enthusiast has some expectation that funds from one source or another can eventually be tapped. It is particularly important in this regard that so many of the big industrial concerns have the imagination to support activities which seek to preserve their own past history. Indeed, some of the most interesting new museums such as the Bass Museum of Brewing at Burton-on-Trent have been set up by the industry itself.

The question of the numbers of enthusiasts and their formal organisation is of course crucial. The Association for Industrial Archaeology, whose numbers exceed 750, is only one of the bodies concerned with the subject. Indeed, it recognises that its more general coverage and the fact that it draws its members from the whole of Britain makes it, in many ways, a less appropriate body for organising seminars and excavations than the local bodies, and has expressed disappointment at the relatively low attendance at some of its meetings. Its most vital functions are the drawing together of information from different areas and the prestige it can bring to bear when there are critical local developments of more than local significance for the discipline. Its council is high-powered. Its members are mainly academics or museum curators from widely scattered places: they include Dr. Angus Buchanan from Bristol (where he heads the centre for the study of the history of technology at Bath University, a department with a strong commitment to industrial archaeology), Dr. John Butt from Strathclyde and Professor Walter Minchinton as well as Neil Cossons, the current president and the director of the very influential Ironbridge Gorge Museum Trust. In line with the association's stated objective in its memorandum of association to 'advance the education of the public in the field of industrial archaeology' it has an immensely important role to play in the defence of sites, the dissemination of information, publicity and consideration of the forward planning of the subject.

It is mainly from this body that ideas about what directions the subject should follow as well as centralisation of the surveying and listing of particular types of sites or machinery (such as water-powered machinery) come. It is noticeable that the subject has moved, in Britain, from the Australian stage in which the simple identification and if possible protection of all and any worthwhile historical industrial material, to the more sophisticated stage of considering what the function of such preservation should in the long term be; how it is relevant to the total conception which man has of himself and his past, so that the emphasis is not on the isolated preservation of a artifact which is technologically interesting to a presentation of the total environment in which its makers and users lived and worked. The British, always pragmatic, have not adopted the Marxist-inspired views of one recent American school of thought on historical archaeology whereby since every artifact is a product of its culture any artifact, however humble, can tell far more of the tale than its own function and use suggest. This teleological view, exemplified by recent works by Stanley South such as Method and Theory in Historical Archaeology (1977), is rare, so far as one can see, in influential British circles.

Considerable thought, however, is being given to total presentation, as the Blisls Hill Open Air Museum at Ironbridge makes clear.

In some ways as impressive from the Australian point of view as the central association (if in other ways more discouraging) is the proliferation and flourishing of the smaller local societies. These are both vigorous and active, having quite commonly a membership of from 200 to 500, producing their own highly professional Bulletins, Newsletters and Journals, and engaging in at least one or two ongoing restoration projects at any one time. There are indeed so many of them that one paper for the conference at Ironbridge in September simply sought to list them all with their objectives and achievements. To attend a meeting of the Wealden Iron Research Group in the worst of last February's weather and to discover that some thirty to forty people had none the less made the effort to attend brings home more forcibly than anything else the sort of commitment and knowledge there is around in Britain.

While in some areas, such as Bristol, there is a local university and academic support plus an important museum to provide a backbone of resources, in others it is heartening to see societies flourishing with minimal academic backing. Nearly every county, region or area has its own industrial history society and the organisation is such that an annual conference for the Western industrial archaeology societies has now been held for ten years or more. It gives the local societies the chance to meet and exchange experiences and information. During the rest of the year, enthusiasm is maintained by regular meetings and work projects. BIAS for example has regular weekly or fortnightly meetings on topics of local or general interest and frequent excursions to places of interest. Also important in keeping control over developments are those groups with an even more restricted geographical area, though often a wider interest range. Quite tiny societies like the Uckfield and District Preservation Society not only fulfil a vital watchdog function but have their own ongoing projects of restoration. In view of the problems which so many well meaning associations for the preservation of individual buildings have encountered in Australia, however, it is interesting that it is increasingly becoming the practice in Britain to establish small specialist societies - or often Trusts - to work on particular projects such as the restoration of a canal. One might cite the Oxford Bus Preservation Syndicate and the Friends of Caudwell Mill. This may be a warning that systems which work well in one country do not necessarily transfer well to another.

The strength of many of the societies, particularly the specialist bodies is the manner in which they draw together people from different backgrounds. The Historical Metallurgy Society for example, includes metallurgists, historians, local area members from various parts of the country plus the people who have spent their working life in the industry. All of these have a distinct and valuable contribution to make to any matters relating to metal working. The Newcomen Society is another case in point. The British have realised the need for a highly integrated and interlocking system. To prevent people from getting under one another's feet there are institutions for co-ordination - the British Aircraft Preservation Council, for instance, was founded in 1967 to bring together otherwise independent bodies such as the Fleet Air Arm Museum and the Imperial War Museum.

The achievements of these local societies can be shown from a single illustrative case. The Sussex Society has carried out a number of highly successful restorations. In conjunction with the National Trust (who own the property) it achieved a very imaginative restoration of the watermill at Batemans Burwash. Kipling, when he owned the property, had removed the waterwheel and replaced it by a turbine which he used to generate electricity for the house and the problem lay in restoring the wheel while leaving and indeed restoring the turbine and its associated work, which was equally significant. The ingenious solution installed a wheel half the width of the final water wheel, but adequate to power the restored stones, alongside the original turbine which was refurbished by the Royal School of Military Engineering. Once again the restoration brought together skills from a wide range of people including the local builder and mechanic, a man in his sixties, who had worked in a windmill all his life, a mill-wright who still had the art of stone dressing, to mention only a few. The Society has also helped with the restoration of the Argos Postmill and is currently helping with the restoration of Jack and Jill windmills outside Brighton, funds for which are being raised by public appeal. The manner in which funds are being raised for the restoration of Ifield Mill (an eighteenth century watermill structure) is a good example of what can be achieved in Britain without recourse to central funds given simple goodwill and co-operation. In 1973 Crawley Borough Council were acquiring land in the area for housing and the Crawley and Mid-Sussex Archaeological Group made a formal approach to the Council for permission to restore the building. In 1974 it was estimated that £6,000 would be needed for basic restoration work. In June that year the Council gave permission for the work on the understanding that it was to be self-financing. At this point, the previous owner, who had found that the commercial cost of restoration was impossible for him to meet, indicated that he was prepared to offer the project financial backing and a fund administered by Crawley Borough Council was established. Crawley Council have granted a thirteen year lease of the site to the Crawley Museum Society, and the Sussex Industrial Archaeology Society is helping with the work. Similarly at Burton Mill in West Sussex, the West Sussex County Council who own the site has made a financial contribution and fortnightly naval working parties are assisting in the replacement of timberwork. The Coultersham Bridge water pump is also being restored with grants from the Historic Buildings Section of the Inspectorate of Ancient Monuments, the Department of the Environment and West Sussex County Council, as well as help from Lord Egremont on whose land the installation is situated.

The Society has also been closely involved with the Southern Industrial History Centre in the establishment of the Chalk Pits Museum at Amberley which opened on 29 May this year. This, the first open air museum of industrial archaeology in the south east of England, is based on the industrial remains of the limeburning industry which produced the quarry, with its associated canal and railway links, but it is intended to provide a comprehensive illustration of the working life of past generations as the display is built up. One of the items already in store is the small jobbing foundry and engineering workshop of Albert Oakley Ltd. of Hurst Green.

It must, of course, be acknowledged that the success of industrial archaeology in Britain has been in part due to the wide but more general range of 'support' facilities upon which the smaller local

specialist bodies can draw for advice and assistance. They include such bodies as the local field units of the Institute of Archaeology; the general expertise of the keepers of the Science or the Victoria and Albert Museums; the professionals in the Department of the Environment; the Heritage Trust and also the Army and Navy and private firms, as well as the various centres for regional studies. The sources of expertise are indeed so numerous and interconnected that it is almost impossible in a short time to master the intricacies. Interaction and co-operation, however, are the keystone of much work. This has helped to encourage a good deal of listing of important collections of materials which currently exist but which could be potentially in grave danger of loss: there is, for instance, a useful printed guide to substantial collections of photographs and slides indexed by subject and often providing the only visual material surviving of vanished structures; old films and tape-recordings are undergoing the same treatment.

One factor which has substantially encouraged both the undertakers of projects and public interest in their activities is the existence of a number of possible awards for worthwhile projects. The Coulterham Bridge Pump, for example, won a £120 award in the Shell Waterways Award Scheme. There is also a nation-wide competition for archaeological projects in which industrial archaeology projects make a not undistinguished showing - and some years ago, when industrial archaeology was not so firmly established, the BBC ran a special competition specifically for them - a move which was an undoubted boost for the local societies.

One problem which is as intractable in Britain as it is in Australia is what is to be done with outmoded industrial structures if they are kept. An interesting, if currently limited to smaller buildings, approach is provided by the Landmark Trust. The brainchild of a member of the National Trust executive, it buys interesting but often 'difficult' buildings, restores them and lets them for holidays to the general public, in this way recouping part of the costs. Amongst its properties are Edale Mill - a cotton mill in Derbyshire, Danesdale Mine - a converted Cornish pumping house in Cornwall, the Masters House at Stoke-on-Trent in the potteries and Alton station in Staffordshire. BIAS has also had to turn its mind to such problems over the Logwood Mill at Keynsham where some alternative use is an immediate necessity. The editorial committee of the journal seems in general in favour of the sort of adaptation which permits the display of important machinery and features while converting the building to new commercial or residential uses. The problem of the larger complexes remains, however. Industrial archaeologists have been very interested in a book brought out by the U.S. Department of the Interior called Rehabilitation: An Alternative for Historic Industrial Buildings which includes as its examples a loco repair shop and a large cotton mill.

To stress the positive achievements of Industrial Archaeology in Britain one does not need to minimise the difficulties it still faces particularly in the face of the Thatcher cut-backs. Interest in the subject has not led in itself to instant preservation of important sites. Often the reverse. The overnight disappearance of significant structures as the result of peculiarly localised earthquakes is a well known phenomenon in Britain. Sites are disappearing quite as rapidly as they are in Australia. Since the appearance in 1974 of the Guide to Sites of Interest in Sussex many have gone. The compiler of the

volume has an annotated copy which makes gloomy reading and my own visiting of sites has been marred by frequent disappointments of this sort.

The mechanism whereby a consent to demolish a listed building must be sought and whereby an inspector then routinely conducts a public enquiry at which submissions can be made by groups interested in preservation and proposals for alternative uses for the buildings put forward, does, however, provide a way for industrial archaeologists to present their case. In a fair percentage of these cases the expert opinion marshalled does convince the inspector of the reasonable nature of the case. Thus Cirencester Town Station was recently saved by joint action from the Town Council, the Victorian Society and the Association for Industrial Archaeology. Two points are, however, worth noting; the great thoroughness with which the briefs were prepared and the comparative difficulty of getting buildings listed. Structures which are of interest only to industrial archaeology, such as old foundries or forges, are harder to save than ones for which support is also forthcoming from other bodies. The opposition of the local council is often also fatal. On Teeside, for example, the local government authorities are of the opinion that the sooner all trace of the dismal past can be wiped from the face of the city the better. Not only is the ironmasters district flattened, but a single remaining jobbing foundry with some possibly unique steam driven cranes is likely to be demolished in the near future despite the protests of the very dedicated local industrial archaeology groups.

It was therefore, instructive at a Society for Historical Metallurgy conference to sit through a discussion whose broad similarity to arguments which rage in Australia illustrates clearly how far from resolved many basic questions are, even in a country whose achievements are already considerable. The Society is associated with similar bodies in Europe and a major attempt to list existing blast furnaces sites and to classify those whose preservation is thought to be essential has been undertaken by a small committee. Opinion, however, was clearly divided both in the meeting, and by report in other European countries as well, as to the wisdom of the procedure. It was argued quite forcibly that to produce a list was to provide a weapon to be used against the best interests of industrial archaeology. That is to say, if we claim 'this we must keep' is also to admit 'this can, if necessary, go' which was an undoubted tactical mistake. It would be better, it was thought, to fight each battle as it arose. For this reason many people in Europe declined to award any order of merit to existing sites. The meeting also produced its quota of people who felt that full photographic and measuring recording, careful and complete surveying and preservation of samples was an adequate and satisfactory substitute for preservation. Moveable objects could be housed in open air museums.

The effects of the Thatcher cut-backs are bound to be seen in the very near future. Absolute reduction in the amount of direct support to unique institutions is only the most obvious of the ways in which the cut-backs will show. The curators of most museums are already engaged in the depressing task of calculating priorities. The cuts to local authorities, however, will also mean the drying up of support from that angle, and perhaps, more worryingly, a reluctance to admit even the desirability of others undertaking conservation on sites which might otherwise be developed in a way that would increase the yield of local rates. There are already rumours. It is thought

that the newly opened Chatterley Whitfield Mining Museum may be unable to re-open next year. The impact of cuts is clearly more likely to be felt by the larger professional institutions where top-priority objectives may be in jeopardy before it is felt by the smaller projects undertaken by local groups who provide labour and skills gratis but these too are likely to feel the pinch eventually.

One cannot claim that Britain has solved most of the problems still facing Australia. British experts are more inclined, themselves, to stress the idea that they have, so far, only scraped the surface of the iceberg. As the experts concerned with the project to rebuild, at Blist Hill Open Air Museum, a puddling furnace and its associated works for the production of wrought iron point out, it is one thing accurately to rebuild the works, another to find surviving men with the expertise to pass on to a new generation the secrets of operating them, secrets which were as much experience or an art, as a science. As attempts are made to operate the machinery and re-employ the techniques of an older technology, it becomes increasingly clear that the documentary evidence does not go far enough. Like a cookery recipe in inexperienced hands, the cake can go wrong. The tricks of the trade, the knack, which gave skilled men their ability have gone. The 'seat of the pants' undefinable precognition of trouble before it arrived, it is being recognized, was an essential part of the operation and one which has largely been lost, even for nineteenth century techniques.

As a result, there has been an upsurge of interest in attempts to reconstruct and operate types of structures once widely used. For example, there are now both in Britain and Sweden a number of places in which reconstructed bloomeries for the manufacture of iron are being operated. The bloomeries are equipped with sophisticated measuring devices to tell the scientist what is going on inside the structure, but they are otherwise worked exactly as our somewhat patchy information tells us that bloomeries once were. The results are yielding an increasing respect for the pre-historic ironworker. Yet bloomeries are an easy problem, since in some parts of the world there are a few who still manufacture in this way, compared with techniques which appear to have been totally lost. Perhaps it is time that Australia entered this field. We know, for example, that the Chinese miners were masters of the art of constructing water leets to within a fraction of an inch in incline. Do we know how they did it?

S.J.

IV. BOOK REVIEWS AND NOTICES.

HISTORICAL ARCHAEOLOGY: A GUIDE TO SUBSTANTIVE AND THEORETICAL CONTRIBUTIONS, edited by Robert L. Schuyler. Published by Baywood Publishing Company, Inc., Farmingdale, New York, U.S.A., 1978. ISBN 0-89503-008-X. Soft cover, 286 pages, cost \$17.00.

New books comprising selections of reprinted journal articles bearing upon a single theme or theoretical viewpoint are a familiar genre these days. Occasionally unexpectedly challenging and illuminating they more often re-present well-thumbed old friends in minimally-varied contexts with an introductory chat and additional bibliography.

Dr. Schuyler's important volume is convincingly not of the latter category. Intended as the first source book in the field of Historical Archaeology for the student, professional archaeologist, and general reader alike, it is a collection of thirty-five reprinted papers on both the substance of Historical Archaeology and its theoretical interpretation. The quality of the papers is extremely high in their own right; their selection and structuring by Dr. Schuyler adds a further and distinct dimension of value for the student at any level.

The papers are ordered in five sections. The first, on the emergence and definition of a new discipline, includes the well-known older papers of Harrington (1955), Fish (1910), Cotter (1958), Fontana (1965) and Woodward (1937), and introduces the reader to Dr. Schuyler's underlying theme, viz. the existence and nature of two main approaches to the subject (at least in America) and the necessary and growing dominance of one of them over the other. These two approaches are the "historicalist" on the one hand, which views archaeology as basically providing only data, and the anthropological on the other which "sees archaeology as an equal partner with traditional history in creating more replete culture histories or cultural reconstructions". The historicalist view is seen as largely a response to requests for restoration policies and specific historical questions by bodies such as the National Park Service; the anthropological view, concerned ultimately with the explanation of past cultural patterns, has now emerged the victor in that in American universities historical archaeology has been rejected by most professional historians and is firmly anchored in departments of anthropology.

The short second section lists some of the sub-fields within the total subject area, very properly noting the inclusion there of such older fields as Classical Archaeology, Assyriology and Egyptology as well as such challenging new fields as Islamic Archaeology. Rowe on the Renaissance foundations of anthropology presents a particularly readable paper; Deetz's paper offers a brief but pertinent survey with numerous examples of the range of historical archaeological study of European colonial culture in N. America; and Buchanan includes a useful survey of reference literature in British industrial archaeology.

Section three, Substantive contributions, is the core section in the book since it presents artifact and field studies selected to illustrate the anthropological (or at least non-historicalist)

approach at work. At the first level of the archaeologist's work, that of establishing dated sequences of local events, Dr. Schuyler includes Harrington and Binford's papers on pipestem dating (unfortunately for Australia a relevant technique only up to the beginning of the 19th century); as well as Deetz and Dethlefsen's colonial gravestone seriation paper. Particularly interesting for the Australian situation is Stanley South's paper on ceramic analysis in historical archaeology, discussing ceramic manufacture dates in relation to site occupation, successive ceramic horizons and many aspects of the quantification of ceramic type sherds. The reprinting of Harrington's report (1957) on the excavation of Fort Necessity is also timely in relation to problems of physical restoration of historic sites.

At the second level, the 'reconstruction of past lifeways' Schuyler includes four papers each illuminating one or more different aspects of past culture - Jim Allen's Port Essington survey especially for its discussion of ecological adaptation, particularly of architecture, Bowen's analysis of faunal remains from Mott Farm (R.I.) which combines physical data with probate inventory records to illuminate colonial economic behaviour, Deetz's excavation report from the La Purisima Mission site which extracts fascinating indications of sex-differentiated trends in acculturation from artefactual material and Leone's work on settlement pattern and fencing as a reflection of Mormon religion.

Dr. Schuyler adds the third goal of archaeology in his introduction - the explanation of past cultural variation, or processual studies, and remarks with proper but teasing brevity that the successes of Historical Archaeology have been confined to the other two.

There is no scope here to do justice to the theoretical discussions of Section 4, which carry on the historicalist-anthropology theme. In the opinion of this reviewer much of the argumentation is increasingly of historic academic interest now - not least in view of the growing avalanche of more than competent work, especially in Britain, being produced by local history-based teams which, while emphatically not anthropological in any technical sense, must clearly be seen often to transcend the narrow definition of historicalist. However its relevance in this selection of significant source material is not questioned.

The last section, on future trends, again contains material of specific interest to the Australian situation as well as in its own terms. South's techniques of artefact ratio comparison, for example (like his earlier paper in this volume) need particular study. The use of probate and other forms of cultural inventory analysis in association with archaeological work is already showing results in America, as shown by both South and Brown, the latter discussing the application of Collier's cultural inventory analysis to the Mott Farm situation. Both Schuyler and Brown contribute interesting case studies in the uses and interpretation of oral information initiating a much-needed approach towards refining this notoriously intractable form of evidence.

Not everyone will agree with Dr. Schuyler's total thesis in this volume. It would appear undeniable that a third category of

historical archaeological work does exist which goes well beyond the historicalist towards the very same goals as the anthropological school using other, and not less valid, techniques. Work along these lines has developed considerably since the cited papers of Harrington and Noel Hume just as the anthropologists have developed their own discipline. But this is a debate for a different arena. We are all indebted to Dr. Schuyler for a remarkably lucid, stimulating and useful re-presentation of so much of the best in N. American Historical Archaeology to date in so disciplined and scholarly a format.

J.M.B.

AUSTRALIAN POTTERY OF THE 19th AND EARLY 20th CENTURY, by Marjorie Graham, photography by Donald Graham. Published by the David Ell Press, Sydney, in association with the National Trust of Australia (NSW) Women's Committee, 1979. ISBN 0908197 08 X. Hard cover, 176 pages, 168 monochrome illustrations, 34 colour illustrations. RRP \$16.95.

In recent years we have had several books devoted to early Australian silver and furniture. This is the first book devoted to early Australian pottery, and as such deserves a place on the bookshelf of everyone interested in the historical development of Australian pottery.

It brings together a great deal of scattered information which has been gleaned from many sources, mostly newspaper articles, publications in journals and magazines, records of potteries and potters, and not least from detailed observation of the pieces themselves. The author has assiduously kept records of all these slight references, made notes on pieces in public collections, private collections and antique or second-hand shops. From this mass of small scraps of information she has put together an excellent introduction to the subject which will be the jumping-off point for further research, and further collecting.

The book is organised into six chapters devoted to pottery developments in each of the States up to the 1920s, with a seventh, longer chapter devoted to the commercial "art potteries" and some of the studio potters of the 1930s to about 1950. The major potteries are covered with a brief note on their dates, history, production and usually an illustration. The illustrations cover a wide range from the major to the minor pieces. There are interesting comments on the state of the industry - how the potters coped with the competition from imports; how they used imported moulds or made their own by copying from ceramic, metal or glass originals; where they got their raw materials; their experiments with glazes.

The reviewer once heard Mrs. Graham affectionately described as "an amateur scholar"; this book confirms that opinion in the best sense. It provides a useful introduction to the subject for student and collector alike, striking a sensible balance between the popular and specialist market. It has undoubtedly led to a greater interest in the subject, reflecting credit on all associated with

the project. The stage is now set for detailed studies of the individual potters and potteries which have here been brought to public notice.

J.W.

POPULAR ARCHAEOLOGY, published monthly by Model & Allied Publications Ltd, P.O. Box 35, Bridge Street, Hemel Hempstead, HP1 1EE, England. Subscription £E10.00 p.a., 54 pages, many illustrations. ISSN 0143 0262.

The first issue of this magazine appeared in July 1979, edited by the well-known producer of archaeological documentaries, Magnus Magnusson. While it concentrates on the archaeology of Britain, the general articles and comments have a wider relevance. In the first number, "Starting in Archaeology" tells how the amateur can get involved in archaeological fieldwork and the skills he needs, and there is to be an article in each issue on industrial archaeology; the first is "Steam on the Roads". The editorial and an article, "Cause for Concern", discuss the use of metal detectors, treasure hunting, and archaeological legislation; the Ancient Monuments Bill was passed on the last day of the rule of the Labor Government. Future editions promise articles on "Going on an Excavation", "The Archaeology of Railway Stations", while one on archaeology in Australia is in preparation. The magazine is well illustrated and deserves to be a success.

J.W.

10,000 YEARS OF SYDNEY LIFE. A GUIDE TO ARCHAEOLOGICAL DISCOVERY, edited by Peter Stanbury with assistance from Judy Birmingham, published by the Macleay Museum, University of Sydney, N.S.W., 2006, 1979. Soft cover, 123 pages, many illustrations. RRP \$8.50. ISBN 0 909635 13 7.

Fourteen chapters by different authors give a wide-ranging view of the archaeology of Sydney from its aboriginal prehistory right up to the present. Take a stroll along historic George Street with Max Kelly, look at the development of gardens with Peter Valder, sit on an imaginary prehistoric Harbour Bridge with Richard Wright, see if you can make anything out of the Aboriginal engravings with John Clegg, learn to look at the archaeology of a building with Clive Lucas; here the experts show what a varied range of evidence is still available for the trained observer. Judy Birmingham suggests ways of recording sites (some of which may not look important at first glance), while Helen Temple, Jenny van Proctor and others look at the emerging status of archaeology today.

The book, and the exhibition, are pioneer efforts which sum up where we have been, and where we are going. It will spark a new interest and provide an impetus for further work before we celebrate our Bicentennial in 1988.

J.W.

AUSTRALIAN COLONIAL PORTRAITS, catalogue of an exhibition presented by the Australian Gallery Directors Council, opening Hobart March 1979 and later visiting Launceston, Brisbane, Darwin, Ballarat, Melbourne, Perth and Sydney. Researched, selected and written by Eve Buscombe. 72 pages, 70 illustrations, soft cover. \$4.50.

The first exhibition of its kind which will initiate a reassessment of colonial portraiture and a recognition of the range of its achievements and shortcomings within the broad spectrum of Australian art. It does not seek to be totally comprehensive and covers the early colonial period with some attempt to represent work from each state. In the introductory note and commentary, the author delineates the major areas of concern and the rationale which guided the selection. Full catalogue details and biographies of the artists are also included.

K.F.

A QUESTION OF POLISH: THE ANTIQUE MARKET IN AUSTRALIA, by Terry Ingram (Collins), 1979, 192 pages, 57 illustrations, hard cover. \$19.95.

The author is well known for his perceptive and irreverent comments on the Australian art and antique scene in his weekly column 'The Saleroom' in the AUSTRALIAN FINANCIAL REVIEW.

In this well illustrated book he takes an obviously well informed, if sometimes hard, look at the auctioneers and dealers in old wares, as well as collectors, in Australia with their idiosyncracies and colourful personalities.

In examining the local antique world he discusses many of its highlights, not to mention some of the discoveries which have not always lived up to their initial promise. Despite some harsh comment on the visual merit of some Australiana, the chapter "Governor Macquarie and All That" provides a lively and eminently readable account of the background and current boom in collecting "our heritage". One hopes that those devotees whose "enthusiasm for the curious in total disregard for the aesthetic" do not feel impelled to seek further use for those items of torture and restraint that are often claimed to have pride of place in their drawing rooms. Another chapter, "The Greatest Shows on Earth", comments on the series of International Exhibitions which began in Sydney one hundred years ago.

Unquestionably a significant and important book for those interested in antiques in Australia, it will also appeal to the much wider audience for its depiction of a fascinating slice of Australian social history.

K.F.

RESTORING OLD HOUSES, by Iain Evans. To be published by Macmillan in October, the book deals with Australian houses built during the Victorian and Edwardian periods. It aims to promote authentic restoration techniques and to discourage unsympathetic alterations. Australia's first national directory of restoration products, suppliers and services is included, together with details of the cast iron registration system which can be used as an aid to dating old houses. The 200 illustrations include interior and exterior photographs obtained from pictorial archives throughout Australia as well as colour and black and white photographs taken especially for the book by the architectural photographer Patrick Crowe. 144 pages, 24 cm. by 24 cm, \$14.95.

K.F.

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BOOKS RECEIVED FOR REVIEW

LOT 48 DARLING STREET, BALMAIN. AN ARCHAEOLOGICAL ENQUIRY. Ed. Maureen Byrne. Sydney University Archaeology Society. Publication No. 1, Sydney, 1979. Cost \$5.50.

CLAY PIPES FROM PORT ARTHUR 1830-1877. Alexandra Dane and Richard Morrison, Technical Bulletin No. 2, Department of Prehistory, Research School of Pacific Studies, Australian National University.

V. PRACTICAL EXPERIENCE IN BUILDING CONSERVATION.

Several years ago I took Sir John Betjeman to Windsor, N.S.W., to see Greenway's famous church which he had heard so much about but had never seen.

As we got out of the car, Sir John turned to me and asked, "What have they done to the tower?" "Restored it", I said. "What a pity", was his reply. Sir John did not mean it was a pity it had been preserved. What he meant was, that it was a pity that the restoration was so obvious, and that it had been necessary to encase the coping in aluminium and by doing so, change its original detail and appearance.

Sir John would have no doubt been more troubled by the restoration of St. John's Church at Mudgee, N.S.W. This church built in 1858 was prior to restoration a delightful essay in soft brickwork and sandstone. It has emerged as a harsh, shiny and somewhat sad building; and from the musty smell of the interior it would seem that the bad problem of rising damp has not been solved. Restoration is an aesthetic and technical discipline which must be carefully balanced. The greatest compliment you can pay a restoration architect is to say it doesn't look as though it has been restored.

If the technique means an aesthetic alteration to the original, it must be strongly resisted.

Those involved must be humble enough to see that there is an alternative to modern building techniques and processes and that architects like Francis Greenway, William Weaver, who built the Mudgee church, and the countless unknown builders and tradesmen, who built buildings across the breadth and depth of Australia throughout the 19th century, might also have known how to build and how to design buildings.

If their building technique is still feasible there is no good reason why it should not be used in the restoration, and this is especially so where the aesthetic is involved.

At St. John's Church, Camden, it has been necessary to re-render the spire.

The original mixture of sand, lime and animal hair had been there since 1849 and while several modern alternatives were considered, there seemed no good reason why I should not put it back if the quality of the spire was to be retained.

Camden Church is a very healthy building which breathes very well.

It is terribly important that solid masonry structures should be allowed to breathe. There is nothing wrong with their absorbing moisture. Rendering should always be thought of as a soft overcoat not an impervious casing. This overcoat absorbs moisture, and acts as a reservoir until it can dry out.

Similarly, the mortar which beds the masonry must be soft, softer than the material it binds so that damp rising from the ground through the walls can escape immediately above ground level. All that

is necessary is periodic repointing. Inside the Camden Church the stone floor is dry laid and moisture can escape through the joints.

In contrast to Camden Church, one sees all over the place, where a hard pointing has been used, or where a wall has been rendered, the moisture is driven up the wall causing the wall to become saturated with salt damp and cause severe fretting.

Where this has happened, affected sections will have to be replaced with the new masonry units as I have had to do at St. Luke's Church, Liverpool, where even those bricks which were not fretted had been damaged by removal of the render. All bricks have had to be either turned or replaced.

This is not all. If a wall has been unable to breathe and taken decades to get saturated, it is going to take time for it to dry out making it difficult to rectify internal finishes for a long time to come. Not only were the walls of St. Luke's Church at Liverpool hard rendered but also the flagged tower floor had been covered with a concrete slab stopping the ground moisture escaping except via the brickwork.

At St. Matthew's, Windsor, the same problem is apparent. Here a concrete slab on a membrane in the nave prevents ground moisture escaping over a much larger area. Moisture is drawn to the warm north wall where the drying is so severe and the brickwork so soft that both joints and the masonry are fretted away. This church once had a timber floor with flagged aisles. Both the floor and flags were butted together and so breathing was possible. This is how Greenway built it and his technique as much as his design should, I feel, be appreciated.

Restoration is, however, also a theatrical discipline, and it is sometimes better and easier to revert to some modern technique.

Cooma Cottage at Yass had to have its roof restored. The roof, though originally shingled, had been sheeted in patent English iron tiles, the first iron roofing used in this country and it seemed that if possible this sort of roof should be retained as an historical example. The existing tiles were beyond reuse and so they were remade copying the original in 26 gge galvanised sheet steel. The roof is identical in shape to the original and so the integrity of the roof has been retained.

At Clarendon in Tasmania the original columns were probably of specially shaped bricks, stuccoed over. The restored cores are of reinforced concrete but stuccoed over so that the feel (and this is terribly important) and appearance is the same. At the back of Clarendon an important balancing chimney and all the masonry structure below it, to the basement, has been removed. There is no good reason to put back the chimney breasts, but the chimney must go back, and it occurs to me that, perhaps, this could be achieved in some modern lightweight material, as here, feel is not important but appearance certainly is.

At Rosedale, it proved impossible to find, in Tasmania, a plasterer who could run moulds and repair the existing ceiling in the main bedroom. The employed plasterers, however, had made up a

fibrous plaster cornice for some work they had done at Hobart Town Hall as building is of about the same date. While not identical, it seemed better than having none at all. It would, of course, have been better to restore, but the particular trade was just not available and so a compromise was made. Expense was also a consideration. Although this cornice is not original it is of the same period and quality.

A deep knowledge of period is essential to the architect if he is to achieve a convincing restoration. So often in this country one sees original detail and indeed buildings sacrificed because those involved have little idea of historical style.

At Collingwood near Liverpool, N.S.W., I was asked to restore the house built by Captain Bunker which dates from c.1810. For at least 30 years, this was thought to be a building which subsequent investigation proved to have been built as a kitchen c.1865, and some 30 years after Eber Bunker's death.

A thorough examination of the neighbouring building quickly found me Bunker's cottage, incarcerated in a house which reached its present size in the 1860s and had been subsequently badly mutilated. If the architect had not had a detailed knowledge of 19th century architectural style, he could have quite easily dismissed this building, demolished Bunker's house, and restored a subsequent owner's kitchen as an 1810 house once occupied by the famous Captain Bunker. It would of course have been a travesty and a joke.

At Hill End, N.S.W., it was necessary to restore the Great Western Store, a slab timber building dating from c.1870.

It would seem the attitude to be adopted here would be quite different. But perhaps not really. One still had to carefully examine the structure, and understand and accept the crude way it had been constructed. Buildings should never be improved by restoration. "A Morris should not be turned into a Rolls Royce".

It is important in all restoration to save whatever you can. One must always be prepared to patch rather than to discard. And the principle of "as much as is necessary but as little as possible" should not be overlooked.

With the Western Store this philosophy was, perhaps, even more important because so much of the fabric was beyond saving. The roof trusses and iron sheeting were saved, as was the shop front and all possible joinery, but everything below plate level had to be rebuilt following, where feasible, the detail of the original. Timbers of the required length could not be got for the plates, so the building had to be divided into three bays whereas originally it was in two.

The only rules of restoration are to examine each building thoroughly and try to understand it. One should be most wary of applying hard and fast rules.

The architect must be humble enough to, at least, consider that buildings might have been built by people who knew what they were doing and try to respect this.

The architect must also have at his disposal those trades and materials which are necessary to restore, such as plasterers who can run moulds, masons who can work stone, quarries which can cut stone of the required scale, slaters who can slate or shingle roofs, metalworkers who can work in lead, copper and zinc, and joiners and carpenters who can wreath handrails and work timber in a traditional way.

From my experience, all these trades are available in large cities like Sydney and Melbourne where there has always been enough work for them. Nevertheless, even in the cities, really good people are few in number, while in the country and to some extent in Tasmania, they seem hardly to exist at all.

If a large scale restoration programme is to be successfully undertaken, we will need a considerably larger body of architectural experts and skilled tradesmen than exists today.

But it does not stop with the restoration; those who are custodians of our heritage must learn that buildings need maintenance.

So often it seems the policy behind restoration is to give the building a maintenance-free future. This leads to a virtual frenzy of rebuilding which loses all sense of antiquity. We must learn to give our buildings loving care and attention. A building which has been loved and cared for is always preferable to the most successful restoration.

The restoration of our National Heritage should not be compromised and damaged by unskilled operation which can create worse problems than dereliction.

C.L.

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VI. THE RESTORATION OF HISTORIC GARDENS.

Gardening can reflect the tastes of an age as clearly as architecture or interior design, and in recent years there has been an increasing awareness that the setting of a building, as well as its structure, can be of considerable historical significance. It is not the intention of this article however to give a history of garden design in Australia during the nineteenth century, or to abstractly discuss the philosophy of garden restoration, but to discuss three garden restoration projects prepared by the author as consultant to the building restoration architects Fisher Lucas Architects. These are the gardens of three historic museums: "Collingwood" at Liverpool, N.S.W.; "Clarendon", Nile, Tasmania; and "Elizabeth Bay House", Elizabeth Bay, Sydney. These vary considerably in character and scale and illustrate in a practical way some of the aspects involved in the restoration and/or re-creation of a garden for an historic house.

"Collingwood", Liverpool, N.S.W.

This house was built in various stages between c. 1820 to c. 1870. In latter years it was used as a golf club house, suffering considerable mutilation, before being restored for the Liverpool Council after the subdivision of the golf course for housing.

Owing to this subdivision the area left surrounding the house was very restricted, but fortunately through negotiations with the Department of Education, who own adjacent land, an adequate area of ground of suitable shape was achieved in front of the house (which fortunately faces away from the street).

The garden at "Collingwood" is almost completely a re-creation. The remains of a carriage loop in front of the house were discernable, although exact shape was unknown. One small tree survived in the loop. Around this were a few mature but not particularly well grown trees - a bunya bunya, two or three peppers, two eucalypts and four or five coral trees. None of these trees appeared particularly old, and only the bunya and the peppers were considered as being particularly appropriate; however, because of their size and the intrusiveness of the surrounding new housing development it was decided that a garden complementary to the house should be formed within the existing framework of the trees.

Fortunately, two photographs of the house c. 1870 were discovered, and from these the character of the garden at that date could be obtained, although few details are evident. It was decided to restore the house and the garden to reflect its appearance at that date. Apart from these photographs, the re-creation of the garden had to rely on contemporary gardening practice and design from printed or manuscript sources, and from contemporary, surviving gardens.

The existence of the carriage loop was confirmed by one of the photographs, (Fig. 1), however its shape was still unclear, therefore a traditional "gardener's oval" was laid out to the directions given in J.C. Loudon's "Encyclopaedia of Gardening", perhaps the most influential gardening book of the mid-nineteenth century. The

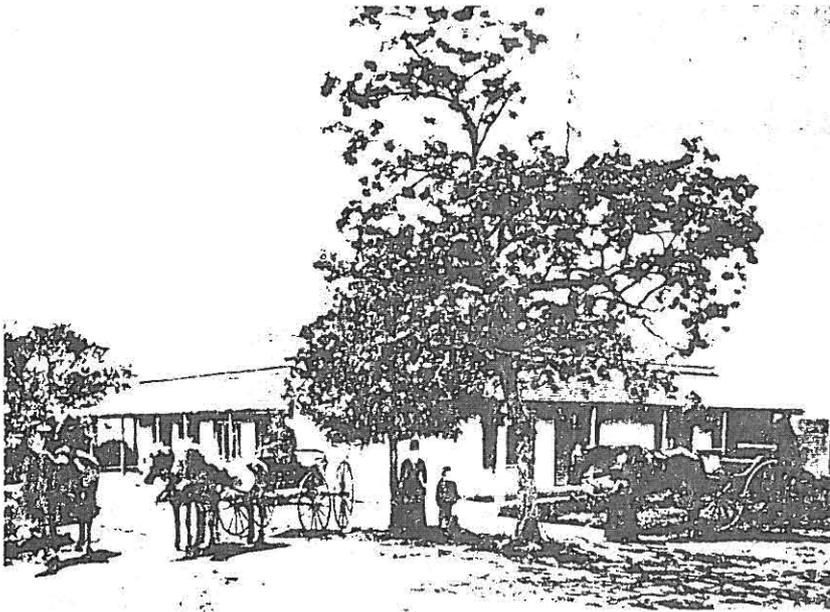


Fig. 1. "Collingwood"
Circa 1870

line of the drive determined by this raised grassed oval proved most compatible with the ring of existing trees, and, remarkably, the small tree in the carriage loop (an *Alectryon subcinereus*) coincided with one of the twin centres of the oval (Fig. 2). It is hoped to plant another to complete the symmetry of the oval. A curved fence was constructed around the ring of trees, again repeating the form of the carriage loop, and the principal gates placed off-centre, between the two gum trees. Visually, and historically an entrance was desirable from this direction, although the house is now approached from the side, through secondary gates centred between two of the coral trees which define the northern boundary of the garden. The photographs also indicate a raised lawn along the verandah on this side of the house, and this has been re-created, and is visually very effective, being planted with buffalo grass with its edge steeply sloping to a gravelled path leading to the kitchen garden separating it from the row of coral trees growing in a rougher, couch lawn planted with bulbs. The carriage loop is also planted with buffalo grass, and both these well defined areas are kept neatly clipped while elsewhere the couch is left longer - for it should be remembered that such gardens were designed before the common use of lawn mowers and fine lawns were hard to maintain. Furthermore a considerable area of garden at "Collingwood" is given over to gravelled drives and paths, again following the evidence in the photographs. The gravel used is a local bush gravel rather than a modern crushed or washed gravel.

The cream painted picket fence around the garden was designed to a mid-nineteenth century pattern; however, the photographs indicate a rough paling and split-rail fence around the kitchen area. Therefore, behind the house (now the road frontage) the fine picket fence gives way to a rough paling fence. New palings of random sizes with pointed tops were used on an old re-erected fence of morticed posts and split rails. Similarly the lawn and gravelled paths give way to bare earth of the kitchen garden.

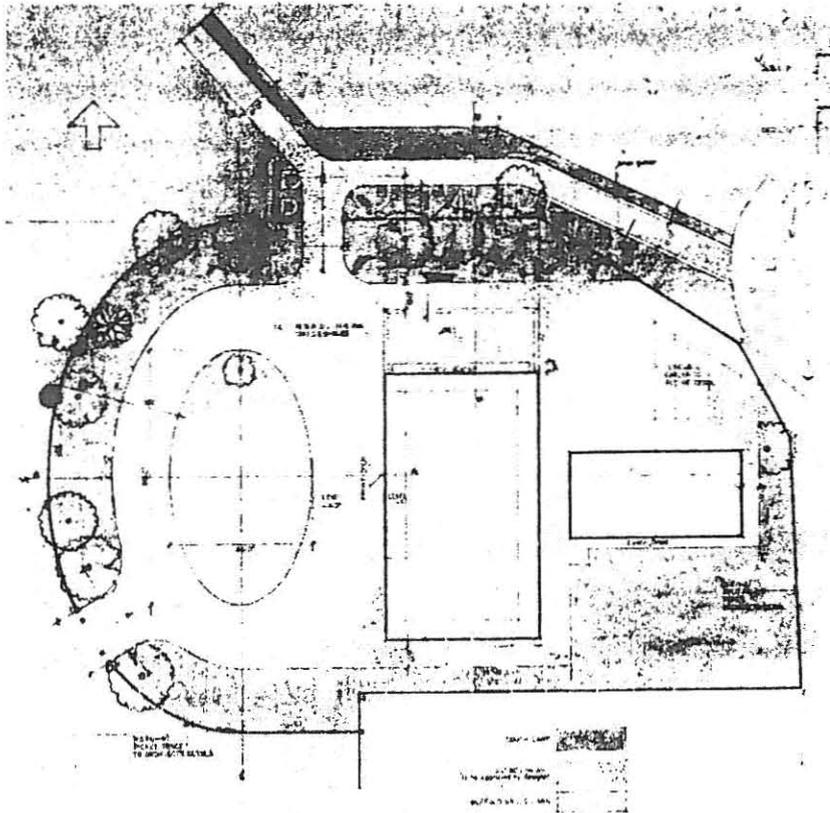


Fig. 2. "Collingwood." The recreated paths and carriage loop were formed within the existing planting. New planting is not shown.

This garden of simple rectangular beds separated by dirt paths is used for growing a variety of common kitchen vegetables and has proved very popular both with the public - who seem to appreciate the idea of a house museum reflecting the working aspects of nineteenth century life as well as the leisurely aspects - and with the caretaker who maintains the garden and reaps the benefits of his labour. Behind the kitchen block a small grassed orchard has been laid out.

The planting of the garden reflects features common in colonial gardens. The large group of yuccas in the centre of the carriage loop is historically appropriate and particularly successful visually. Clumps of grey agaves complement the gray trunks of the gums to either side of the entrance gates - but more importantly their use is sanctioned by colonial gardening practice. Likewise the secondary gate is flanked by sweet bays and plumbago hedges. Further plumbago with geraniums and brunfelsias edge the side verandah. Beneath the coral trees winter flowering honeysuckle has been planted, while common honeysuckle will clamber over the rough palings and down the steep bank to the street outside on which periwinkle has been planted as a ground cover. Hedges of olive (*Olea africana*) will eventually screen the garden from the intrusive neighbouring brick veneer bungalows.

At "Collingwood" the aim has been to re-create a typical, small "garden of the mid nineteenth century, unsophisticated, yet not unduly crude in its design".

The work was wholly carried out by the Parks and Gardens division of the Liverpool Council under the supervision of Mr. Cliff Russell who enthusiastically sought out many old fashioned, "common" plants unobtainable from nurseries.

"Clarendon", Nile, Tasmania.

In contrast to "Collingwood" the garden at "Clarendon", constructed in the late 1830s and now the property of the National Trust of Australia (Tasmania) was designed on a grand scale covering several acres, and has not been subject to any modern subdivision. Neglected for many years, the garden presented little obvious evidence of its original design, however on careful study the original concept appeared intact, enabling a scheme for the restoration of the garden to be prepared and which is now in the process of implementation.

The initial impression of the area before the house was that of a randomly planted "park", but on closer inspection patterns could be discerned in the planting - trees appeared to "line up" or to be placed in significant positions. The dominant planting was of oaks, hawthorns, elms and robinias, the latter trees suckering extensively, and the hawthorns spreading by seed. However by analysing the existing planting, and comparing it with early photographs and written descriptions, a plan of the garden has been prepared which is believed to be reasonably accurate.

By having the entire area surveyed, noting the positioning, types of trees and shrubs, and noting the approximate size of their trunks, the basic layout became more apparent. This was achieved by redrawing the surveyor's plan to show only the largest of the suckering trees, individual specimens obviously not suckers (such as cypress), and the remaining lengths of hawthorn hedge (not individual bushes). It was presumed that the largest elms and robinias were the least likely to be suckered trees - although some Clarendon elms must have suckered a century ago.

The great circular drive suggested by the perimeter planting was, on careful inspection, still traceable on the ground, but it was only with the aid of the redrawn surveyors' plan (Fig. 3) that the sophistication of the concept became apparent (Fig. 4). The most interesting feature to emerge was the main axis of the garden, centred on, but not perpendicular to the portico of the house. On either side of this were hedges which terminated in reveals or wings which framed the vista from the house and conversely, precisely determined the view of the house obtained from the far side of the drive. They acted precisely like the wings of a stage set, with cleverly determined sight-lines.

Three important early photographs of the garden (one dated 1867) enabled the clarification of further details still existing in the garden. By plotting on the modified surveyor's plan the position from which each of these views was taken, most features shown in the photographs and still surviving could be identified. Thus the significance of the single cypress and the row of robinias in the shrubbery and the positioning and manner of planting the carriage loop were determined. Sections of hedges were compared with the hedges shown in the photographs and the curvature of missing sections approximated (with varying degrees of accuracy). These photographs were also invaluable as they clearly showed the original concept of the garden: various compartments of different character and usage (shrubbery, small fields, lawns) firmly divided by clipped hedges of hawthorn, rather than being a uniform "park"



Fig. 3. "Clarendon" The redrawn surveyor's plan revealing the exciting geometry of the garden design.

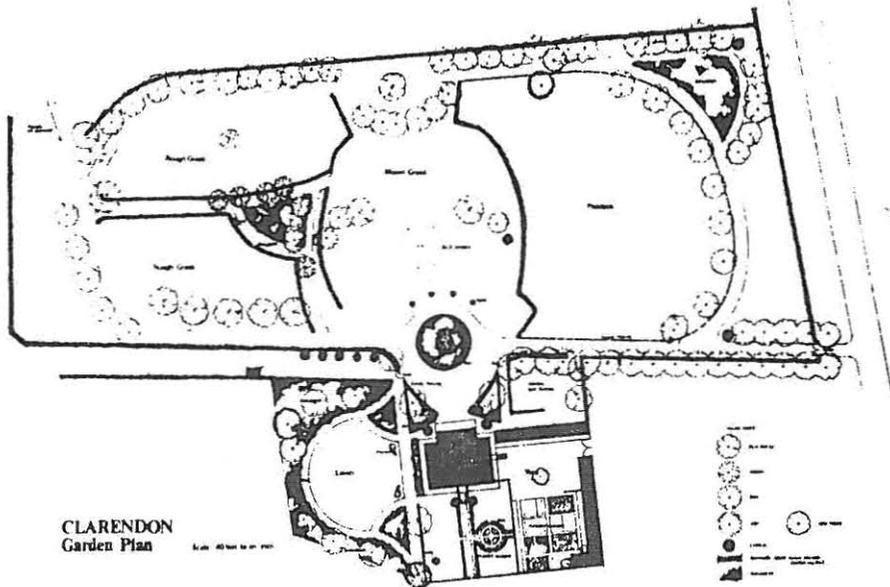


Fig 4. "Clarendon" The garden plan.

(Fig. 5). By the elimination of many suckered trees and the rejuvenation and replanting of the hedges, it is hoped to restore this feeling.

Contemporary written evidence also verified more details - such as the bulb garden in the main lawn and the introduction in the early 1840s of the iron fencing shown in the photographs. Lastly the circular and triangular beds of the bulb garden were suggested by a present day recollection of the garden, however such arrangements are readily found in contemporary gardening books and therefore reintroduced with some justification.

Two areas of the garden nevertheless are purely conjectural - the lawn and shrubbery beside the house and the walled kitchen garden. The former is again derived from general gardening practice in the mid-nineteenth century, and the latter is more explicitly based on a surviving example in a similar relationship to the house as this - the walled kitchen garden at "Killymoon".

The restoration of the garden at "Clarendon" is an ambitious task and to what degree the scheme will be implemented is still uncertain. However the restoration of the basic layout has begun, notably with the reforming of the carriage drive and the reinstatement and replanting of the carriage loop before the house, thus reaffirming the important original relationship between the house with its grand portico and the garden.

In contrast to "Collingwood" the garden at "Clarendon" is not just an appropriate "period setting" for the house but is historically important in its own right, largely intact, (although obscured through years of neglect), and ideally should be subject to the same disciplines as the restoration of any other part of the national heritage.

"Elizabeth Bay House", Elizabeth Bay, Sydney.

The problems of designing a garden around "Elizabeth Bay House" were different from either those at "Collingwood" or at "Clarendon". Firstly the site was even more restricted than "Collingwood" - being confirmed, literally, to a border ranging from about 2 ft. 6 in. to 15 ft. wide around the grandest of early colonial houses (and with a soil depth of approximately two feet above solid rock). Furthermore, a roadway surrounds the house on all sides. Thus even to establish any planting in scale, let alone historically compatible with the house was a major problem. Secondly, the history of the house and its garden precluded it being treated merely as a sympathetic setting.

Fig. 5 "Clarendon" 1865. The arrangement of fields, lawns and shrubberies, firmly divided by clipped hedges, is clearly shown. (Photo: Queen Victoria Museum and Art Gallery, Launceston, Tasmania.)



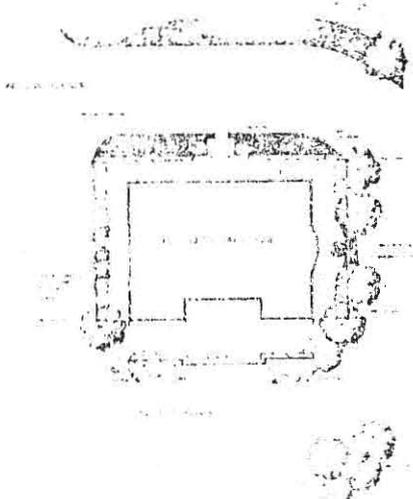
"Elizabeth Bay House" was designed for a garden setting with a rich variety of planting. Its builder, Alexander Macleay, was a renowned horticulturist. He planted his private botanic garden during the 1830s -- interspersing exotic trees and plants amidst equally "exotic", new, yet indigenous Australian plants. Between wings of dark foliage the house looked over a sunny, smooth lawn to the harbour.

Initially it was hoped that the road before the house might be closed, thus linking the house with the park opposite, but unfortunately this did not eventuate and the house is still isolated on its irregular island site. In view of this it was felt that the form of the house, rather than the arbitrary curving of the road, should determine the outline of the garden. Hence, despite the extreme smallness of the area around the house, the fences on two sides are set well within the actual boundaries except at their extreme points, and repeat the plan form of the house (Fig. 6). On three sides security fences were required - iron palisades to either side, and a high paling fence to the rear.

Whereas "Clarendon" depends principally on the unique geometry of its layout, with little emphasis on plant material, and "Collingwood" upon common nineteenth century gardening practice, "Elizabeth Bay House" relies almost totally on the variety of plants employed, for the planting, as shown in the plan, is confined to borders around the terraces. Their associational effect is as important as their aesthetic effect.

Fortunately an extensive list of plants introduced into the garden during the late eighteen thirties and early forties survives in the Mitchell Library and this, with two other contemporary Australian nursery catalogues, formed the basis of the plant selection. With only two or three exceptions, every plant chosen is known to have been ordered for the garden by the Macleays, and these exceptions, such as plumbago or the trumpet flowers - were so common in early colonial gardens that their inclusion here appeared justified.

The principal trees planted are Port Jackson figs which, although unpopular for suburban planting in recent years, were felt suitable to this situation. They are indigenous to the area and large specimens were certainly a feature of Alexander Macleay's garden. Their scale is suitable to the house and, hopefully, they will be more reliable in the shallow, rocky soil than other species and eventually provide a green setting once again for the house.



With respect to the view and the traditionally uninterrupted aspect of the main facade, the planting before the house has been restricted to a low clipped hedge of plumbago - a practice

Fig. 6. Elizabeth Bay House. The garden plan.

frequently evidenced in old gardens. The only relief to the severity of the planting on this side being two whimsical "teardrop" shaped flower beds (typical of the 1830s) to either side of the portico, and a wistaria to twine around one of the columns.

Behind the house the planting is also purposely severe, consisting of a clipped hedge of small-fruited olives within the paling fence, in order to emphasise the "service" side of the house and the site of the original out-buildings.

The main planting is confined to the borders along the northern and southern terraces. The "Macleay plants" used on the sunny side include a Magnolia grandiflora the once popular and now much overlooked oleander, and most significantly a central bed of Macleaya cordata.

Around the central bow of the shaded southern terrace Bangalow and Lady palms (further "Macleay plants") have been grouped, underplanted with cliveas and edged with clipped box. To either side of these are further shrubbery plants listed in the plant-book - laurestinus, camellia, murraya and brunfelsia, underplanted with impatiens. To increase the apparent extent of the border, most of the figs have been planted without the fence, and a large antique cast iron urn is to be placed in the centre of the bow, displaying appropriate ferns in the summer and flowering plants in winter. A further list of plants has been prepared for use in the reception rooms.

This garden has been planned in conjunction with the Parks and Gardens division of the Sydney City Council.

Different approaches have been taken, and different disciplines applied to each of these three projects: analysing the existing structure of a garden by surveying and basic archaeology, consulting contemporary illustrations and written descriptions and comparing them with what remains, referring to contemporary garden manuals, design books, and plant lists, and comparing other contemporary gardens.

As in the restoration of buildings, the decisions made are largely empirical. For example, a garden, more obviously than a building, cannot be restored to its "original" without total recreation, for the process of growth is, of course, essential to a garden. The original "concept" may be restored, but this may destroy the contributions successive generations of gardeners, or the process of growth alone may make the restoration of the concept impossible. A shrubbery around a sapling may not be able to be restored a century later around a spreading tree. Compromises must be acknowledged and no set solutions can be formulated. Therefore this article has ventured to explain only by example, some approaches to the restoration of gardens around historic houses.

J.B.

VII. THORPE WATER MILL ... A HISTORY

Thomas Axford who built this mill arrived in Hobart Town on 23rd November 1822. He, his wife and family had travelled from England on the brig "Christiana" and among other passengers was his brother-in-law Frederick Slade R.N. (Thomas Axford had married Martha, one of the nineteen children of John and Deborah Slade.) In making an application for a grant of land Axford claimed that he had "means" amounting to £587 and on the same document gave his address as Abingdon, Berkshire, England. His wife Martha also came from Berkshire and it was from the Slade family farm at Aston Upthorpe, Berkshire that the name Thorpe Farm was derived.

Axford immediately set about building a water mill and Archibald McDowall II later recalled that it was well established by 1825. Dr. Ross' "Hobart Town Almanack" for 1830 also refers to Axford's excellent cornmill. His death is recorded in 1855.

His son, Thomas junr., lived at Thorpe for some years but then left and the property passed on to the Chamberlen family - Mrs. H. J. Chamberlen being Thomas junr.'s eldest sister. After the death of Henry Francis Chamberlen in 1899 the estate was at first let to Frederick McDowall (grandson of the original Archibald McDowall who had taken up the adjoining block, Logan in 1824.) Finally Frederick records in his journal of 1899 that he agreed to buy Thorpe (800 acres) for £3,250. This purchase of course included the mill, which he operated until 1906 for grinding wheat and until 1916 to cut chaff.

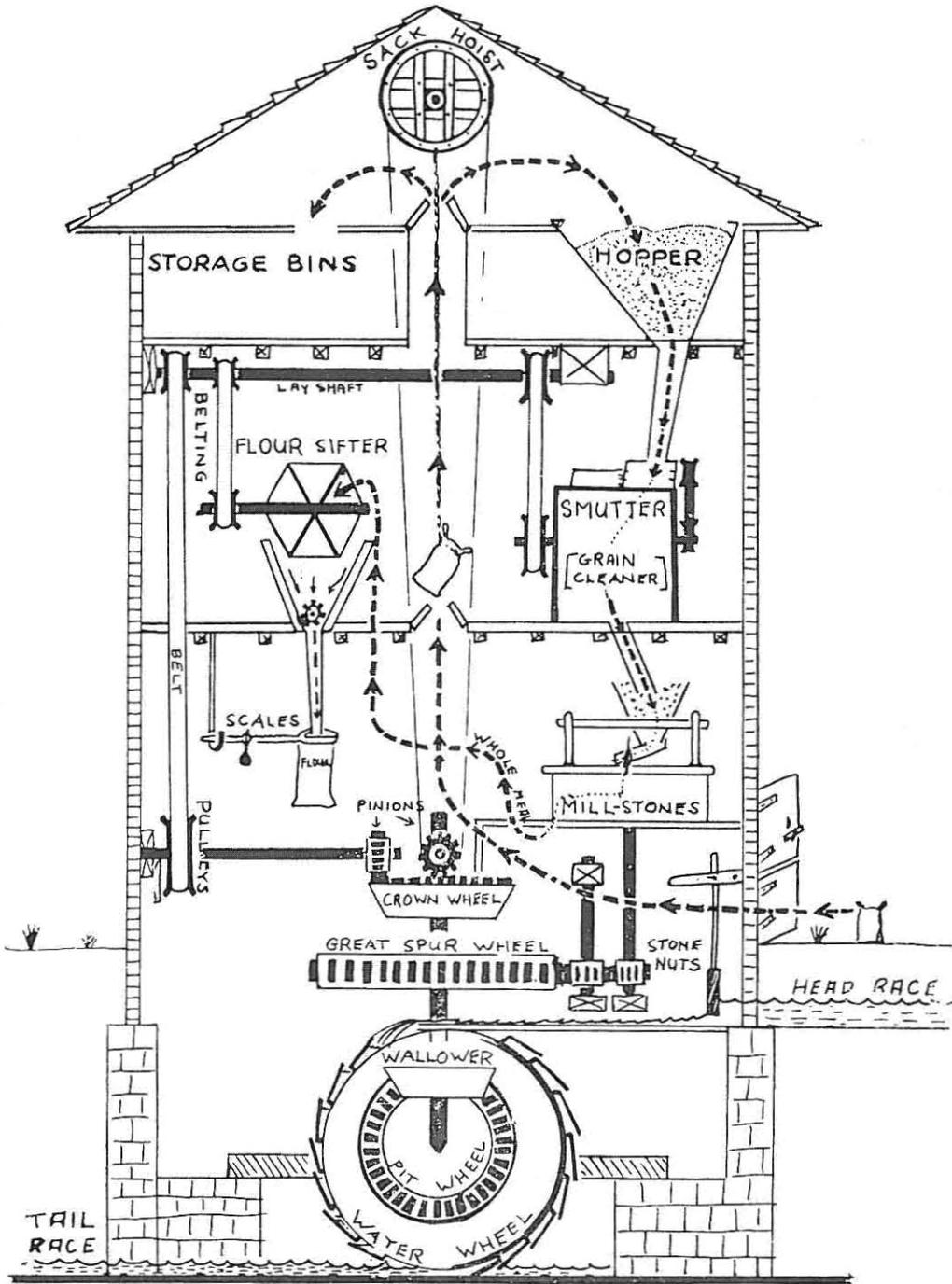
The mill is now owned by Mr and Mrs Jeffrey Bignell, whose sons have been responsible for the restoration.

Operation of the Mill.

The heart of any watermill is obviously the waterwheel itself because it drives all the machinery for milling the grain as well as machines in the workshop such as forge bellows.

The waterwheel in the Thorpe Mill is known as an overshot because the water enters the wheel at the top just past the highest point, and the wheel turns as a result of the weight of water held in the buckets and to a lesser extent as a result of the momentum of the water. A constant supply of water comes from the Clyde River via the millrace, and once having turned the wheel, re-enters the river almost 1 km downstream. The waterwheel generates about 4 H.P. (3 Kw) turning at 8 RPM and the gearing increases the speed to 120 RPM at the stones. It requires 225 gallons of water to grind one pound of flour (or 2,250 litres per Kg). Drive to the machinery upstairs is taken from the Crown Wheel by a series of belts and pulleys.

It was usual practice in mill construction to have iron cogs meshing with wooden cogs to save wearing out the expensive and heavy cast iron wheels. This also served to lessen noise and the chance of fire from sparks. As the wooden teeth became worn they were simply knocked out, a replacement fitted and wedged from behind.



During its 81 years of operation the mill would have been used to grind the wheat grown on Thorpe as well as that brought in from surrounding farms. If grinding someone else's grain, the miller would claim a certain percentage of the grist as a toll or simply levee a charge. In 1866 it cost 1/6 to have a bushel of wheat gristed.

Although much of the machinery would have been renewed and updated over the years, the operation of the Thorpe Mill was typical of most country mills anywhere in the world, and can be simplified as follows.

Grain arrived at the front door of the mill in carts or wagons and the bags were manhandled into the main room to a position under the sack hoist. The sack hoist would lift the bags right through to the top (granary) floor, the trap doors opening and closing as the bags passed through.

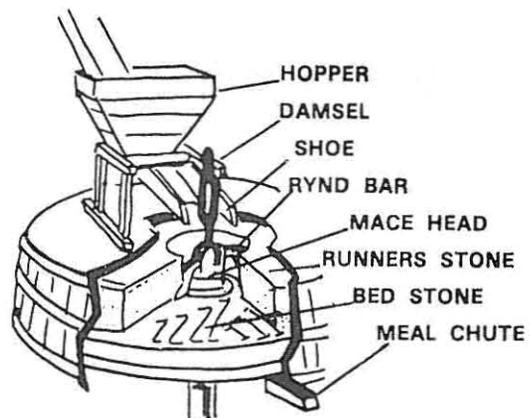
Unless the grain was to be stored in the large bins, it would have been tipped straight into the large hopper feeding the Smutter on the floor below. This machine removed all the impurities from the grain, such as dirt, straw, weed seeds and smut (black fungi). From here the wheat would gravitate to the millstones where it was ground to wholemeal.

To produce white flour it was necessary to raise the wholemeal back to the second floor using an endless belt carrying buckets. The wholemeal tipped into the Reel Separator and was sifted according to size into four main products - flour, middlings, bran and pollard. These fell through a chute to the ground floor and were bagged and weighed. Quite often a farmer would bring along his cart load of grain for gristing and was able to leave the same day with a load of flour, bran and pollard.

Other interesting items around the mill are the wooden chute below the long window on the second floor used for sliding bags of flour etc. straight onto waiting carts, the tally marks scratched into the brickwork on the western end wall, and finally the tiny arched hole to the left of the arch on the downstream side of the water wheel. This was supposedly built specifically to allow free access to the numerous cats which played a vital role in controlling rats and mice in the mill.

The Millstones.

The millstones in the Thorpe Mill are made of a type of quartz found in the Paris Basin of France. They are called French Burrs, and because the stone doesn't occur in sufficiently large pieces it was necessary to cement many small pieces together and bind them around with iron hoops.



There are actually two stones, one called the bedstone that sits on the floor and the other the runner which is balanced on a vertical shaft above the bedstone. Grain is fed into the centre (eye) of the runner stone and is ground between the stationary bedstone and revolving runner. A special pattern is cut on the stones to facilitate grinding and to move the meal to the outer edge of the stones where it falls into the enclosing tun and drops out the meal chute. The flow of grain to the stones is maintained and regulated by the stone furniture comprising the horse, hopper, shoe, rap, damsel, crook string and miller's window. The fineness of the meal is adjusted by the larger screw beside the meal chute, which changes the gap between the two grinding faces of the stones. The tools used to cut the pattern are known as the bills (steel chisels) and thrifts (the wooden handles to hold these bills).

Restoration.

Milling continued at Thorpe until 1906 when competition from larger steam "roller mills" closer to the larger population centres made it uneconomical to produce flour with stones and waterwheels. In 1861 there were fifty watermills in Tasmania and most of them met a similar fate to the Thorpe Mill. Although the waterwheel was used to drive a chaff cutter up until 1916, the death knell was finally sounded when the old wooden water-wheel axle broke. Although numerous attempts were made to repair and renew it these were all finally abandoned and so the mill fell into disrepair. It was rapidly looted, the water works became silted and choked with willows and much of the lower level woodwork rotted and was carried away in the floods which regularly inundated the mill.

Restoration began in 1975, and all the work apart from re-roofing was done by members of the Bignell Family in their spare time. The major jobs included re-roofing and flooring; cleaning or re-digging the water-ways; re-building water control gates, windows and doors; digging out all the mud and rubbish from around the water-wheel and gearing and then replacing the huge wooden water-wheel axle and timbers supporting the gearing. By far the most difficult work was lining up and adjusting all the cogs, shafts and millstones so that on 31st of July 1977 stoneground wholemeal was once again produced at the Thorpe Mill using water power.

Although there is still much work that could be done, further deterioration has been halted, so preserving an interesting link with our past that will become even more important in the future.

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