8.2 CEMENT WORKS

Cement kiln - draw A continuously run kiln consisting of a stone tower containing at least one pot and drawing arch Fuel and cement stone or 'briquettes' were loaded in alternate layers and the base of the pot may incorporate one of several mechanisms to facilitate periodic drawing of cement
Date Range Early nineteenth century to twentieth century
Importance Early examples high

Cement kiln - flare An intermittently run kiln of the 'bottle' or 'domed' form a brick or stone structure with a bottle-shaped or domed upper, in which fuel and raw materials may be mixed or kept separate
Date Range Early nineteenth century to twentieth century
Importance Early examples high

Cement kiln - horizontal ring Specifically the Hoffman kiln and its variants, where the burning zone was moving continuously around a horizontal tunnel
Date Range Late nineteenth century to twentieth century
Importance Relatively rare in UK, therefore generally high

Cement kiln - horizontal tunnel A kiln in which the stone to be burned was carried on trucks through a heated tunnel
Date Range Late nineteenth century
Importance Any example would be high.

Cement kiln - rotary A kiln where cement mix, as a slurry, is burnt as it falls through a heated and slightly inclined rotating steel tube
Date Range Late nineteenth century to twentieth century
Importance Poor chance of survival of steel kilns, makes non-modern surviving examples generally high Widely used today

Cement kiln - vertical furnace A continuously run kiln with superstructure of brick or stone (early examples) or steel (later), and fired via furnaces located around the burning zone
Date Range Late nineteenth century to twentieth century
Importance An important technology, but early examples appear to be rare and therefore have high importance The tendency to scrap steel kilns, makes surviving examples of these also generally of high importance

Cement kiln - vertical mixed-feed Continuously run kiln with superstructure of brick or stone (early examples) or steel (later), and fired by injecting fuel into the burning through a series of narrow, angled shafts
Date Range Late nineteenth century to twentieth century
Importance An important technology, but early examples appear to be rare and therefore have high importance The tendency to scrap steel kilns, makes surviving examples of these also generally of high importance

Clinker grinding mill Mill for grinding cement clinker to powder form
Date Range Early nineteenth century on
Importance Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole.

© Lancaster University Archaeological Unit March 1996

Drying floors	Stmcture for drying cement 'briquettes' in wet process prior to burning
Date Range	Early nineteenth century on
Importance.	Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole
Lime kiln	Used in double kiln process Types as for LIME WORKS
Date Range	Early nineteenth century on
Importance	Individually may be low to high depending on type and date Enhanced where part of a well preserved site
Setding ponds	Large reservoirs or 'backs' for holding cement slurry to allow it to separate out into solid matter and water
Date Range.	Early nineteenth century on
Importance	Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole
Stone grinding mill	Mill for grinding broken stone prior to burning, may be animal. water or steam powered
Date Range·	Early nineteenth century
Importance.	Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole
Washmill	Mill to break up and mix materials of artificial cement in wet process. producing slurry ready for the 'backs'
Date Range	1820s on
Importance	Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole.

8.3 GYPSUM PLASTER WORKS

Gypsum Kiln	Kiln used for burning or cooking of powdered rock gypsum
Date Range	Medieval on
Importance.	Examples of all non-modem dates, high
Gypsum Grinding mill	Machine for grinding rock gypsum to powder ready for calcination
Date Range	Medieval onwards
Importance.	Examples of ail non-modem dates, high

8.4 COMMON COMPONENTS

The following components may occur for any of the three classes of site

Building other	Any building (intact or mined) not forming a named component, includes rare and important components not individually listed (eg carpenters shop. fiiel store, laboratory, smithy. stables, store rooms, weighbridge, wheelwrights shop). as well as uninterpreted buildings of uncertain or low importance
Date Range·	Any period
Importance	Depends on individual cases

© Lancaster University Archaeological Unit March 1996

Conveyor/hoist	Machinery for lifting materials
Date Range	eighteenth century on.
Importance	Early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole
Crane	Apparatus for lifting material, in this case generally for loading a kiln
Date Range	Nineteenth century on
Importance	On site survival is likely to be rare, hence early examples may be high
Crushing Mill	Apparatus for reducing size of raw material prior to grinding or burning Only examples spatially linked to the kilns rather than the quarry will be considered as part of the lime/cement industry
Date Range	Nineteenth century on
Importance	On site survival is likely to be rare, hence early examples may be moderate to high Otherwise individually low, but would add to value of site as a whole
Drum house	Housed or open-air setting for a winding drum associated with an incline
Date Range	Mainly nineteenth century
Importance	Moderate
Engine house	Any building that has housed a steam engine or other mechanical prime mover
Date Range	Eighteenth to twentieth century
Importance	Depends on site.
Feature other	Any feature not part of the named components, includes rare and important components not individually listed, as well as unterpreted features of uncertain or low importance
Date Range	Any period
Importance	Depends on individual cases
Gin Circle	The circular earthwork remaining from a horse-powered winder or pump, the central bearing sometimes survives
Date Range	16th to 19th centuries
Importance	Well preserved examples will be high
Housing	Workers or manager's permanent dwellings (only included if physically within the site)
Date Range	Mainly eighteenth and nineteenth century
Importance	Moderate importance depending on individual case
Incline	An embankment or cutting surfaced at a uniform gradient, up or down which materials were usually hauled by rope, usually as part of a tramway system
Date Range	Nineteenth century and later
Importance	Not especially common for lime cement and gypsum sites Good examples may be of moderate importance, otherwise low
Machine other	Any machine not forming a named component
Date Range	Any period
Importance	Depends on individual cases.

© Lancaster University Archaeological Unit March 1996

Office	Administrative building
Date Range	Eighteenth and nineteenth centuries.
Importance	Low technological importance but many examples will merit listing on architectural grounds
Railway	An iron rail system used by steam locomotives Only included where specifically part of the site
Date Range	Early nineteenth century on
Importance	Individually low, but would add to value of site as a whole.
Roadway	Any built or eroded route for horses and/or wheeled vehicles Only included where specifically part of the site or where a close spatial relationship can be demonstrated
Date Range	Any period
Importance	Low individual importance
Ropeway	The line of a rope-operated haulage or power system (typically an aerial ropeway) May be signified in the archaeological record by drum house or by pylons Sometimes known by the term 'blondin'
Date range	Nineteenth and twentieth centuries
Importance	Well preserved examples of moderate importance, otherwise low
Silo	Structure for storing cement clinker, cement or lime
Date Range	Nineteenth century on
Importance	Individually low, but would add to value of site as a whole
Structure other	Any structure not forming a named components, includes rare and important components not individually listed, as well as uninterpreted features of uncertain or low importance
Date Range	Any period
Importance	Depends on individual cases
Tramway	A railed transport system, of narrow gauge and either gravity or horse drawn, rails may have been of wood or iron and stone sleepers or stone blocks may have been used for anchorage The rails themselves sometimes survive, more common survivals are the earthworks supporting the track beds
Date Range	Eighteenth to the twentieth century
Importance	Low individual importance for these types of site
Wharf	River or canal berthing for receiving or sending materials by boat or barge
Date Range	Medieval (and possibly earlier) on
Importance	Generally low individual importance, but would add to value of site as a whole
Wheelpit	Stone-lined pit, or above ground housing for, a water-wheel
Date Range	Eighteenth century on
Importance	Depends on site

© Lancaster University Archaeological Unit March 1996

9 SOURCES OF INFORMATION

9.1 Modern Published Works

There exists a considerable literature on the history and archaeology of lime burning and lime kilns, although curiously no established text on its history Many sources are referenced in the text of this report Of particular value for lime and lime burning are the following Williams (1989) gives a concise general introductton whilst Dix (1982, see also Dix 1979) covers the Roman period, Ellison et al (1993) covers the Medieval period and various authors cover its history in the industrial era (eg Davey 1961, Singer et al 1958)

Davey also gives a broad technical background, while specific kiln technologies are discussed by Leach (1995), Tmeman (1992), and Williams (1989) (and rather more thoroughly by the technical literature referred to below) Regional works have been listed in detail under Regionality Broadly, many of the David and Charles series on the Industrial Archaeology of different areas of Britain, now twenty years old, still give useful regional summaries, particularly Ashmore (1982), Atkinson (1974), Davis-Shiel & Marshall (1969), Harris (1992) and Booker (1971) Other regional works of value are Alderton (1984), Goodbury (1992), Minchinton (1984), Palmer & Neaverson (1992), Stanier (1993)

For the history of the cement industry, Francis (1977) is the main work, and there is an earlier paper by Gooding & Halstead (1954, not consulted) Published work on the archaeology of the industry appears to be very thin Examples are Millward and Robinson (1971), who name many sites along the Thames, Martin (1984), an account of recording work on the Beddingham kiln in West Sussex, and Hudson (1984, 8-10), aerial photographs of a Blue Circle cement works at Westbury, Wiltshire The journal Archive contains a series of articles on individual works, important for their use of otherwise unpublished contemporary photographs

Studies of the Gypsum plaster industry are even scarcer The main sources consulted were Davey (1961) and Ashurst (1988) There are also a useful pieces on the Nottinghamshire industry by Firman (1964) and Smith (1965)

9.2 Contemporary Published Works

There is an extensive set of technical works relating to lime and cement from the mid eighteenth century to the present For the Roman period there are three standard works Cato's De Agricultura, written c150BC, Vitmvius' De Architectura of c30BC, and Pliny writing in c90AD For the Medieval period there is Walter de Henley's text (see Williams 1982), and for the Post Medieval period a host of authors give advice on the use of agricultural lime, some including a description of lime burning These include Fitzherbert (1523), Merrick (1578), Owen (1603) Norden (1607), Plattes (1639), Markham (1639), Mortimer (1707), and Maxwell (1757) From the end of the eighteenth centary and the beginning of the nineteenth century a useful source is the series of publications on the 'General Views of the Agriculture of the different counties of England and Wales (eg Young 1813, Farey 1811-17, Plymley 1803, Davies 1815) Running through the eighteenth century and nineteenth century are encyclopaedias, including Neve (1726), Diderot (c1760), Pyne (1808), Rees (1819/20, largely republished in Cossons 1972) and Ure (1843) Of similar historical importance are the many technical works, including Pasley (1838), Burnell (1856), Gillmore (1870), Reid (1877), Sutcliffe (1893), Redgrave (1895), Doncaster (1916), Eckel

© Lancaster University Archaeological Unit March 1996

(1928), Martin 1932), Searle (1935), Marks (1971), and Boynton (1980) Similarly many writings exist in industry journals, although these have not been consulted, they are probably of limited use for this project Examples are The Builder, The Engineer, The Architect, The Illustrated Carpenter and Builder, Proceedings of the Institution of Civil Engineers, and the Repertory of Arts and Inventions

9.3 Primary Records

It is unlikely that primary records can or need be consulted in carrying out this project, unless the information is readily available in relation to sites of potential interest Although they have therefore not been investigated in any depth, the following is worth noting

- Numerous primary records relating to the industries are contained in the collections of County Record Offices, and other public and private repositories Some of these form the records of specific nineteenth and twentieth century lime and cement companies, but the large majority are contained within collections of estate, family, and general business archives
- The Historical Manuscripts Commission is currently compiling a subject index to Record Office and other non-state archives However this is currently only *c* 20% complete, and is likely to be confined to specific lime and cement businesses which (as already noted) will form only a minority of the relevant holdings
- Numerous patents, primarily relating to kiln technology, exist and should be accessible through the patent office
- Primary records may be held by modem industrial concerns
- Early edition Ordnance Survey maps also plot innumerable industrial sites, including almost all kilns and works standing at the time of survey
- The British Geological Survey holds large numbers of photographs and surveyors field notes However this data is probably far too detailed and insufficiently indexed for the purposes of this project

9.4 Museum Collections

Of particular value to the history and archaeology of the lime industry is the Amberley Chalk Pits Museum, which includes a range of kilns and nineteenth-century ancillary lime works buildings For the cement industry there was the Blue Circle Heritage Centre at Northfleet, Kent, which included an 1840s cement kiln of William Aspdin and reconstmcted a nineteenth-century cement works laboratory (see Aldsworth 1979 and Trinder 1992, Medway entry) However the centre has recently closed and its collection has been divided between the Chantry Heritage Centre and The Gravesend Museum The status of the site itself is unknown Other museums with material of relevance are the Black Country Museum (West Midlands), which has impressive lime kiln stmctures in its grounds, Derby Industrial Museum, Hartland Quay Museum (Devon), and the Morwellham Quay Open Air Museum (Devon)

9.5 Sources for Step 2 Data and Consultation

Broadly the sources to be used for steps 2 and 3 divide between databases, published works and knowledgeable individuals or groups It is anticipated that an initial shortlist of sites may be drawn from archaeological databases m the public domain, specifically English Heritage's list of Scheduled Monuments and of listed

© Lancaster University Archaeological Unit March 1996

buildings, the National Monuments Record, maintained by the RCHME and accessed through the MONARCH system, individually county and district SMRs, and the AIA's IRIS database, together with the regional published works listed under Regionality Modifications to this initial shortlist will be made in consultation with individuals and groups having relevant knowledge

English Heritage's Records Section maintains a list of scheduled monuments for each county, those sites of relevance to this report total 15 County SMRs hold varying data on large numbers of lime kilns (every SMR in England holds some information on the industry), and the NMR MONARCH database also includes many sites, but even taken together these databases currently form a very inhomogenous and incomplete listing and the information given for individual sites is often insufficient to allow useful assessment of importance In October 1995, the AIAs IRIS database had centrally collated 130 lime industry sites, mainly from Cumbria, uncertain additional numbers of sites were waiting to be passed on from SMRs In addition, many lime kilns are included in the Lists of Historic Buildings, although this informauon is publicly available, the lack of an index and the sheer volume of sites, makes its use on a national level to extract a subset such as lime kilns very difficult

Many of the AIA affiliated local amateur groups have a strong interest in the lime and cement industry and it is considered essential that they are consulted (see address list) The archaeologists of the various national parks are also important, most of the parks having large concentrations of hme kilns For comparative information in Wales and Scotland, consultation should be made with Dr Peter Wakelin (Cadw), Dr Miles Oglethorpe (RCAHMS) and Steve Hughes (RCAHMW) In addition the following individuals are highlighted

For North-West England, Mike Davies-Shiel has expertise on the Lake District, Tony Keates holds a database of limekilns in the South Lakelands, and the Armitt Tmst has card records for Cumbria (contact through John Gavin, Ambleside Public Library) In the North East, important contacts are Ian Ayris, Harry Beamish (National Tmst) and Stafford Linsley For the Yorkshire Dales, Robert White is the central contact, work earried out by local groups, such as the Sedburgh and District History Society, is accessible through him Tim Smith also has knowledge of Dales lime industry Gary Marshall (National Tmst) and the Cleveland Industrial Archaeology Society should be consulted on the North Yorks Moors industry, including the important early cement works in this area

Similarly in the Peak District, Ken Smith is the central contact and John Leach is knowledgeable on pye kilns For the East Midlands generally Marilyn Palmer and Peter Neaverson have extensive knowledge, Gary Marshall (National Tmst) should also be consulted In East Anglia, David Alderton is the main figure to have published relevant material In the West Midlands a range of individuals have carried out work or have relevant knowledge, these include Valerie Goodman (Herefordshire), Ivor Brown (Shropshire), David Bick (Forest of Dean, Hereford and Worcester, Gloucestershire), Tim Smith (Llanymynech area of Shropshire), Barrie Trinder (Shropshire) and Kate Clark (Ironbridge Gorge and Wenlock Edge)

For South-East England, Paul Sowan has a broad knowledge of the industry including nineteenth- and twentieth-century kilns, Richard Williams authored the Shire Album on the Lime industry, and Ron Martin knows the Sussex area and is one of very few to have undertaken archaeological recording of cement industry sites In addition GLIAS members have a broad knowledge for London and a wider area For the South of England, Peter Stanier has published work on Dorset, and in the South-West, the Cornwall Unit should be consulted together with Michael Havindon of Exeter University

© Lancaster University Archaeological Unit March 1996

© Lancaster University Archaeological Unit March 1996

10 PRIORITIES AND RECOMMENDATIONS

10.1 General policies

Limekilns were and are abundant in many parts of the country, for example 902 are shown on the Ordnance Survey's 1st edition map for the Yorkshire Dales (1850s) many of which survive to some extent It is likely that the population of lime and cement works of all periods, retaining some degree of on-site preservation, is at least 50,000. In order to meet the policies outlined below, it is estimated that about 500 sites will need to be assessed at step 3

Lime burning as a basic technology appears to have been imported to England by the Romans The development of draw kiln technology may have been a Medieval event Certainly the invention of Roman and Portland cements was an English development of international importance The invention of the rotary kilns also appears to have a British origin

It is clear that a very large number of lime kilns survive around the country dating from the Post Medieval and Industrial eras By contrast about fifty Medieval examples have been excavated, and rather fewer Roman Cement works are fewer in number than lime works, and uncertain numbers survive Gypsum works appear relatively unstudied, and there is very little information on surviving sites in the public domain

It is also clear that there is a notable regional variation of lime kiln designs and practices in the operation of the industry with, for example, agricultural field kilns of individual farmers and commercially operated set-ups; kilns for short-lived building project of all periods, coastal lime kilns sometimes importing raw materials, others exporting the lime, lime kilns in association with canals and railways, and large works within or by quarries Cement technology had less regional variation, but there were a set of discrete areas that produced cements Currently fifteen sites are scheduled or are included in scheduled areas in relation to the lime industry with none for cement or gypsum Sites protected by the lists of historic buildings are not currently indexed and have not been evaluated at this stage

Broadly MPP policy should aim at protection of a balanced sample of sites covering the chronological regional, and typological range of the industries If practicable, the preservation of complete works and landscapes is desirable for each industry, and where the industries were carried out at the same site

The selection of sites at steps 2 & 3 should be undertaken in close conjunction with work on stone extraction, since many kiln sites are in or close to quarries (indeed a quarry with associated lime, cement or gypsum kilns and other buildings would historically have been considered a 'works') Transport features from the quarry to the kilns and other parts of the site should be included where appropriate, in cases where the internal transport features form a major aspect of the works, their survival will be a major factor in selection Some kilns were built in association with major transport systems specifically canals, railways, roadways, wharves and harbours Where a limited area containing these features can be included within the boundary of a proposed site it may be appropriate to do this, but systematic coverage of transport can only be done as part of the MPP study for the appropriate transport industry

© Lancaster University Archaeological Unit March 1996

10.2 Specific Policy Proposals

10 2 1 Limekilns

It is important to represent the following
- Technological range - as given in the Technical Outline
- Regional diversity - using regional typologies where suitable areas exist
- Chronological diversity
- Kilns for a specific end use - in particular agriculture and mortar

To achieve this, it is likely that identified sites should include all Roman and Medieval kiln sites with any quality of preservation (above or below ground) A carefully selected sample of later sites will be required, from the large population of surviving sites Within this, careful consideration should be given to identifying clamp kiln sites and high importance should be attached to complex nineteenth- to early twentieth-century types, reflecting their apparent rarity Other factors influencing selection will include the quality of survival of the kilns themselves, the survival of associated feamres (in particular, quarrying and transport features associated with the use of the kilns), and in some cases amenity and wildlife value.

10 2 2 Cement

All early cement works with reasonable survival should be assessed, and the selection process should include research into the level of survival at pioneering sites A selection of later nineteenth- to early twentieth-century should be identified, from what at this stage appears to be a quite small population No strong case can be made at present for the preservatton of any post 1950 sites

10 2 3 Plaster

The range of gypsum kiln varieties and survival is unclear at this stage It would seem likely on present knowledge that a sample will need to be identified from a small population

10.3 Forms of protection

The majority of sites assessed will be standing kiln structures These sites are amenable in principle to either Listing or Scheduling, or indeed both In practice only a small number (fifteen) is Scheduled, whereas a very much larger number is Listed These Listed structures are likely to be overwhelmingly standing structures of eighteenth-nineteenth century date, and of Grade II architectural interest

In terms of current national policy for industrial monuments, kilns (as non-habitable structures with no realistic prospects for beneficial re-use) would in principle be considered as more suitable for Scheduling than for Listing, and associated earthwork features such as quarries, access ways, and waste tips are only amenable to Scheduling However, the majority of Listed kilns are correctly identified as being of 'special architectural or historical interest', rather than being of 'national importance' as defined for MPP

For these reasons, a policy of systematically re-assessing all Listed kilns is specifically not recommended MPP coverage of lime, cement and gypsum kilns should assess a shortlist of sites drawn up under the priorities in sections 10 1 and 10 2 above Sues identified from this process as of national importance under

© Lancaster University Archaeological Unit March 1996

MPP cntena should nonnally be Scheduled, and where tiese sites are already Listed is it likely that Delisting rather than dual designation will be appropnate, in the case of Listed sites not assessed, or not identified as of national importance under MPP cntena. no change should be made to the existing Listing Sites with important non-structural remains in association with kilns should particularly be considered for Scheduling, in order to apply a single protection to the whole site.

For sites which do not consist of standing structures, Scheduling will be the appropnate form of statutory protection, the question of Listing overlap does not arise m this situation

In some areas. scattered kilns may form an important aspect of the rural or semi-rural landscape and m a few cases these may fall within Environmentally Sensitive Areas or Conservation Areas, or be suitable for designation as such. Abandoned lirue and cement works are often in an area of quarries of geological and/or botanical value and may also be bat habitats, and may therefore be designated for statutory protection under non-archaeological designations such as Sites of Special Scientific Interest In cases where sites are identified as being of national importance for MPP, as well as being SSSIs, it ruay be appropnate to consult English Nature and/or the British Geological Survey about the desirability or otherwise of dual designation, and about management regimes

© Lancaster University Archaeological Unit March 1996

© Lancaster University Archaeological Unit March 1996

BIBLIOGRAPHY

Alderton, D 1984 The Industrial Archaeology of Regions of the British Isles, no 1 East Anglia, *Industrial Archaeology Review*, 7/1, 7-23 (12-15 on lime kilns)

Alderton, D & Booker 1980 *The Batsford Guide to the Industrial Archaeology of East Anglia*

Aldsworth, F 1979 *Limeburning and the Amberley Chalk Pits A History*

Ashbee, J 1995 *MPP The Stone Industry Step 1 report*, LUAU ms report to English Heritage

Ashurst, J & N 1988 *Practical Building Conservation, vol 3 Mortars Plasters and Renders*, Aldershot Gower Technical Press

Ashmore, O 1982 *The Industrial Archaeology of North-West England*, Manchester UP

Atkinson, W 1974 *The Industrial Archaeology of North-East England*, David & Charles, 2 vols

Austen, B, Cox, D & Upton, J 1985 *Sussex Industrial Archaeology a field guide*, Phillimore

Ayris, I & Linsley, S 1994 *A Guide to the Industrial Archaeology of Tyne & Wear*

Bainbridge, J W 1991 Lime kilns of north Northumberland, *History of the Berwickshire Naturalists' Club*, 45, 111-37

Bennet, J & J 1993 *A Guide to the Industrial Archaeology of Cumbria*, AIA/Cumb Ind Hist Soc

Bick, D 1984 'Lime-kilns on the Gloucester-Herefordshire Border', *Industrial Archaeology Review* VII 1, 85-93

Blair, J & Ramsey, N eds 1993 *English Medieval Industries*, London

Boden, P K 1963 'The limestone industry of North Derbyshire', *Geographical Journal*, 129/1

Booker, F 1971 *The Industrial Archaeology of the Tamar Valley*, David & Charles

Born, A 1991 Limestone, limekilns and the limeburning industry north and west of Dartmoor *Rpt and trans of the Devons Assoc for the Adv of Sci, Lit and the Arts*, 123 - history and gazetteer

Bowie, G 1980 'Twyford Waterworks', *Industrial Archaeology Review*, 4/2, 188-91

Boynton, R S 1980 *Chemistry and Technology of Lime and Limestones*

Bray, W 1782 *Sketch of a Tour into Derbyshire and Yorkshire*

© Lancaster University Archaeological Unit March 1996

Brook, F 1997 *The Industrial Archaeology of the British Isles, 1 The West Midlands*. London Batsford.

Burnell, G R 1856 *Lime, Cements, Mortars & Concretes*. Weales Rudimentary Series, 2nd edn

Cato De Agricultura XXXVIII - translated in Davey, N 1961 *A History of Building Materials*

Challands, A 1976 'A Roman Limekiln at Helpston', *Durobrivae*, 4, 22-4

Clark, C 1993 *Ironbridge Gorge*, Batsford

Clarke, R J 1987 'The Closeburn Limeworks Scheme A Dumfrieshire Waterpower Complex', *Industrial Archaeology Review* X 1, 5-22

Cleasby, I 1994 'Limekilns and limeburning in Sedbergh, Garsdale and Dent', *Sedbergh Historian*, 3/2, 2-9

Cleasby, I 1995 'Limekilns in Sedbergh, Garsdale and Dent', *Current Archaeology*, 145, 16-20

Cossons, N 1987 *The BP Book of Industrial Archaeology*, David & Charles Newton Abbott

Cranstone, D 1993 *MPP The Arsenic Industry Step 1 report*, ms report to English Heritage

Craster, O E 1950 'A Medieval Limekiln at Ogmore Castle, Glamorgan', *Arch Camb* 72-6

Crocker, G 1990 *A Guide to the Industrial Archaeology of Surrey*, AIA/Surrey Ind Hist Group

Crompton, J ed 1991 *A Guide to the Industrial Archaeology of the West Midland Iron District*, AIA

Dakin, G F 1968 'Two Post Medieval Stmctures at Thorpewood, Peterborough', *Post-Medieval Archaeology* 2, 164-6

Daniel, P & Murless, B J 1993 'Limekilns at Warren Bay, Old Cleeve, West Somerset', *Somerset IA Soc Bulletin*, 65, 15-22

Daniel, P & Murless, B J 1994 'A limekiln complex at Down End, Puriton', *Somerset IA Soc Bulletin*, 62, 2-8

Davies-Shiel, M & Marshall, J 1969 *The Industrial Archaeology of the Lake Counties*, David & Charles

Davey, N 1961 *A History of Building Materials*, London Phoenix house

Day, J A 1987 *Guide to the Industrial Heritage of Avon*, AIA

Diderot c1760 *Encyclopaedia*

Dix, B 1973 *The Production of Lime and its applications in the Roman World*, BA diss, Univ of London

© Lancaster University Archaeological Unit March 1996

Dix, B 1979 'Roman Lime-Burning', *Britannia*, 10 261-2

Dix, B 1982 'The manufacture of Lime and its uses in the Western Roman Provinces', *Oxford Journal of Archaeolgy*, 1/3, 331-45

Doncaster, E A 1916 *Limes and Cements*

Dinry, D 1992 *An archaeological assessment of the Much Wnlock Bypass Route*, LUAU ms report to Shropshire County Council

Eckel, E C 1928 *Cements and Plasters*

Farey, J 1811-17 *General View of the Agriculture of Derbyshire*, 3 vols, London

Firman, R 1964 'Gypsum in Nottinghamshire', *Bull Peak District Mines Hist Soc*, 2/4, 189-203

Fitzherbert, A 1523 *The Boke of Surveying and Improvement*

Fletcher, J 1995 'Early Locomotives at Swanscombe Cement Works', *Archive*, 7, 19-28

Foster, P J, Harpur, R & Watkins, S 1977 'An Iron Age and Romano-British Settlement at Hardwick Park, Wellingborough, Northants', *Northants Archaeol*, 12, 55-96, esp 63-4

Francis, A J 1977 *The Cement Industry, 1796-1914 A History*, David & Charles

Gillmore, Q A 1870 *Practical Treatise on Limes, Hydraulic Cements and Mortars*, US Engineering Dept, NY

Goodbury, V 1992 'Herefordshire Limekilns', Ironbridge Institute dissertation.

Gooding, P & Halstead, P E 1954 'The Early History of Cement in England', in Proc 3rd Int Symp on Chem of Cement, London 1952, Cement and Concrete Association

Gould, S & Cranstone, D 1992 *MPP The Coal Industry Step 1 Report*, ms report to English Heritage

Hammond, M D P 1977 'Brick Kilns an Illustrated Survey', *Industrial Archaeology Review* I, pt 2 171-92

Harris, H 1992 *The Industrial Archaeology of The Peak District*, David & Charles

Haselfoot, A J 1978 *The Batsford Guide to the Industrial Archaeology of South-East England*, Batsford

Haveron, F 1993 *A Guide to the Industrial History of Guildford and its Borough*, SIHG

Hill, P R, and David, J C E 1995 *Practical Stone Masonry*

Hudson, K 1965 *The Industrial Archaeology of South England*, David & Charles.

Hudson, K 1984 *Industrial History from the Air*, Cambridge UP

© Lancaster University Archaeological Unit March 1996

Hughes, S 1981 'The Industrial Archaeology of the Montgomeryshire Canal', *Montgomery Collect* 67, 101-28

Hughes, S 1988 *The Archaeology of the Montgomeryshire Canal*, RCAHMW, 55-69

Hughes, S 1990 *The Brecon Forest Tramroads*, RCAHMW

Hutton, J 1782 *A Tour to the Caves in the Environs of Inglehorough*

Innocent, C F 1916 *The Development of English Building Construction*, Cambridge UP

Jackson, D A, Biek, L & Dix, B F 1973 'A Roman Limekiln at Weekley, Northants', *Britannia* 4, 128-40, esp 137-8

Jackson, L 1950 'The Buxton Lime Trade', in *Cement and Gravel*

Jobey, G 1966 'A Note on "Sow" Kilns', *Journal Agricultural Soc Univ Newcastle upon Tyne*, 37-8

Johnson, W B 1970 *The Industrial Archaeology of Hertfordshire*, David & Charles

Leach, J T 1992 *The North West Derbyshire limestone industry*, Manch Poly MA dissn

Leach, J T 1995 'Burning Lime in Derbyshire Pye Kilns', *Industrial Archaeology Review*, 17/2, 145-58

Leicestershire Industrial History Society 1983 *Leicestershire Archaeology The Present State of Knowledge vol 3 Industrial Archaeology*, Leicestershire Museums Archaeological Reports Series no 6

Ling, R 1976 'Stuccowork', ch 16 in Strong, D & Brown, D *Roman Crafts*, Duckworth

Linsley, S 1992 'Eighteenth Century to nineteenth century agrarian transformation and inustrial revolution', in Grundy, J, McCombie, G, Ryder, P, Welfare, H & Pevsner, N *Northumberland*, The Buildings of England series

Loeb 1931-4 *Vitruvius De Architectura*, London heinemann

Mackay, K J H 1977 Limestone Working - a Stirlingshire industry', *Forth Naturalist and Historian*, 2

Marks, S 1971 'Lime, Cement & Concrete' in Bussey, J H (ed) *Materials & Technology*

Marshall, G, Palmer, M & Neaverson, P 1992 The History and Archaeology of the Calke Abbey lime-yards, *Industrial Archaeology Review*, 14/2, 145-76

Martin, G 1932 *Chemical Engineering and Thermodynamics applied to the Cement Rotary Kiln etc*

Martin, R G 1992 'Experimental Cement Shaft Kiln at Beddingham, *Sussex Industrial History*, 22

© Lancaster University Archaeological Unit March 1996

Martin, R G 1994 'An experimental Cement Shaft Kiln at Beddingham', *IAR* 16/2, 170-83

McLeod, M, Stratton, M & Trinder, B 1987 *Llanymynech Hill An Archaeological and Historical Evaluation*, Ironbridge Institute Research Paper no 18

Merrick, Rice 1578 - see Corbett, J A 1887 *'A Booke of Glamorganshire Antiquities' by Rice Merrick esq*

Mills, S, Riemer, P, Standmg, I & Wilson, R 1992 *A Guide to the Industrial Archaeology of Gloucestershire*, AIA/Glos Soc for Ind Archaeol.

Millward, R & Robinson, A 1971 'South-East England Thameside & the Weald', in *Landscapes of Britain*

Minchinton, W 1984 *A Limekiln Miscellany The South West and South Wales*, Exeter Industrial Archaeology Group

Moore-Colyer, R J 1988 Of Lime and Men aspects of the coastal trade in Lime in SW Wales in the eighteenth and nineteenth centuries, *Welsh History Review* 14, 54-77

Morgan, G T & Pratt, D D 1938 *The British Chemical Industry, its rise and development*, London Edward Arnold

Morris, C H 1984 '160 years of cement manufacture in Cleveland', *CIA* 16, 35-54

Mortimer, J 1707 *The Whole Art of Husbandry, or the way, of managing and improving land*, 2nd edn 1712, iv, 68

Murphy, K & Sambrook 1994 'South-East Dyfed Minerals a survey of the archaeological resource threatened by mineral extraction', Dyfed Archaeological Trust ms report to Cadw

Neve, R 1726 *The City and Country Purchaser*, David & Charles reprint (1969)

Nixon, F 1969 *Industrial Archaeology of Derbyshire*, David & Charles

Norden, J 1607 *The Surveyors Dialogue*

Owen, H 1892 *'The Description of Pembrokeshire' by George Owen*, London

Palmer, M & Neaverson, P 1986 *A guide to the Industrial Archaeology of the East Midlands*, AIA/Leics Ind Hist Soc

Palmer, M & Neaverson, P 1992 *Industrial Landscapes of the East Midlands*, Phillimore

Pasley, C W 1838 *Observations on Limes Calcereous Cements, Mortars, Stuccos and Concretes*, London

Plymley, J 1803 *General View of the Agriculture of Shropshire*

Pyne, W H, Hill, J & Gray, C 1808 *Microcosm*

© Lancaster University Archaeological Unit March 1996

Raistrick, A 1967 'Country Limekilns', ch 5 in *Old Yorkshire Dales*, David & Charles Newton Abbot

Raistrick, A 1972 *Industrial Archaeology*, London Granada Publishing

Ramsey, N 1993 'Alabaster', in Blair, J & Ramsay, N *English Medieval Industries*

Rees A 1819/20 *The Cyclopaedia* - see Cossons, N 1972 *Rees's Manufacturing Industry (1819-20)*, David & Charles reprints

Reid, H 1877 *The Science and Art of the Manufacture of Portland Cement*, London & NY

Rowe, D S 1985 'Note on Cement Manufacture in Cleveland at ICIS, Caseboume Works', *CIA* 17

Salzman, C F 1923 *English Medieval Industry of the Middle Ages*, Clarendon Press

Salzman, C F 1952 *Building in England down to 1540*, Oxford

Samuel R 1977 'Mineral Workers' in *Miners, Quarrymen and Saltworkers*, Routledge & Kegan Paul

Searle, A B 1935 *Limestone and its Products their nature and uses*, Ernest Benn Ltd London

Sherlock, R 1976 *The Industrial Archaeology of Staffordshire*, David & Charles

Singer, C, Holmyard E J, Hall, A R & Williams T I 1958 *A History of Technology*, vols 4 & 5, Clarendon Press Oxford

Skinner, B C 1969 *The lime industry in the Lothians*

Skinner, B C 1975 'The Archaeology of the Lime Industry in Scotland', *Post Medieval Archaeology* 9 225-30

Smith, D M 1965 *The Industrial Archaeology of the East Midlands*, David & Charles

Sowan, P 1993 'Notes on Sussex Limeworks', *Sussex Industrial History*, 23, 2-5

Spratt, D A & Harrison, B J D 1989 *The North York Moors Landscape Heritage*, David & Charles

Stanier, P H 1993 Dorset Limekilns a first survey, *Proc Dorset Nat Hist and Arch Soc*, 115, 33-49

Stanier, P H *Quarries and Quarrying*, Princes Risborough

Stanier, P H 1995 'A suggested typology for Dorset limekilns', *IA News* 92, 3

Stanier, P H 1995 *Quarries of England and Wales an historic photographic record*, Truro Twelveheads Press

Starmer, G 1995 'Limekilns and typologies', *IA News* 92, 2

© Lancaster University Archaeological Unit March 1996

Steane, J M 1985 *The Archaeology of Medieval England and Wales*, Groom Helm London, 228-9

Thompson, W J undated *Industrial Archaeology of Staffordshire*, Moorland Publishing Company

Todd, A C & Laws 1972 *The Industrial Archaeology of Cornwall*, David & Charles

Todd, M 1994 *A Guide to the Industrial History of Tandridge*, SIHG

Toft, L A 1988 'Lime Burning on the Gower Peninsula's Limestone Belt', *Industrial Archaeology Review* XI 1, 75-85

Trueman, M R G, Isaac, S & Quartermaine, J 1989 *The Langcliffe Quarry Limeworks, Settle an archaeological survey of the site and Haffman lime kiln*, LUAU ms report to YDNP

Trueman, M R G 1992 'The Langcliffe Quarry and Limeworks', *Industrial Archaeology Review*, 14/2, 126-44

Trueman, M R G & Quartermaine, J 1993 *Mealbank Quarry and Hoffman Kiln, Ingleton, N Yorkshire archaeological survey*, LUAU ms report to YDNP

Trinder, B 1982 *The Making of the Industrial Landscape*, London Dent & Sons

Trinder, B 1992 *The Blackwell Encyclopeadia of Industrial Archaeology*, Blackwell

Wailes, R 1982 *Berney Arms Windmill*, English Heritage Guide

Ward, A 1983 'A Sod Lime Kiln on Cefn Bryn, Gower, West Glamorgan', *Post-Medieval Archaeology* 17 177-84

White, R F 1977 'A Roman Lime Kiln near Cardington Mill, Bedford', *Beds Archaeol J* 12, 23-6

Williams, E 1982 *The Historic Farm Buildings of Wales*, John Donald Edinburgh

Williams, J G 1990 *The Wenlock Limestone Industry an historical note*

Williams, J H, Shaw M & Denham, V 1979 *St Peters St, Northampton excavations 1973-76*, Northampton DC

Williams, J H 1985 Middle Saxon Palaces at Northampton, Northampton DC

Williams, R 1989 *Limekilns and Limeburning*, Princes Risborough Shire Album 236

Young, A 1770 *A Six Month Tour through the North of England*

© Lancaster University Archaeological Unit March 1996

© Lancaster University Archaeological Unit March 1996

APPENDIX 1- ILLUSTRATIONS

© Lancaster University Archaeological Unit March 1996

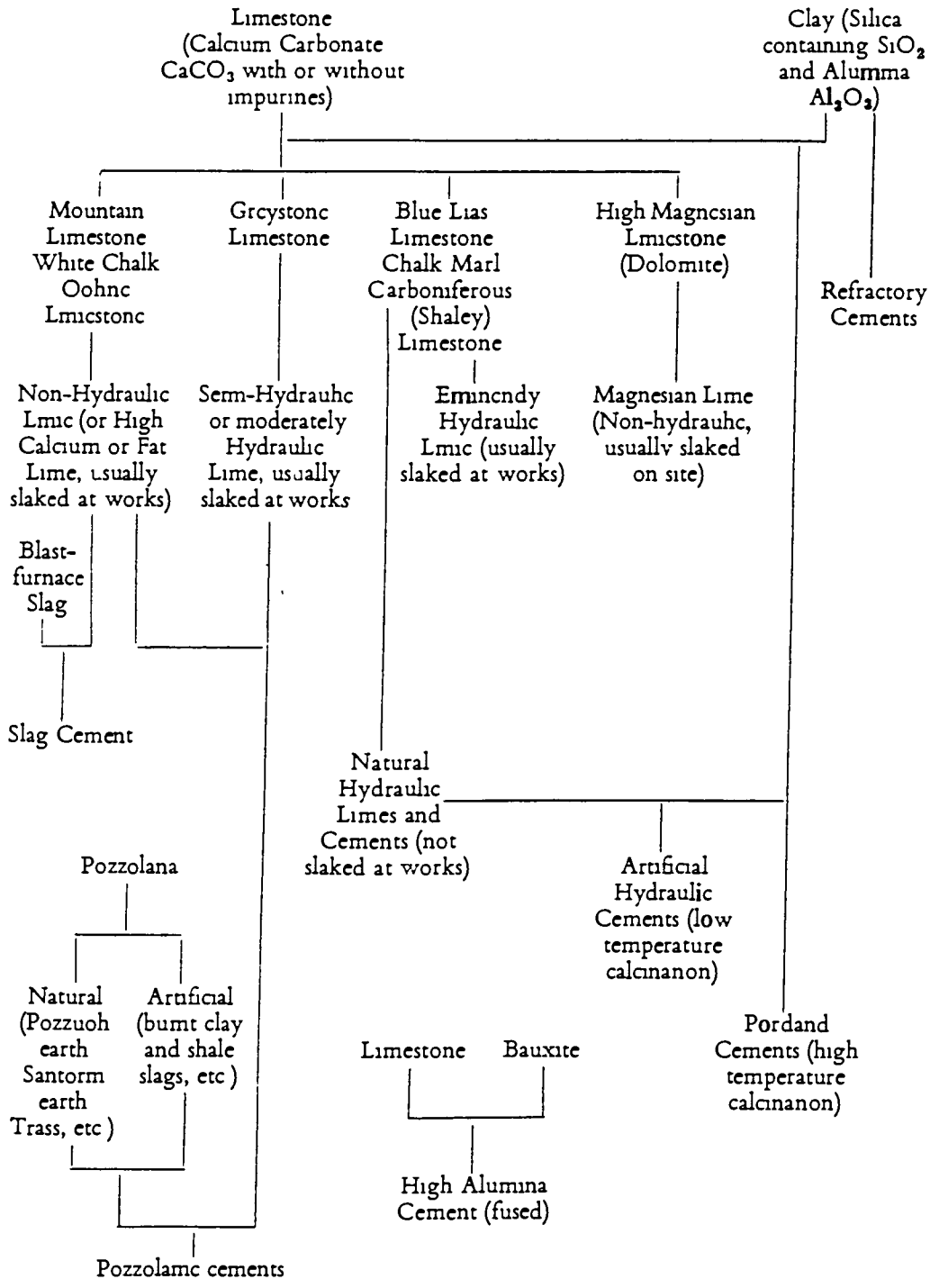


Fig 1. Types of limestone, and the mortar and cements produced from them (Davey 1961, p 109)

© Lancaster University Archaeological Unit March 1996

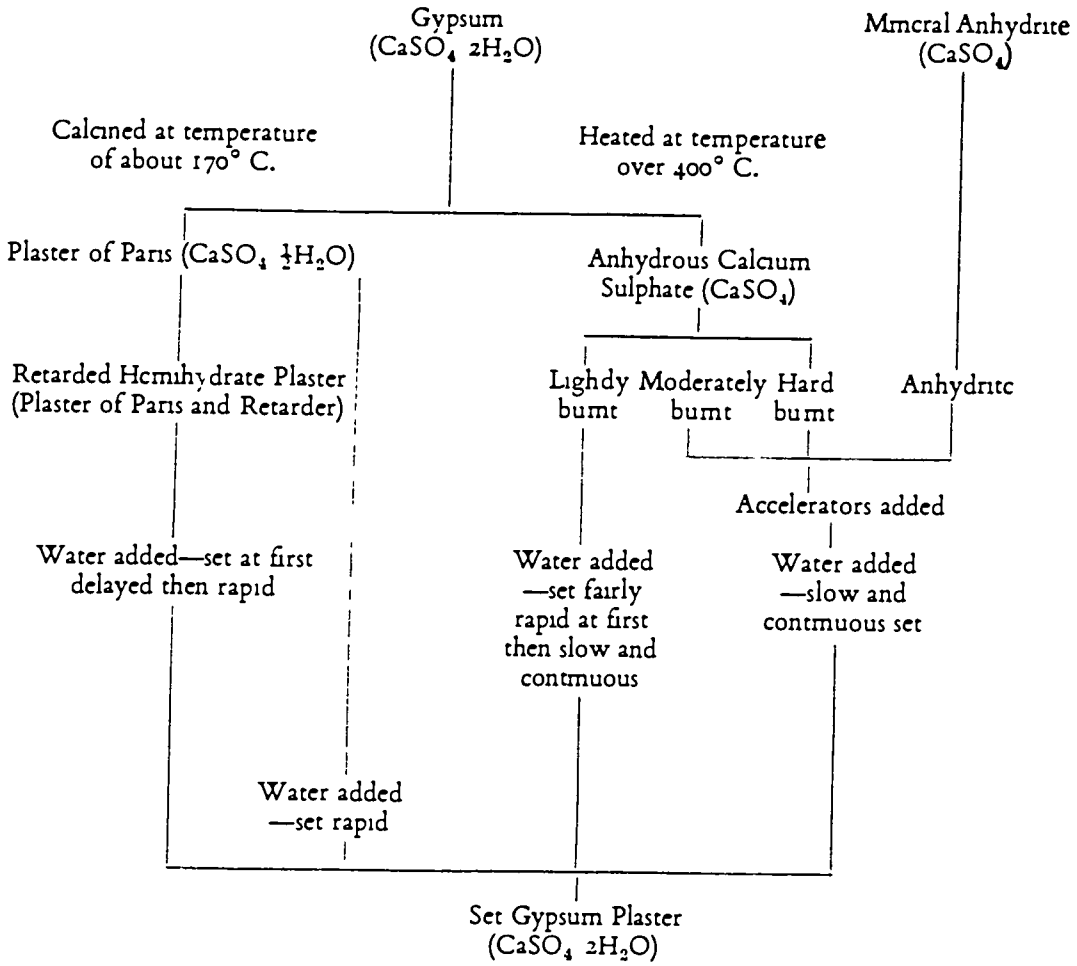


Fig 2. The process of gypsum plaster production (Davey 1961, p 93)

© Lancaster University Archaeological Unit March 1996

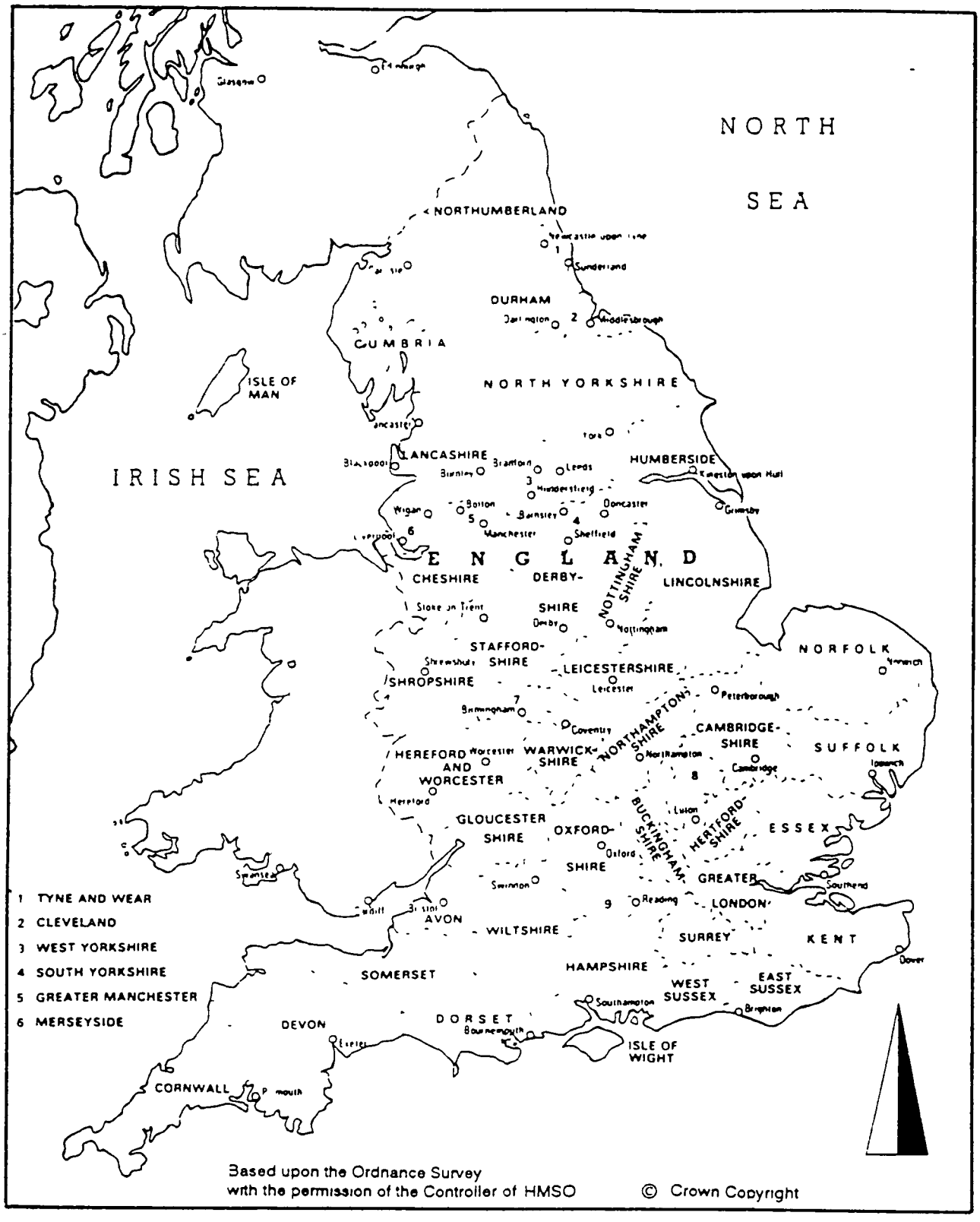


Fig 3. Counties of England

© Lancaster University Archaeological Unit March 1996

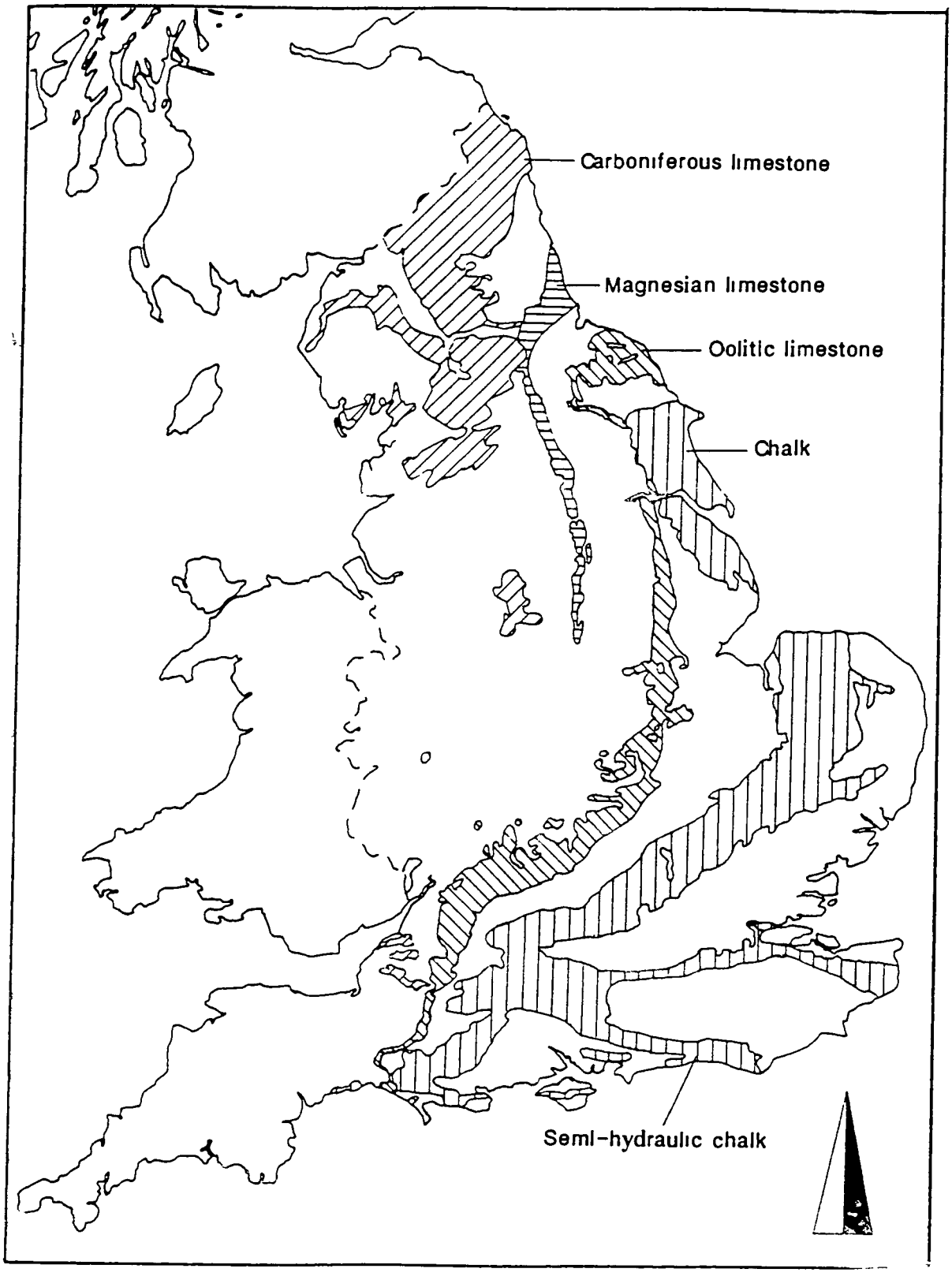


Fig 4. Geological deposits of non-hydraulic and semi-hydraulic limestone

© Lancaster University Archaeological Unit March 1996

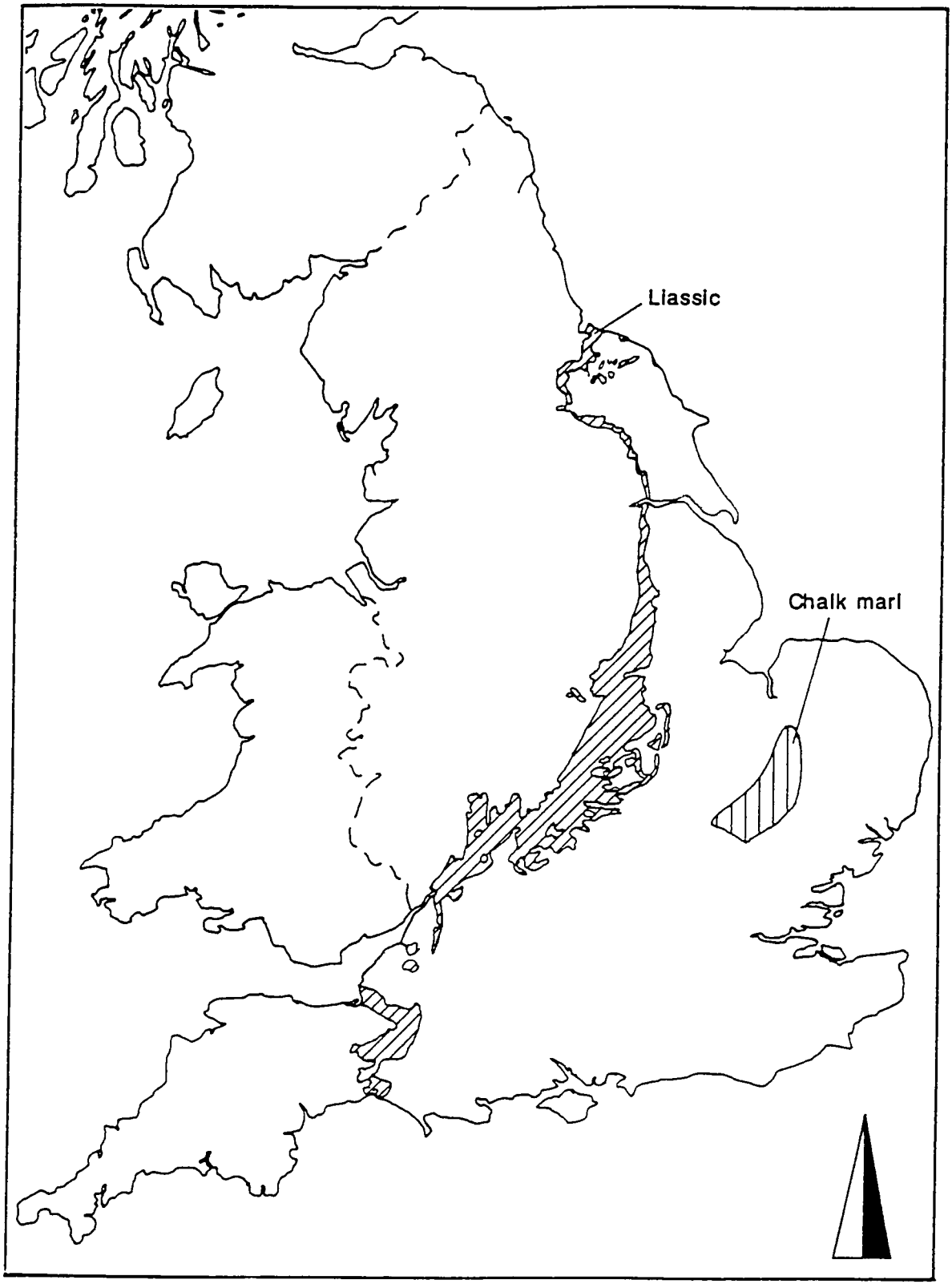


Fig 5. Geological deposits of limestone

© Lancaster University Archaeological Unit March 1996

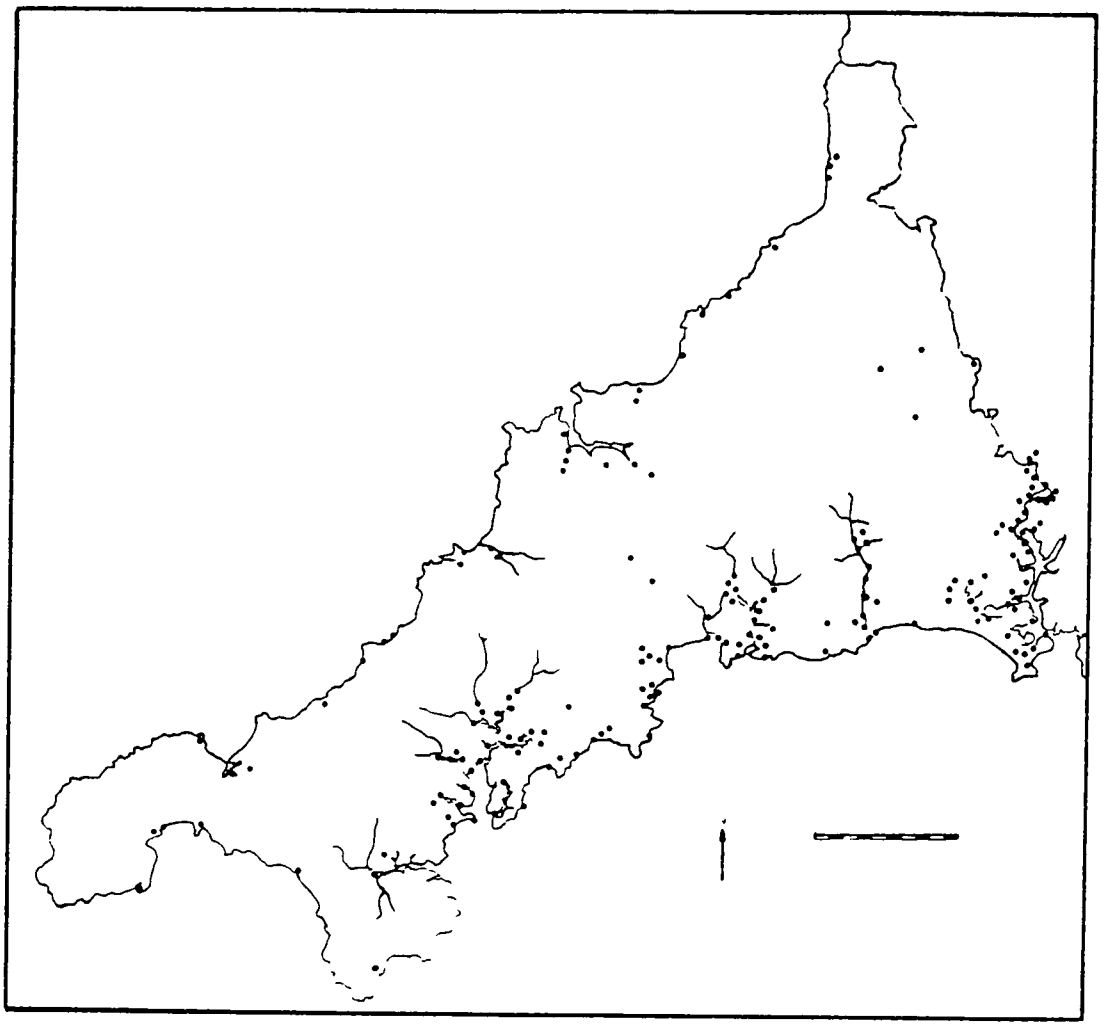


Fig 6. Distribution of lime kilns in Cornwall (Minchinton 1984, p 10)

© Lancaster University Archaeological Unit March 1996

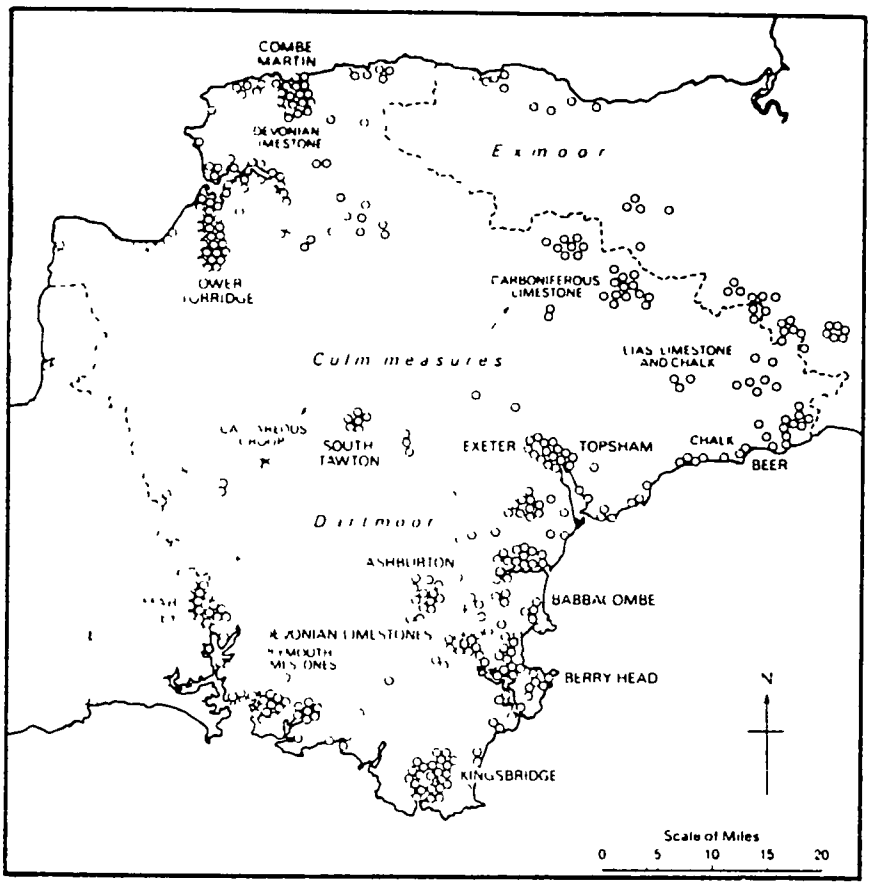


Fig 7. Distribution of lime kilns in Devon (Minchinton 1984, p 12)

© Lancaster University Archaeological Unit March 1996

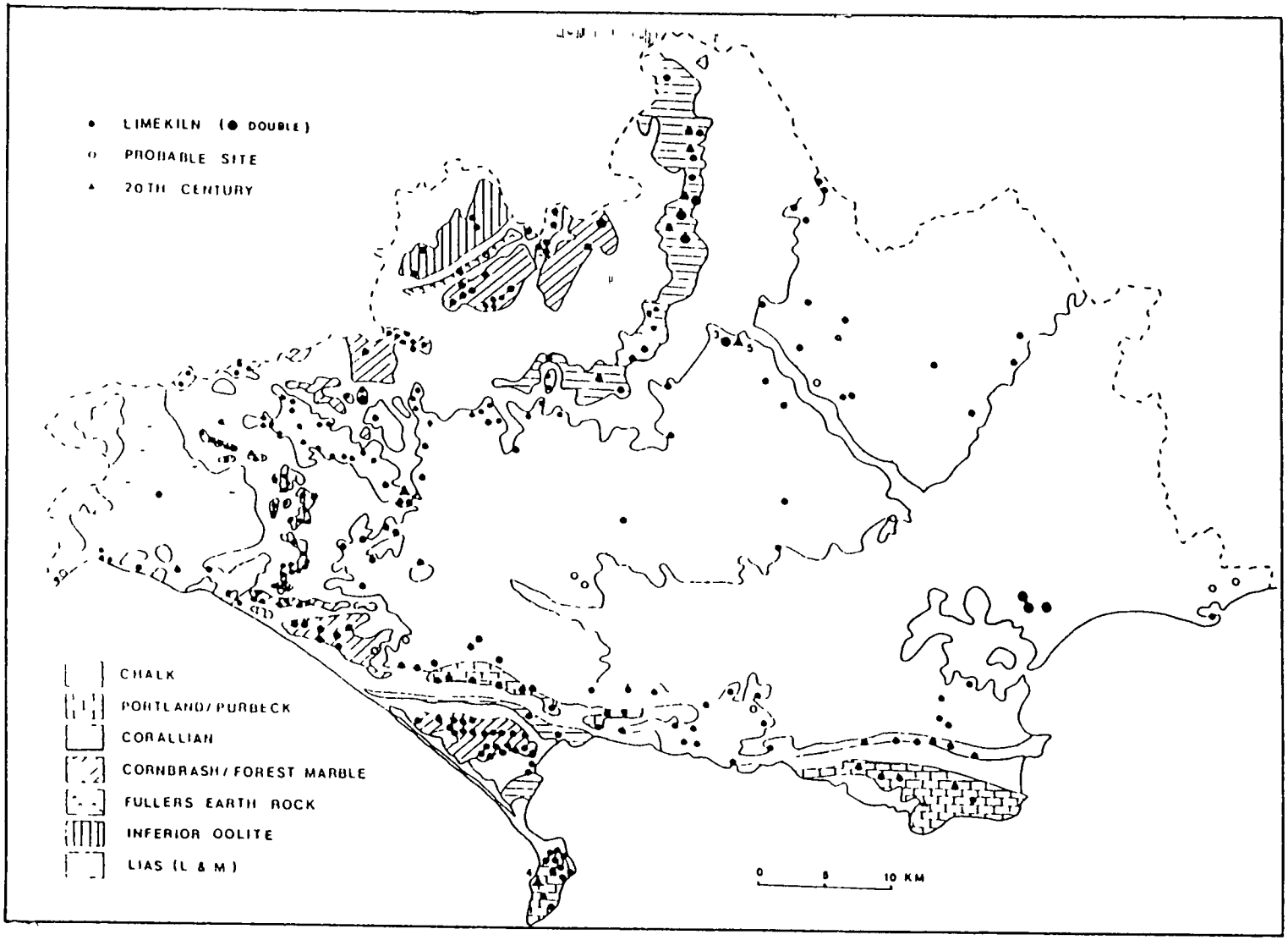


Fig 8. Distribution of lime kilns in Dorset (Stanier 1993, p 36)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996

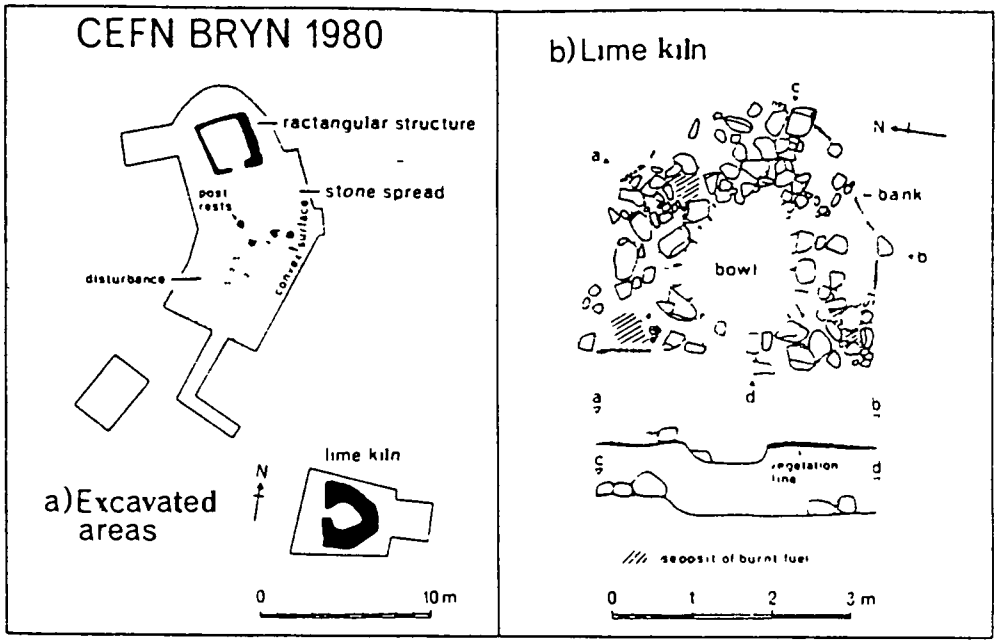


Fig 9. Excavated clamp kiln (sod kiln) (Ward 1983, p 178)

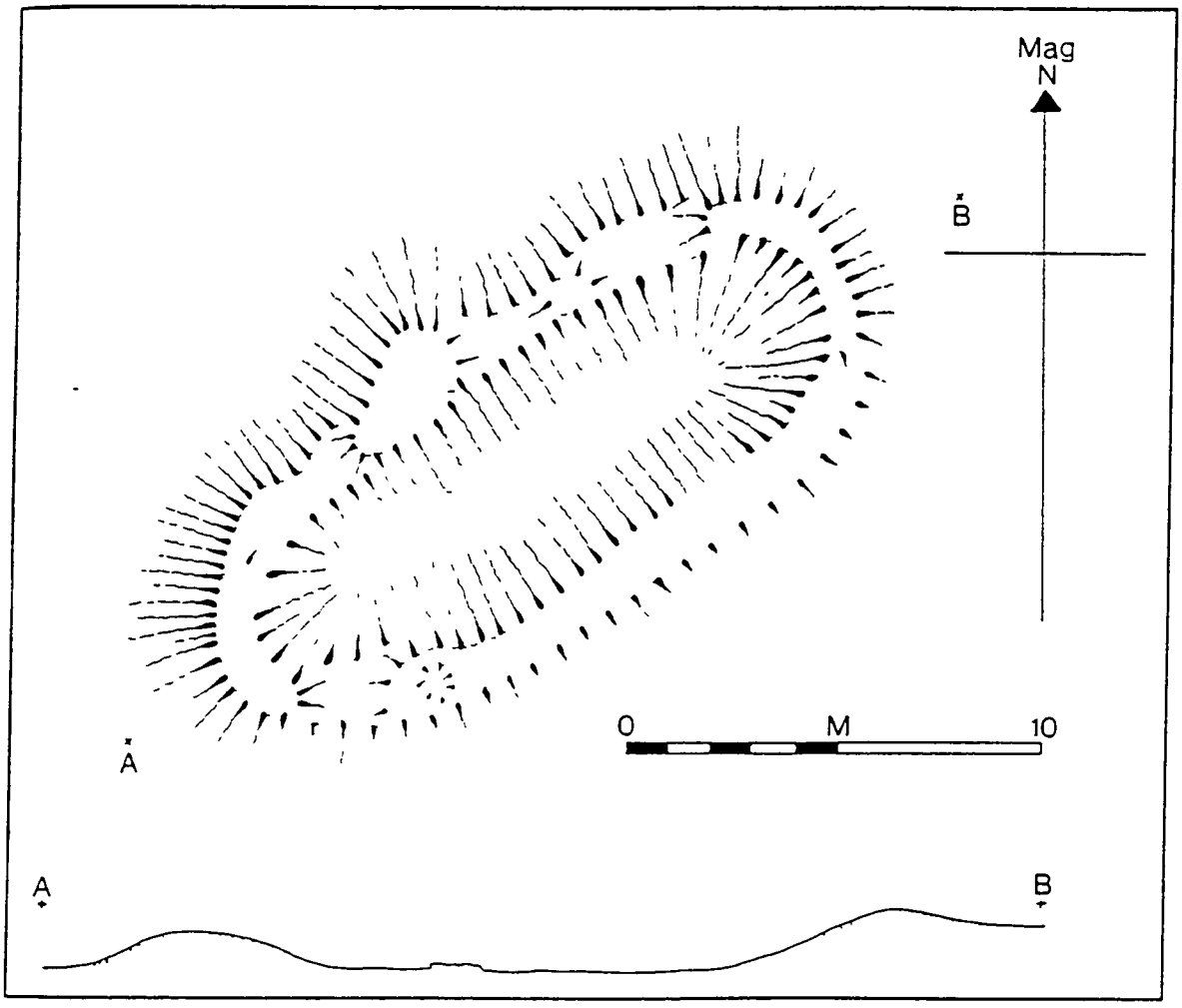


Fig 10. Excavated clamp kiln (Pye kiln) (Leach 1995, 153)

© Lancaster University Archaeological Unit March 1996

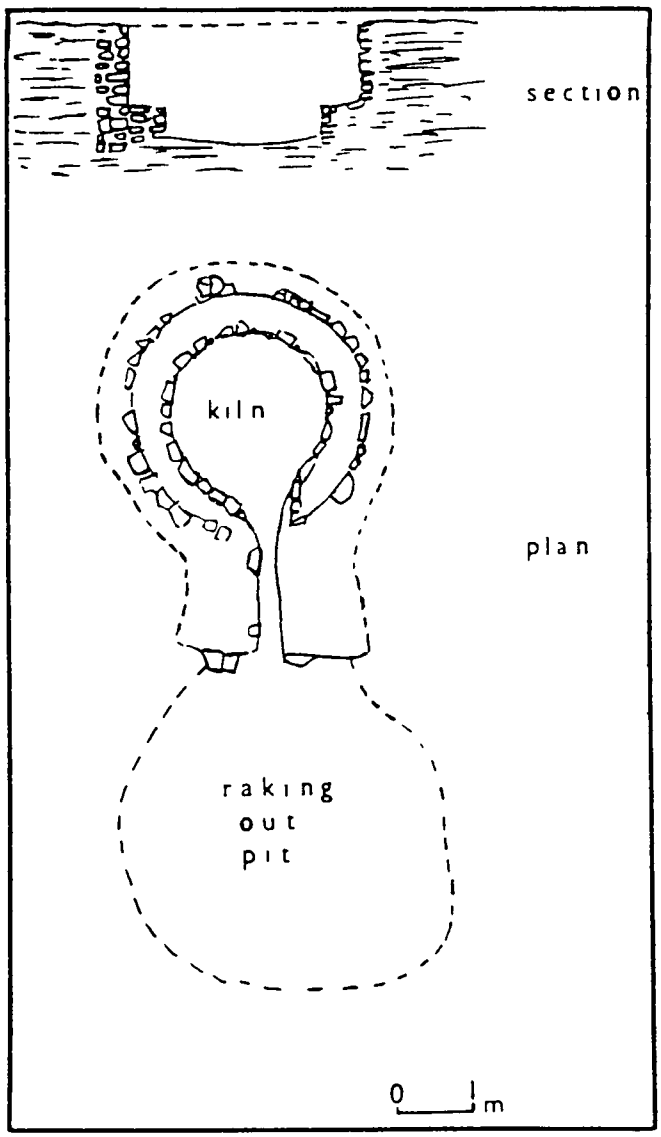
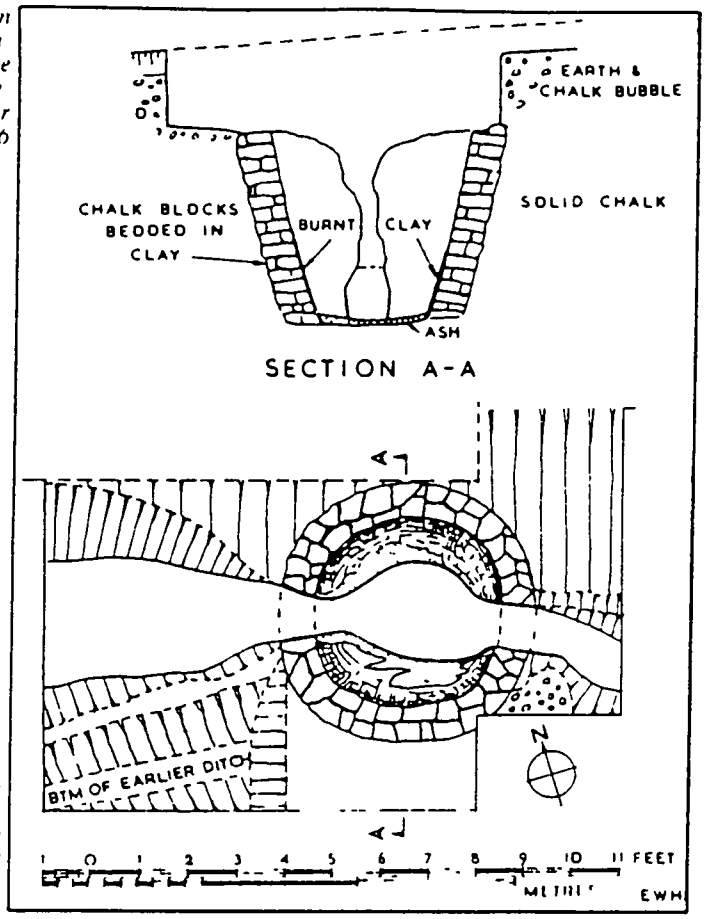


Fig 11. Excavated Roman flare kiln, Weekly, Northants (Williams 1989, p 4)

© Lancaster University Archaeological Unit March 1996

Right *Fifteenth-century limekiln excavated at Old Erringham Shoreham West Sussex Note the two draw-holes and clay lining Built for making lime mortar for a manor house it was about 6 feet (1 8 metres) deep*



Below *Thirteenth-century limekiln at Edgerran Castle Dyfed Only the base survives, with two draw-holes It was coal-burning and was possibly an early type of semi-continuous kiln*

Fig 12. Excavated medieval lime kilns (Williams 1989, p 5)

© Lancaster University Archaeological Unit March 1996

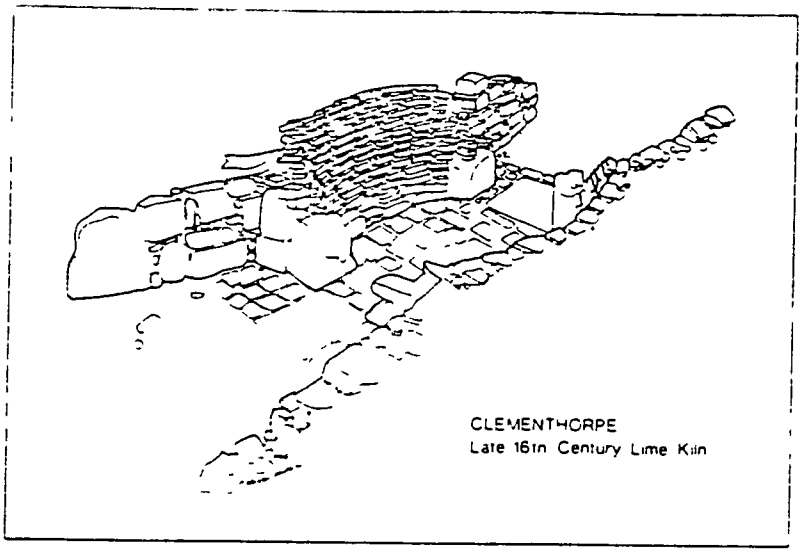


Fig 13. Excavated 16th Century lime kiln (Post-Med Arch 11)

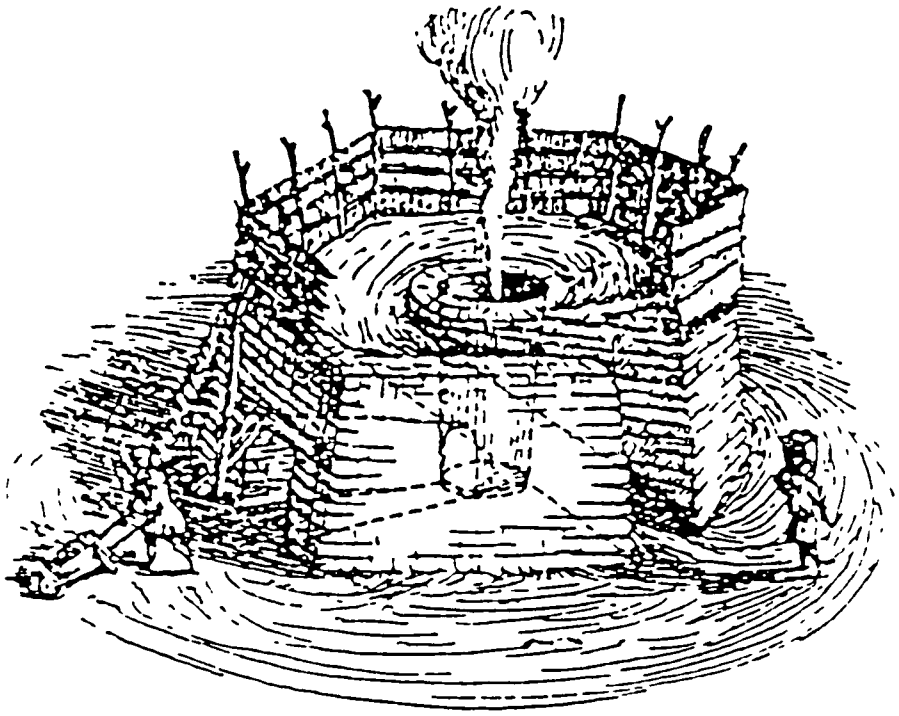


FIGURE 323—*Lime-kiln reconstructed from a painting by David Teniers the younger (1610–90). Chalk or limestone is brought up a ramp (indicated by dotted lines), heaped on the platform, and held in place there by a rough paling. The central fire is fuelled through the tunnel and the lime turned over from time to time.*

Fig 14. Reconstruction of a 17th Century flare kiln (Singer et al, Vol 2, 1958)

© Lancaster University Archaeological Unit March 1996

Flare kilns with bottleneck-shaped chimneys at Dorking chalkpits, Surrey, from a pen-and-wash drawing by G. Scharf, 1823. The burning kiln's draw-hole is roughly blocked to reduce the draught. Loading doors are visible in the chimneys. Note also the lean-to shed on the right. A larger open-topped kiln is being fired on the left of the picture.

Fig 15. Illustration of bottle flare kiln (Williams 1989, p 23)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996

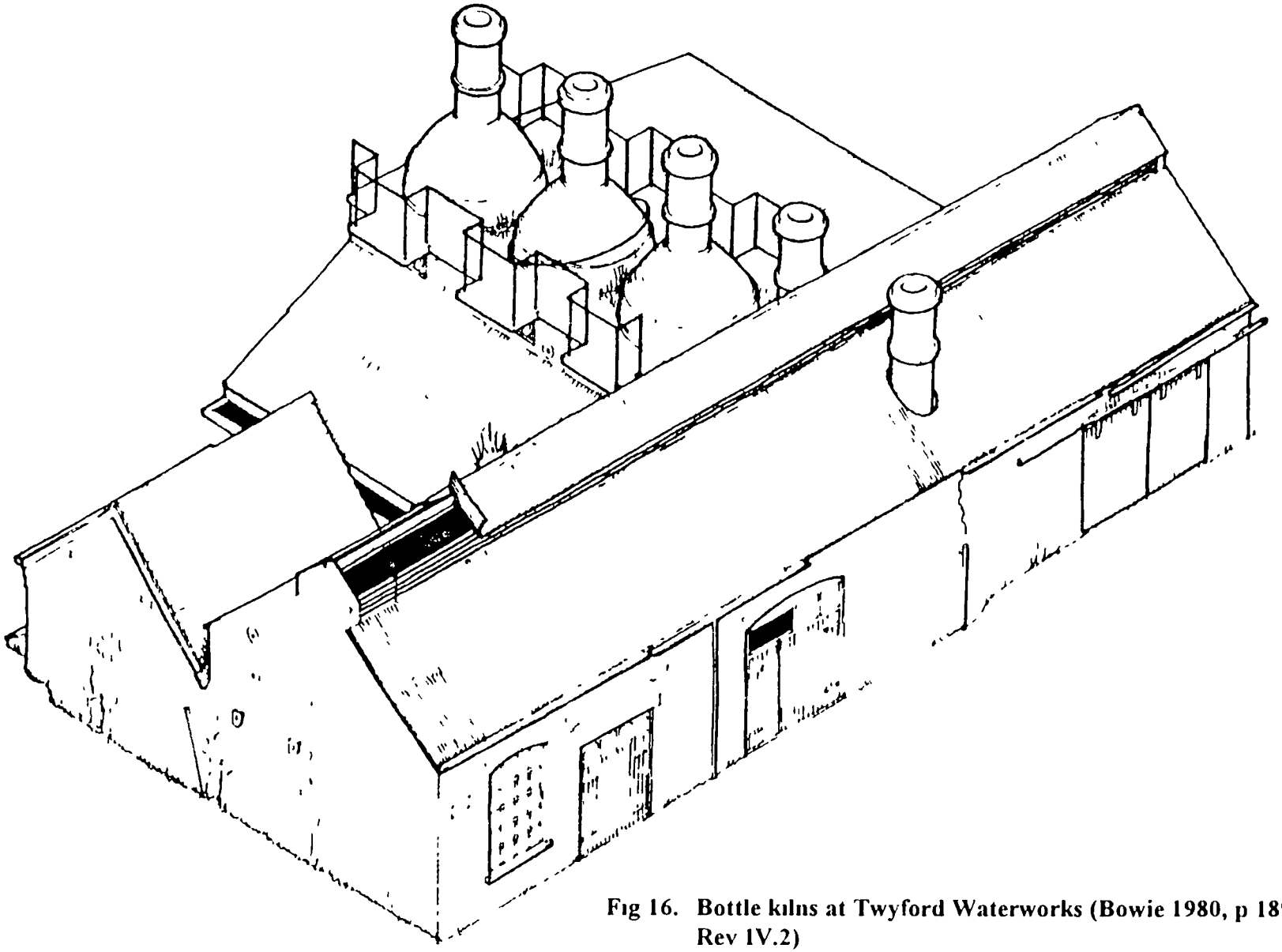
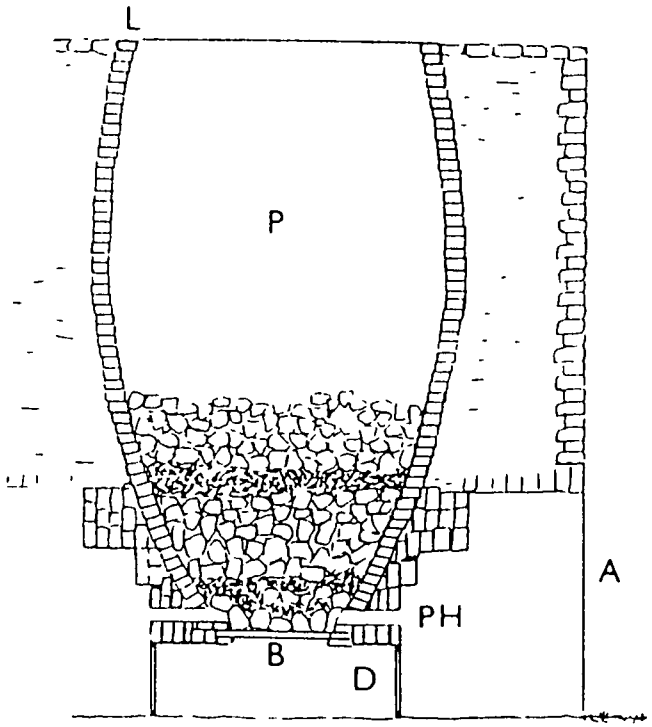


Fig 16. Bottle kilns at Twyford Waterworks (Bowie 1980, p 189, Ind Arch Rev IV.2)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996



Left *Features of a draw kiln, showing limestone and coal in alternate layers Pot diameters varied from 8 to 16 feet (2 4 to 4 9 metres) and the depth varied from 20 to 30 feet (6 0 to 9 1 metres) The shape varied in profile, but generally narrowed to 3 feet (0 9 metres) or less at the base and usually curved in at the top Up to four draw-holes are found P, kiln pot, L, lining, D, draw-hole, A, access arch, PH, poking-hole, B, support bars (a separate grate is sometimes also found) The kiln is shown partly loaded*

Fig 17. Cross-section of draw kiln (Williams 1989, p 18)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996

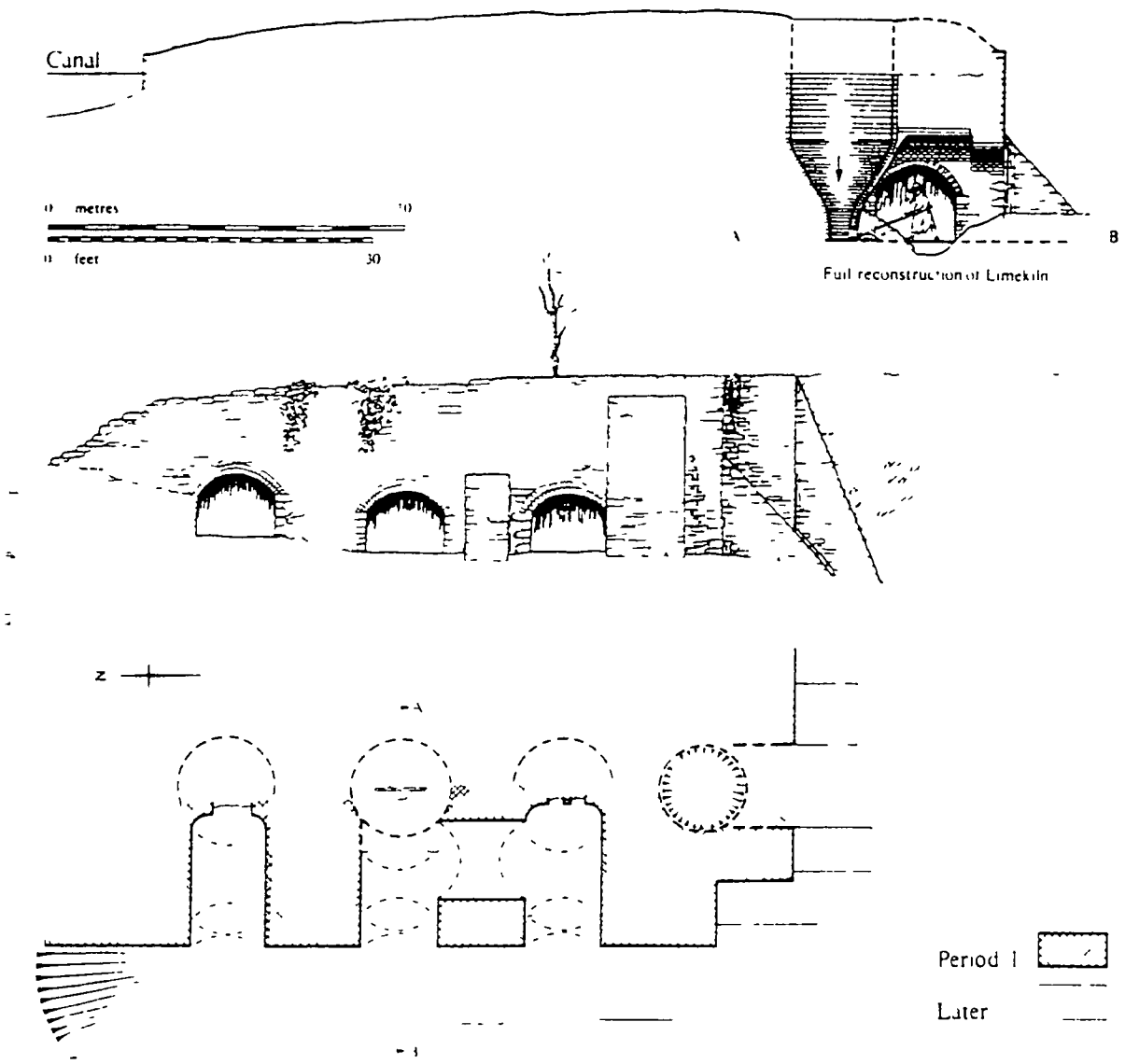


Fig 18. Mid-19th Century draw kilns (Hughes 1988, p 151)

© Lancaster University Archaeological Unit March 1996

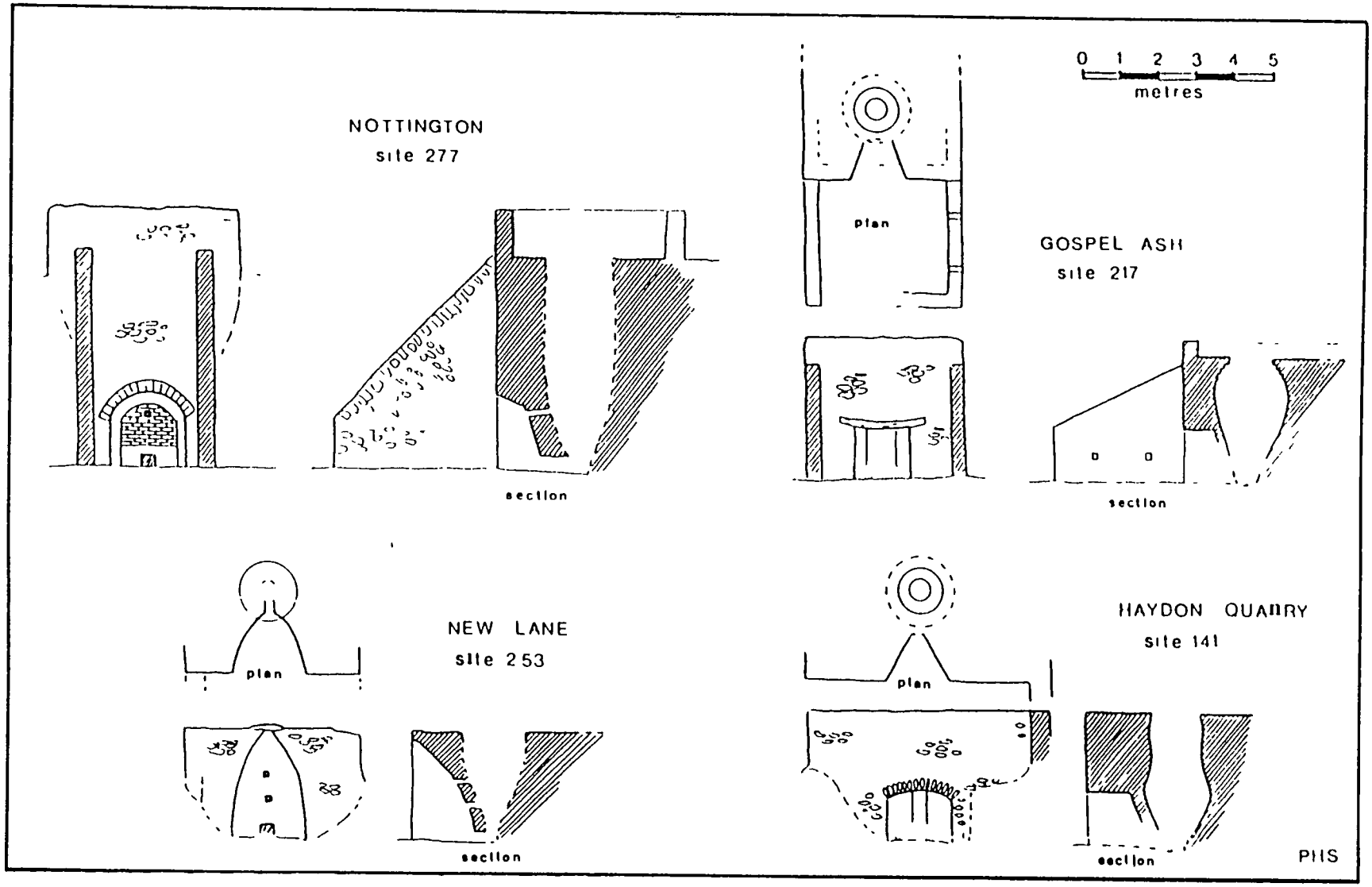


Fig 19. The range of lime kilns in Dorset (Stanier 1993, p 41)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996

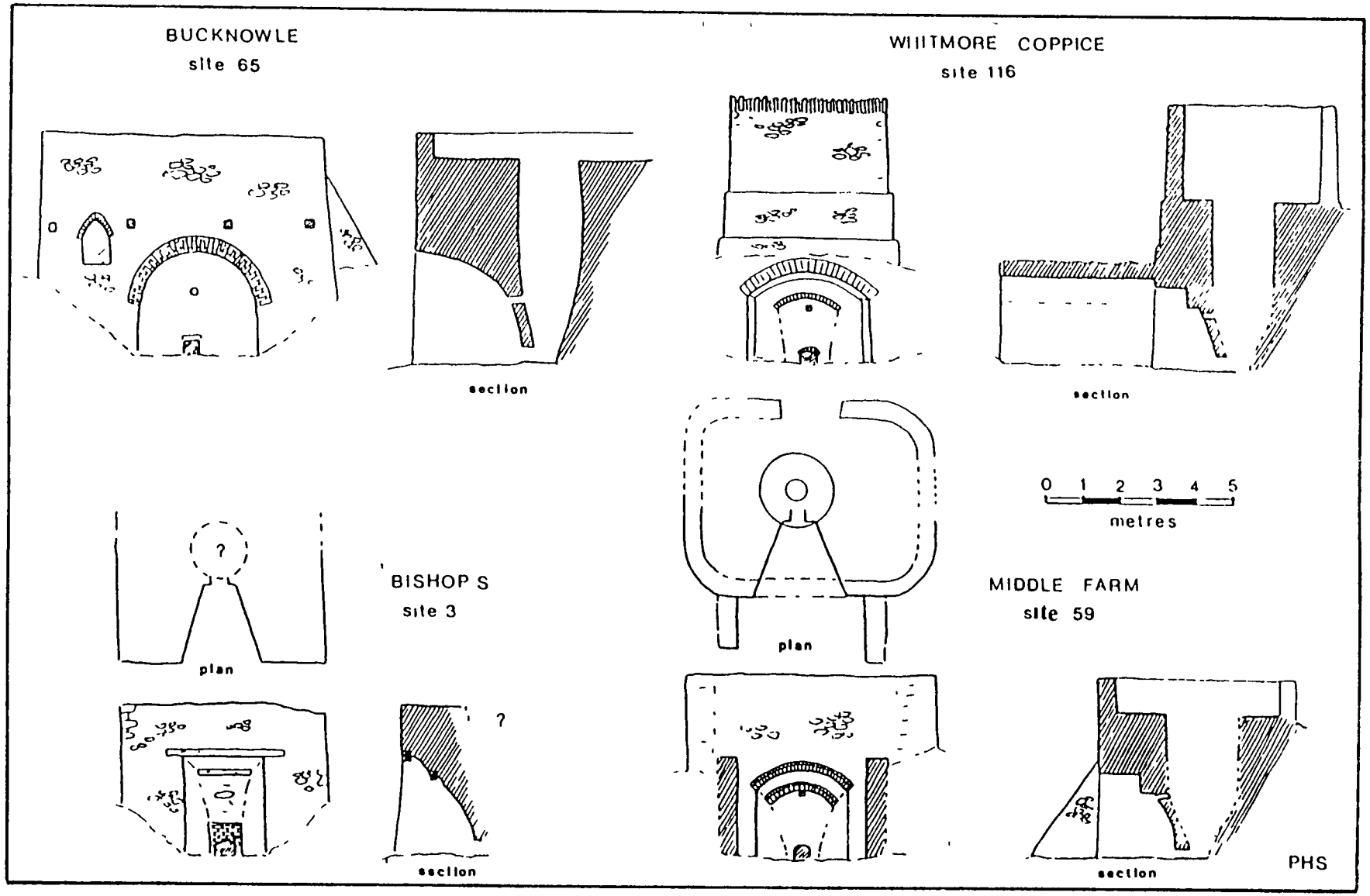


Fig 20. The range of lime kilns in Dorset: continued (Stanier 1993, p 43)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996

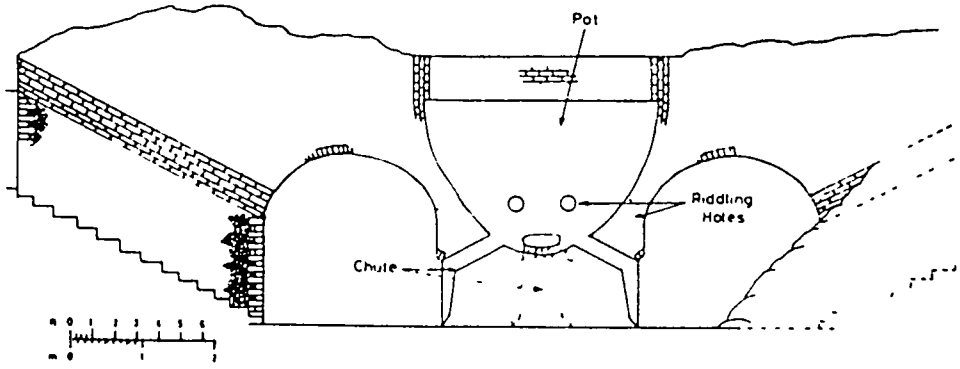


Fig 21. Cross-section of East Anglian lime kiln (Allerton & Booker 1980, p 25)

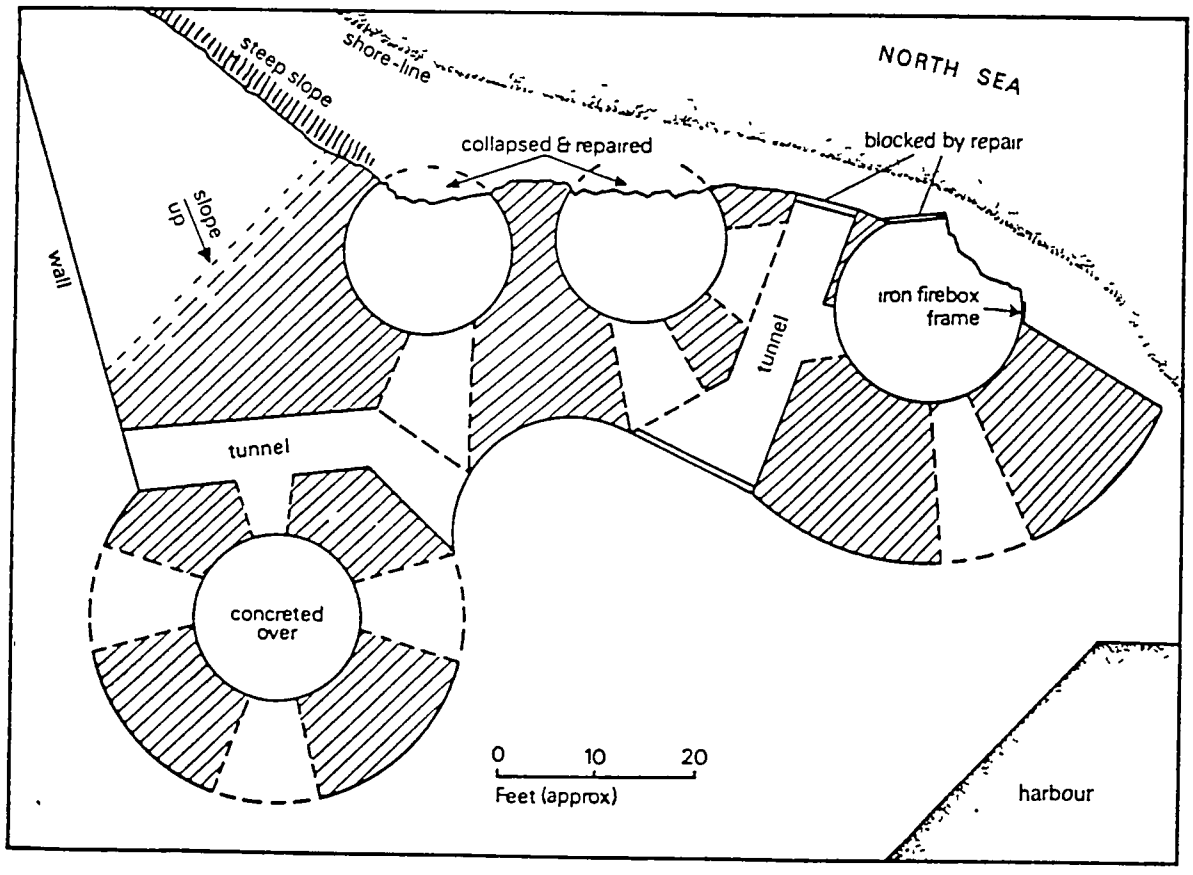
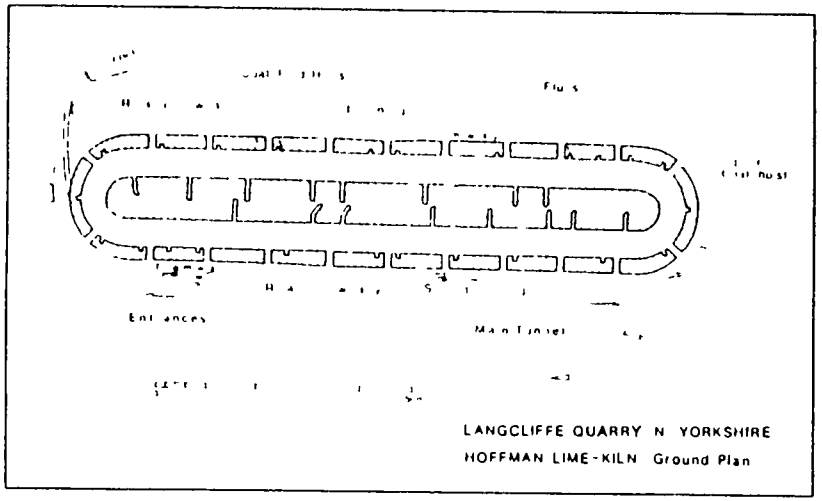
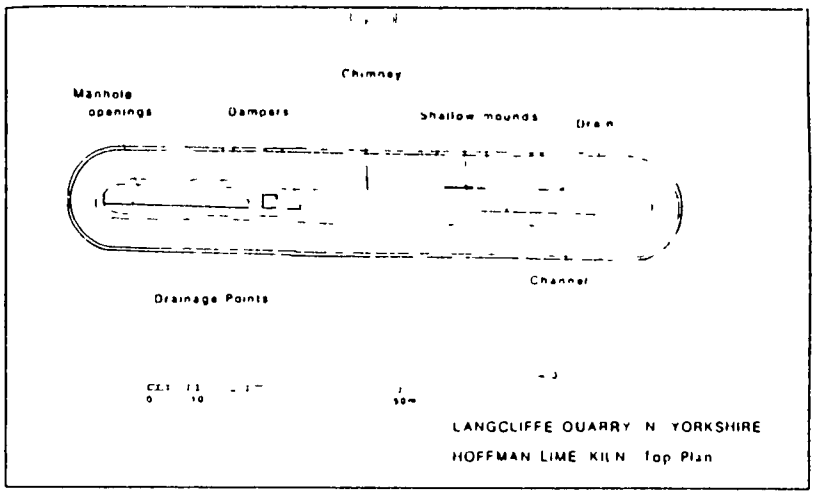


Fig 22. 18th Century coastal lime kilns at Beadnell, Northumberland (Atkinson 1974, p 18)

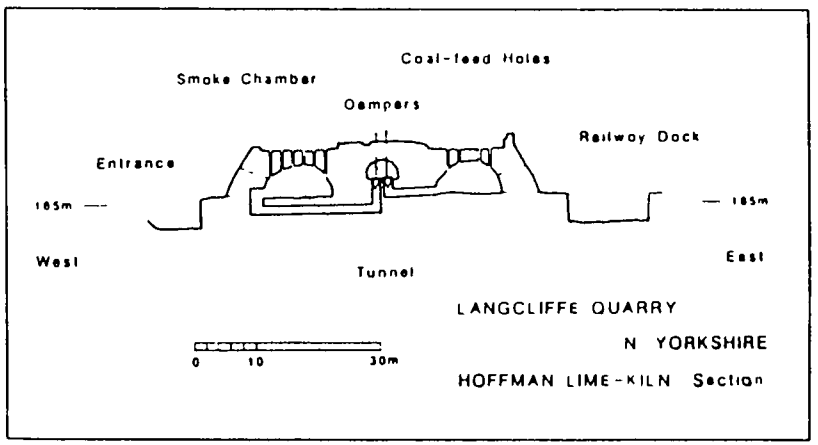
© Lancaster University Archaeological Unit March 1996



Langcliffe Quarry ground plan of Hoffman kiln



Langcliffe Quarry top plan of Hoffman kiln

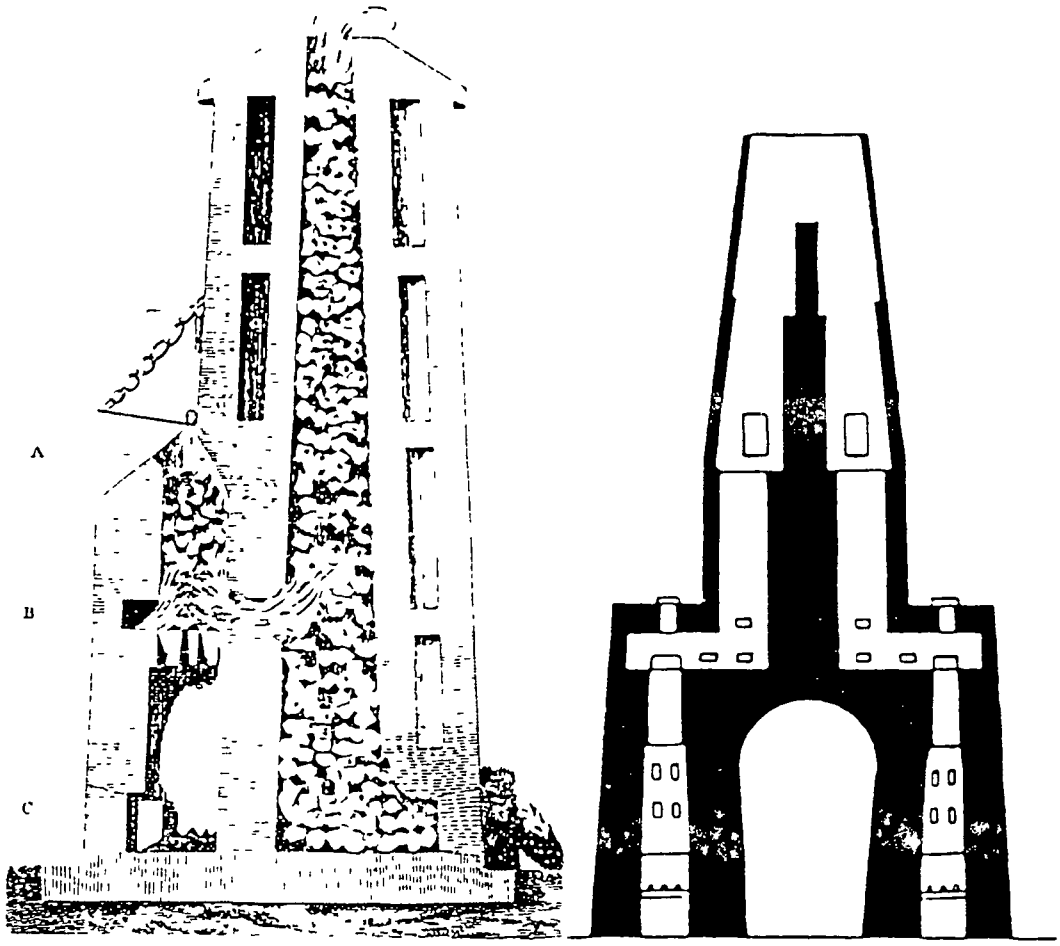


Langcliffe Quarry section through Hoffman kiln

Fig 23. Hoffman kiln at Langcliffe, North Yorkshire (Trueman 1992, p 136)

For the use of English Heritage only

© Lancaster University Archaeological Unit March 1996



Left *Vertical shaft kiln built by Count Rumford in Dublin in about 1801. The shaft, with brick cavity walls, was 15 feet (4.6 metres) tall, 9 inches (0.23 metres) in diameter at the top and 2 feet 10 (0.61 metres) in diameter at the base. Fuel was injected through a hinged iron door at point A and kept separate from the limestone, which descended through a drying and pre-heating zone into a burning zone followed by a cooling zone. The lime drawn off was free of ash. A door at B showed clearing of the flue and there was an ash-pit door at C. In effect it was a continuous vertical kiln. (From Malcolm's Compendium of Modern Husbandry, 1805.)*

Right *Simplified drawing of a Dietzch cement kiln modified for chalk and production at Betchworth, Surrey, in 1887. It was very tall and chalk was loaded at the top of the heating zone. Fuel was fed in at the shoulder and the chalk raked to form a drying zone below. The burnt lime descended through a cooling zone to the draw-hole. These kilns were always built in back-to-back pairs. They were used at several American cement works.*

Fig 24. Rumford & Dietzch kilns (Williams 1989, p 24)

© Lancaster University Archaeological Unit March 1996

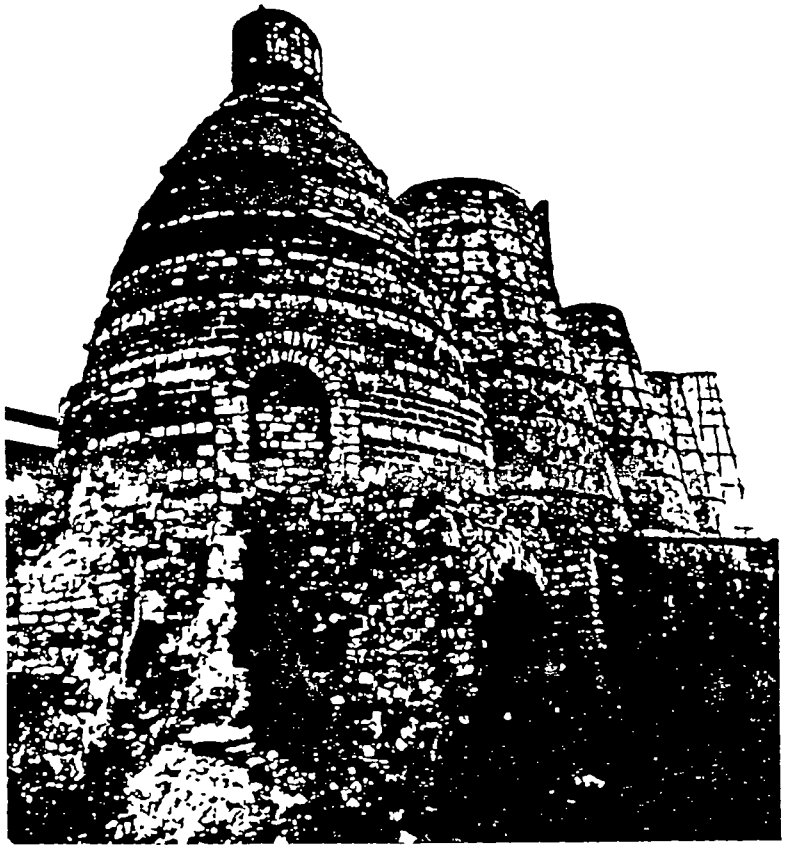
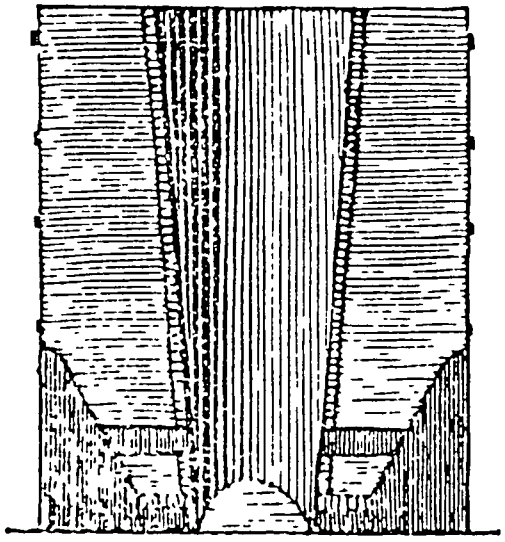
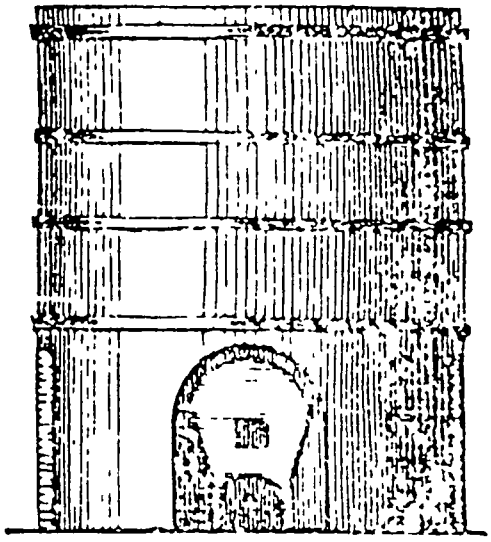


Fig 25. 19th Century bottle kilns at Northfleet cement works (Francis 1977, p 68)

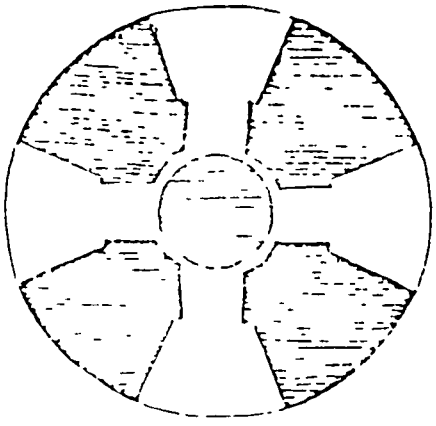
© Lancaster University Archaeological Unit March 1996



1. *Section.*



2. *Elevation.*



3. *Plan.*

Fig 26. An early cement kiln at Sheerness Dockyard (Pasley 1838, p 283)

© Lancaster University Archaeological Unit March 1996

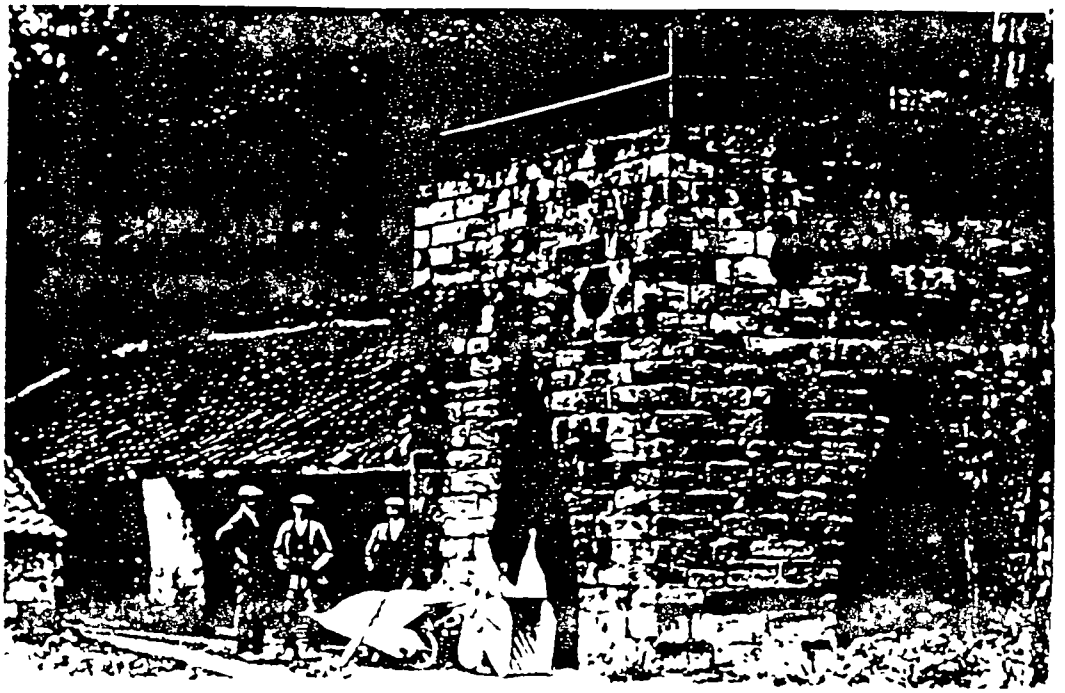


Fig 27. An early cement kiln at Sandsend (Francis 1977, p 35)

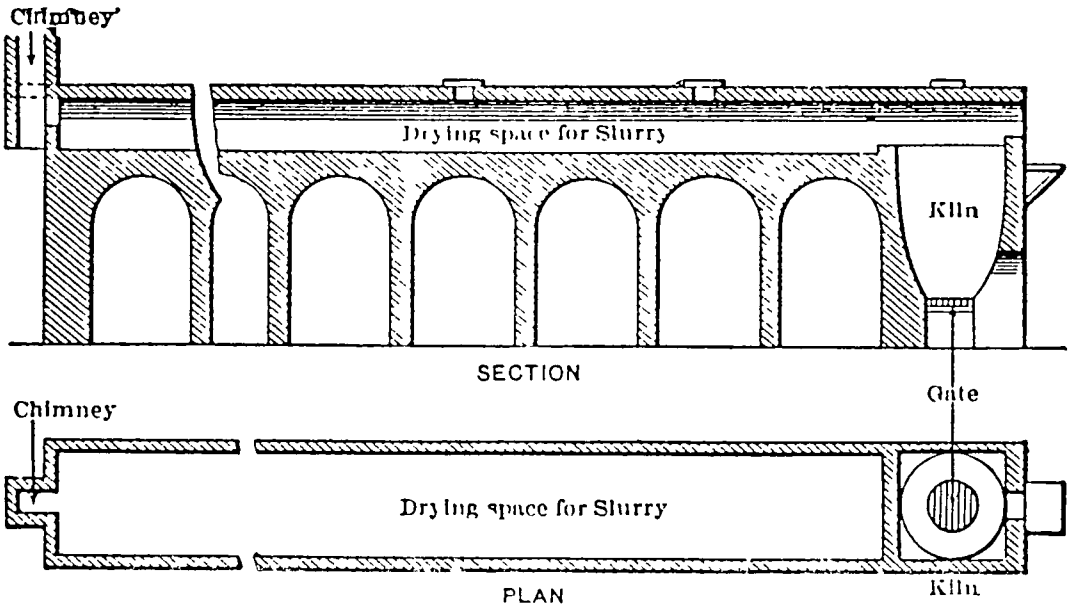


Fig 28. Johnson cement kiln (Eckel 1928, p 412)

© Lancaster University Archaeological Unit March 1996

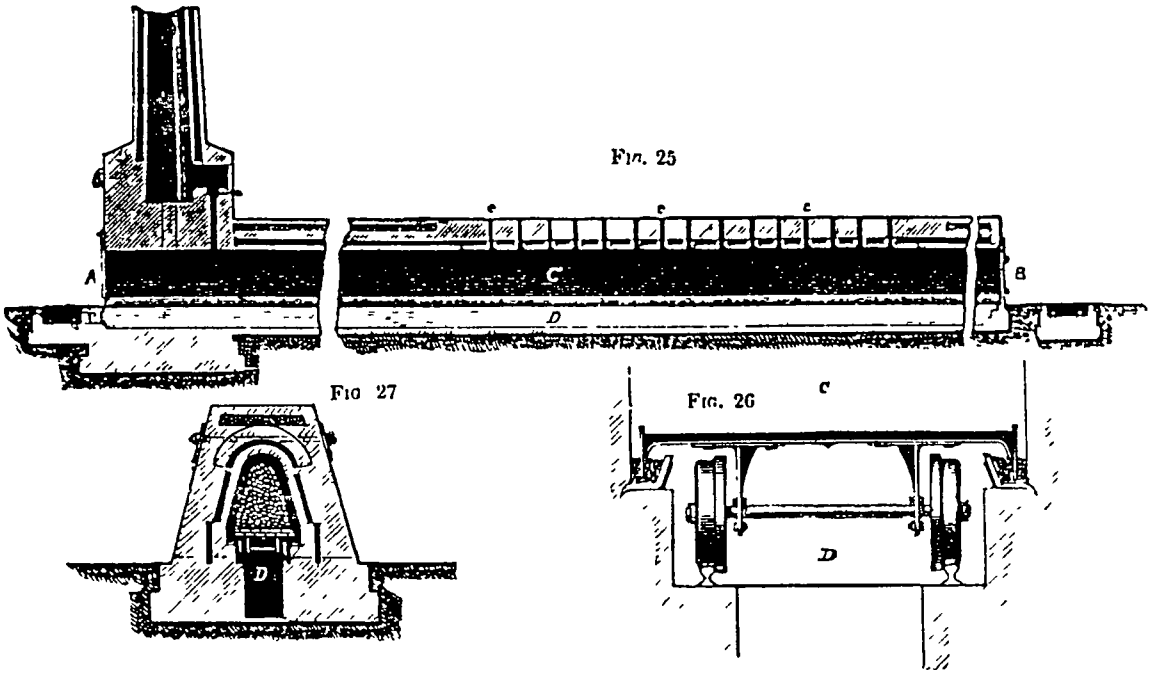


Fig 29. A late 19th Century tunnel kiln (Reid 1877, p 256)

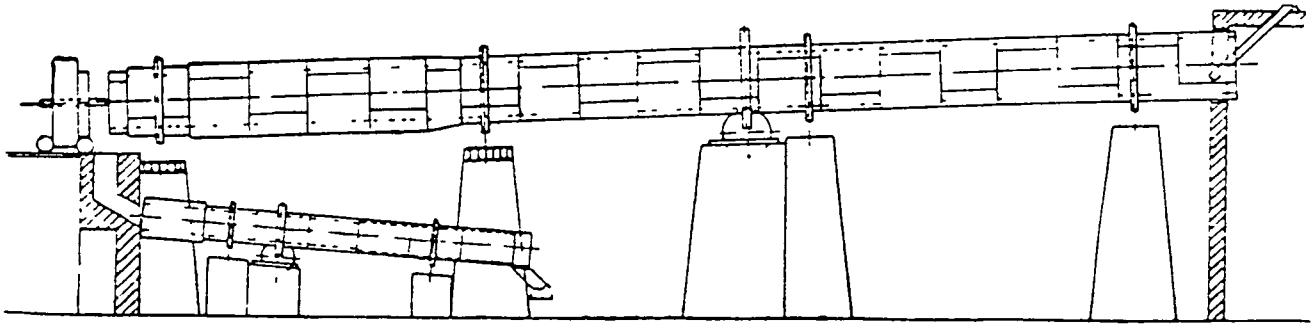


Fig 30. Rotary kiln (Searle 1935, p 375)

© Lancaster University Archaeological Unit March 1996

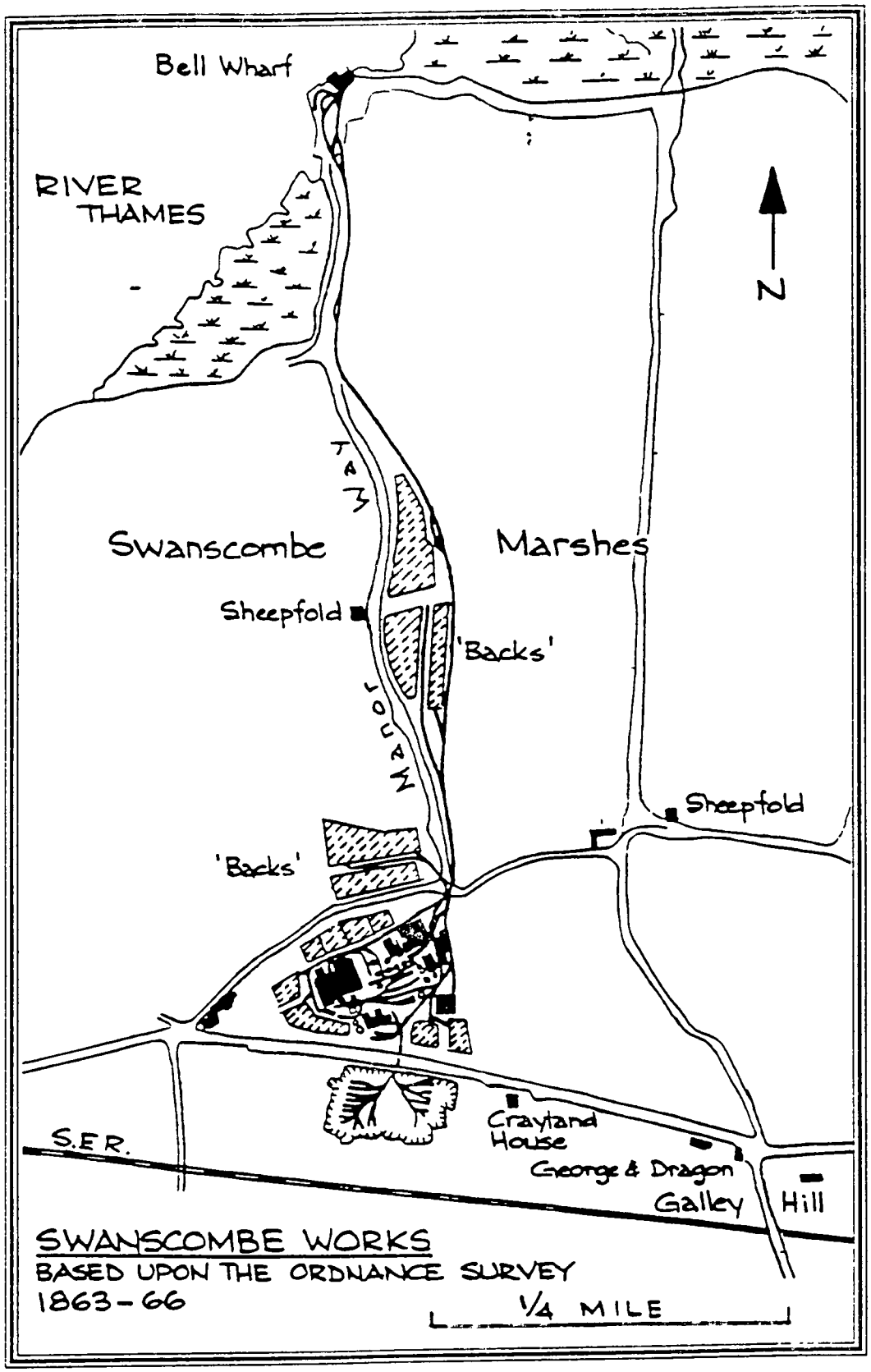


Fig 31. Plan of Swanscombe cement works in the 1860s (Fletcher 1995, p 18)

© Lancaster University Archaeological Unit March 1996

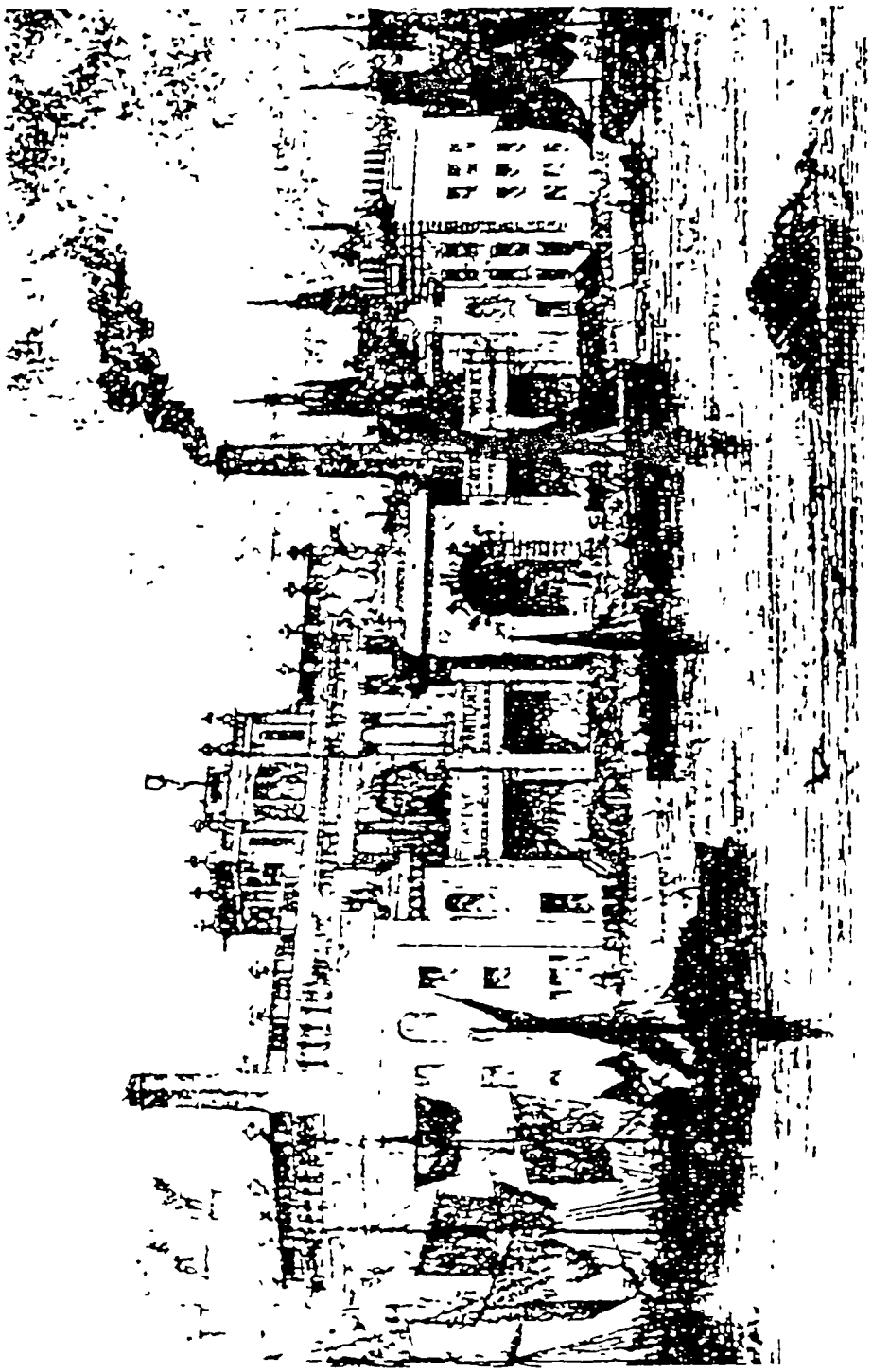


Fig 32. Aspdin's Gateshead cement works (Francis 1977, p 135)

© Lancaster University Archaeological Unit March 1996

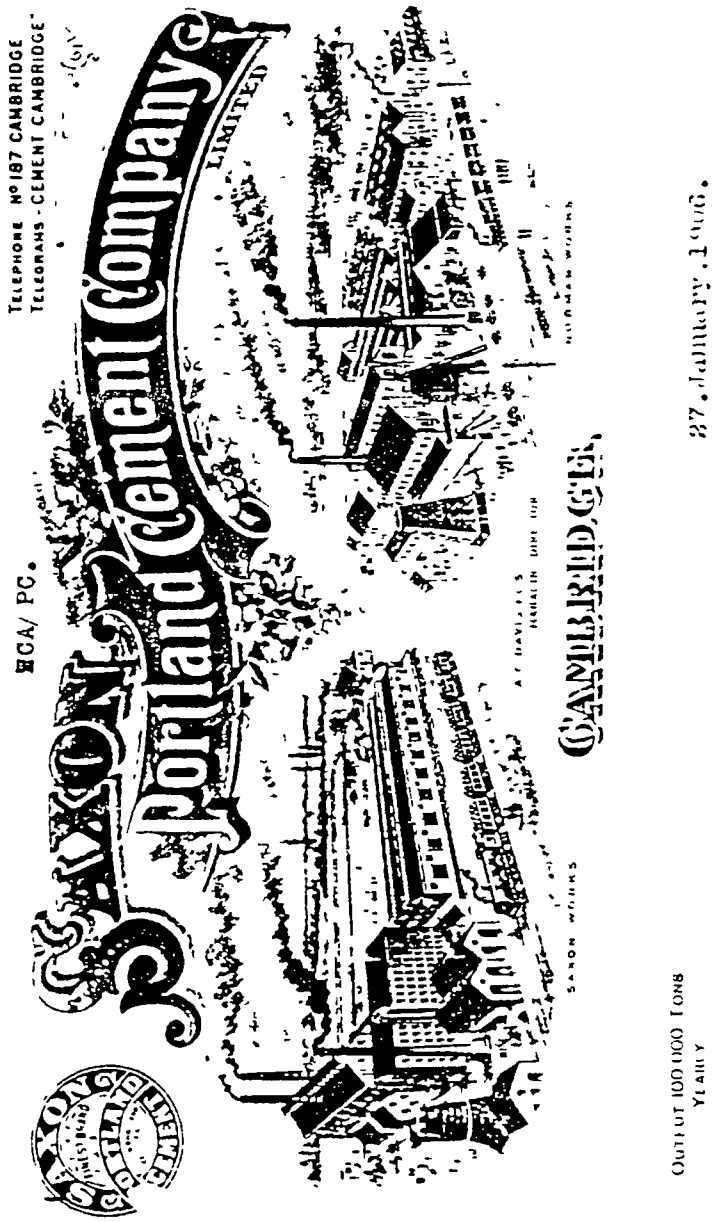


Fig 33. The Saxon cement works, Cambridge (Francis 1977, p 170)

© Lancaster University Archaeological Unit March 1996

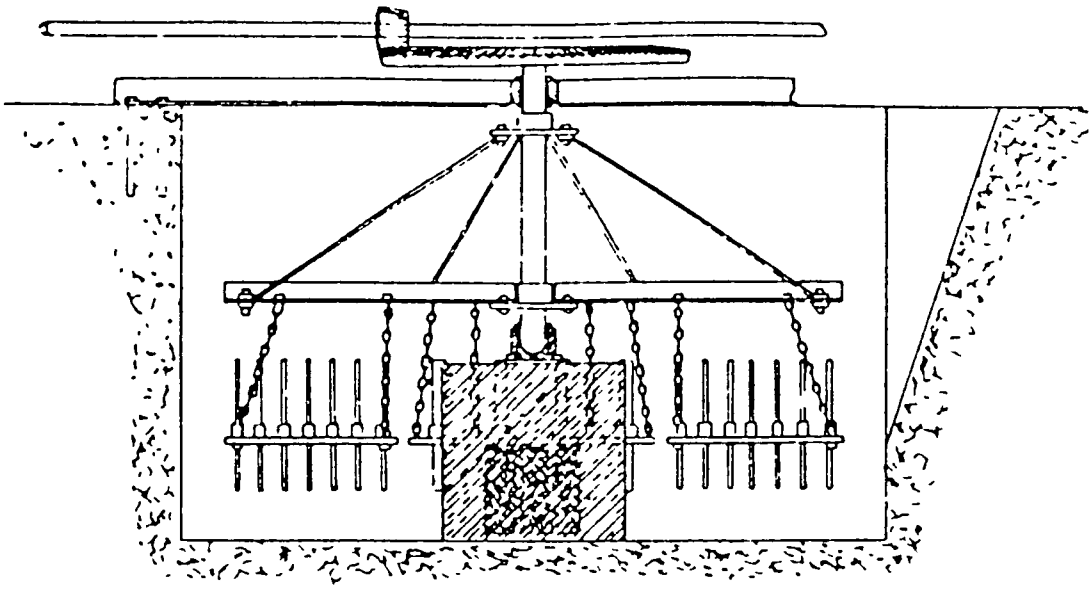


Fig 34. A 19th Century washmill (Francis 1977, p 132)

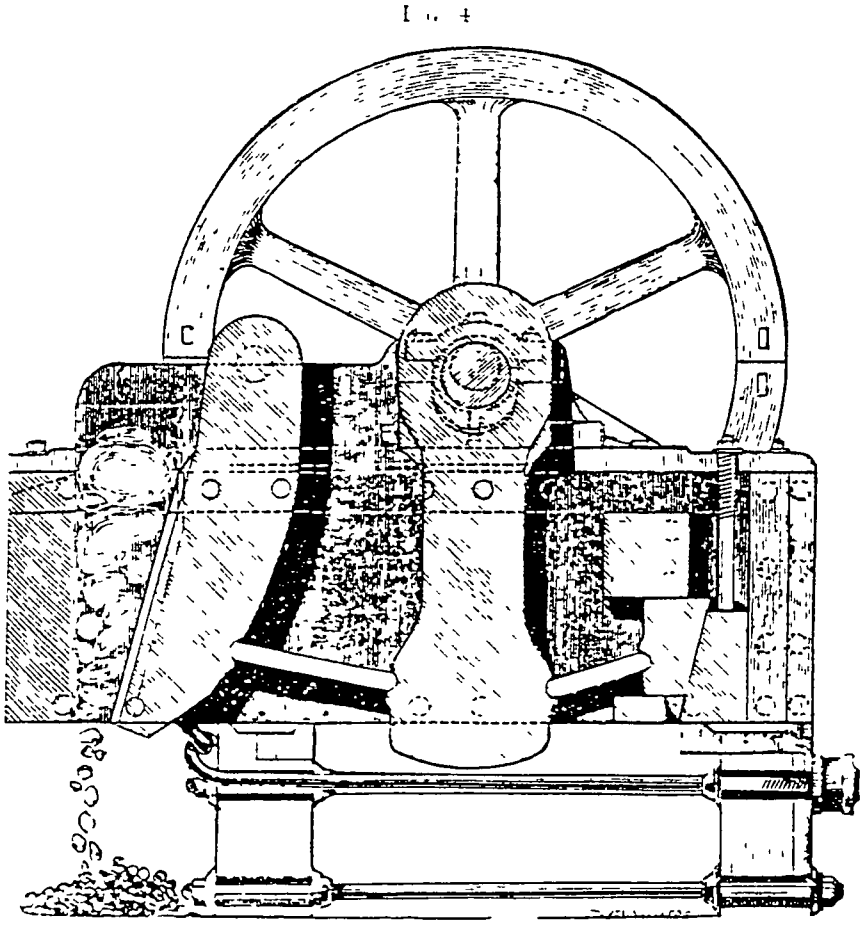


Fig 35. An example of stone crushing plant (Reid 1977, p 187)

© Lancaster University Archaeological Unit March 1996

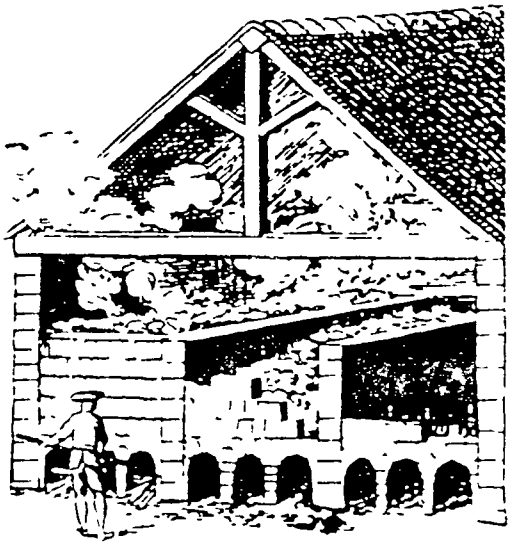


Fig 36. 18th Century French gypsum kiln (Diderot & d'Alembert, 1771-80)

Fig 37. Mountfield gypsum works (from a late 19th Century handbill) (GPDA 1977, p 6)

© Lancaster University Archaeological Unit March 1996

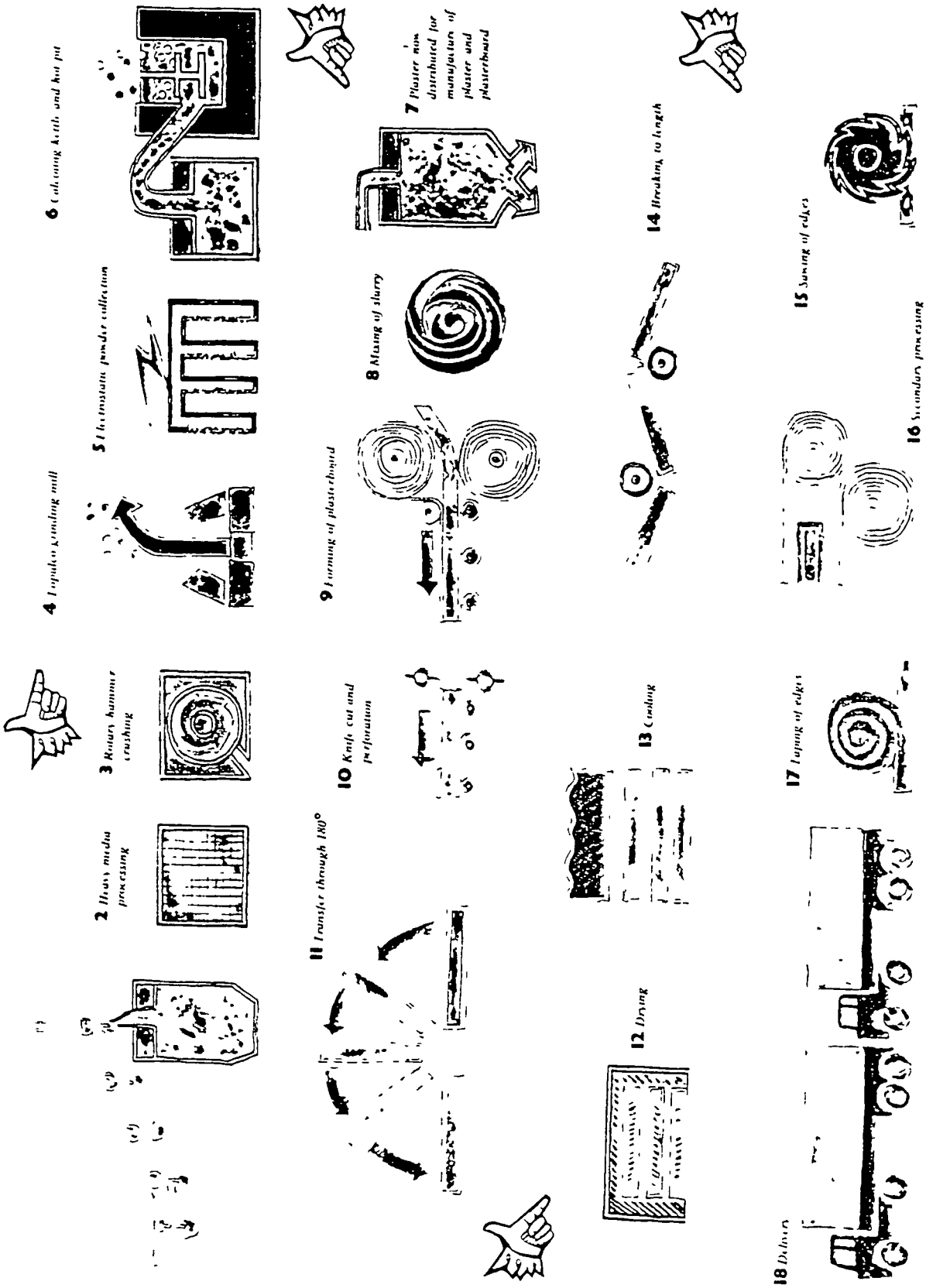


Fig 38. The process of gypsum platerboard production (GPDA 1974)

© Lancaster University Archaeological Unit March 1996

APPENDIX 2 - ADDRESS LIST FOR CIRCULATION

Individuals, Museums, National Organisations

Amberley Chalk Pits Museum (Robert Taylor, Director), Houghton Bridge, Amberley, Arundel, West Sussex BN18 9LT

David Alderton, 48 Quay Street, Halesworth, Suffolk IP19 8EY

Harry Beamish, National Trust, Northumbria Regional Office, Scots Gap, Morpeth, Northumberland NE61 4EG

David Bick, Pound House, Newent, Gloucestershire, GL18 1PS

British Geological Survey, Dr Brian Young, British Geological Survey, Murchison House, West Mains Road, Edinburgh EH9 3LA

Dr Ivor Brown, 95 Manygates Lane, Sandal, Wakefield, West Yorkshire WF2 7DL

Brian Dix, Northamptonshire Archaeology, 2 Bolton House, Wootton Hall Park, Mereway, Northampton NN4 8BE

Cornwall Archaeological Unit, Old County Hall, Station Road, Truro, Cornwall TR1 3EX

Cumbria Amenity Trust, Mrs S Barker, 411 West Shore Park, Barrow in Furness, Cumbria LA14 3XZ

Mr Michael Davies-Shiel, Micklethwaite, Annisgarth Park, Windermere, Cumbria LA23 2HX

Exeter Museums Field Archaeology Unit, RAM Museum, Queen Street, Exeter EX4 3RX

V Goodbury, via Hereford and Worcester County Archaeologist (on list of constant consultees)

Martin Hammond, St Annes, 13 Jackson Road, Parkstone, Poole, Dorset BH12 3AJ

Michael Havindon, Department of Economic History, Exeter University, Amory Building, Rennes Drive, Exeter EX4 4RJ

Tony Keates, Ellenboro, Newton in Cartmel, Grange over Sands, LA11 6JP

John Van Laun, 33 St Martins St, Hereford HR2 7RD

© Lancaster University Archaeological Unit March 1996

John Leach, Assistant Curator, Buxton Museum and Art Gallery, Buxton, Derbyshire.

Dr Stafford Linsley, Centre for Continuing Education, University of Newcasde-upon-Tyne, King George VI Building, The University, Newcastle-upon-Tyne, Tyne & Wear NE1 7RU

Gary Marshall, 27 Leckhampstead Road, Wicken, Milton Keynes MK19 6BY

Morwellham and Tamar Valley Tmst, Mr Garry Emerson, Morwellham Quay, Tavistock PL19 8JL

National Stone Centre, Ravenstor Road, Wirksworth, Derbyshire, DE4 4FY

Dr Miles Oglethorpe, RCAHMS, John Sinclair House, 16 Bernard Terrace, Edinburgh EH8 9NX

Tim Smith, 30 Gaveston Drive, Berkhamstead, Herts HP4 1JF

Society for Medieval Archaeology, Dr Paul Stamper, Archaeology Service, Shropshire County Council, Winston Churchill Building, Radbrook Centre, Radbrook Road, Shrewsbury, Shropshire SY3 9BJ

Society for Post-Medieval Archaeology, Department of Medieval and Later Antiquities, The British Museum, Great Russell Street, London WC1B 3DG

Paul Sowan, 96a Brighton Road, South Croydon, Surrey CR2 6AD

Ian Standing, Rock House, Bowens Hill, Coleford Glos GL16 8DH

Peter Stanier, 49 Breach Lane, Shaftesbury, Dorset SP7 8LF

Mr Phil Harding, Tmst for Wessex Archaeology, Portway House, Old Samm Park, Salisbury SP4 6EB

Don Wilcock, 26 Bede Terrace, Bowbum, Durham DH6 5DT

Alan Williams, The Archaeology Practice, Department of Archaeology, University of Newcastle upon Tyne, NE1 7RU

Richard Williams, 20 The Glebe, Shalford Road, Guildford, Surrey GU4 8BL

Association for Industrial Archaeology Affiliated Societies

National
Mr R Paulson, NAMHO, Holt House, Holt Lane, Lea, Matlock, Derbyshire, DE4 5GQ
Mike Gill, Northern Mine Research Soc, 38 Main Street, Sutton In Craven, Keighley, Yorkshire, BD20 7HD
Avon

© Lancaster University Archaeological Unit March 1996

Mr R H Fullagar, Bristol Industrial Archaeology Society, 37 Perrycroft Avenue, Bishopsworth, , Bristol, Avon, BS13 7RZ

Berkshire
Mr J D Asteraki, Berkshire Industrial Archaeology Group, 122 Reading Road, Finchampstead, Wokingham, Berkshire, RG11 4RA

Cambridgeshire
The Secretary, Cambridge Society For IA, c/o Station Road Cottages, Westwick, Oakington, Cambridge, Cambridgeshire, CB4 5AR

Cornwall
W Newby, Trevithick Society, 5 Fairfield Close, Lelant, St Ives, Cornwall, TR2 36JY

Cumbria
Miss C L Gamett, Cumbria Industrial History Society, The Garret, 135A Craig Way, Bowness-On-Windermere, Cumbria, LA23 3AX

Derbyshire
I Mitchell, Derbyshire Arch Soc, 159 Draycott Road, Sawley, Long Eaton, Nottinghamshire, NG10 3BX

Devon
Mr Pymm, Friends Of Morwellham, c/o Morwellham Quay, Tavistock, Devon, PL19 8JL

Dorset
Brenda Innes, Honorary Secretary, Dorset Industrial Archaeology Society, 10 Gold Hill, Shaftsbury, Dorset, SP7 8HB

Gloucestershire
Dr R Wilson, Gloucestershire Industrial Archaeology Society, Oak House, Hamshill, Coaley, Dursley, Gloucestershire, GL11 5EH

Greater London
Mary Mills, Recording Group Secretary, Greater London Industrial Archaeology Society (GLIAS), 24 Humber Road, London SE3 7LT
J R Hammond-Seaman, Meadhurst Club Industrial Archaeology Section, BP Research Centre, Chertsey Road, Sunbury On Thames, Middx, TW16 7LN

Greater Manchester
Mr S Little, Manchester Region Industrial Archaeology Society, 19 Gibsons Road, Stockport, Greater Manchester, SK4 4JX
Mr Neil Barlow, Saddleworth Historical Society, Carr Farm Cottage, Diggle, Oldham, Greater Manchester, OL3 5ND

Hampshire
Mrs Pam Moore Southampton University Industrial Archaeology Group, 20 Stourvale Gardens, Chandlers Ford, Hampshire, SO5 3NE

Kent

© Lancaster University Archaeological Unit March 1996

P S Jarvis, East Kent Mills Group, 16 Broadlands Crescem, New Romney, Kent, TN28 8JF

Lancashire
Hon Secretary, Northem Mill Engine Society, c/o 84 Watkin Road, Clayton-Le-Willows, Chorley, Lancashire, PR6 7PX

Leicestershire
via Marilyn Palmer (on list of constant consultees)

Lincolnshire
Mr G P Young, Society for Lincolnshire History & Archaeology, Jews' Court, Steep Hill, Lincoln, Lincolnshire, LN2 1LS

Merseyside
Adrian Jarvis, Chairman, Merseyside Industrial Heritage Society, National Museums & Galleries on Merseyside, Albert Dock, Liverpool, Merseyside, L3 4AA

Norfolk
D J Manning, Norfolk Industrial Archaeology Society, 223 St Faith's Road, Old Catton, Norwich, Norfolk, NR6 7AP

Northamptonshire
Miss Susan Lees, Treasurer, Kettering Civic Society, 16 Charles Street, Kettering, Northamptonshire
Geoffrey Starmer, Northamptonshire Industrial Archaeology Society, 34 The Crescent, Northampton, NN1 4SB

Nottinghamshire
Mrs P A Baker, Nottinghamshire Industrial Archaeology Society, 1 Bramble Gardens, Aspley, Nottingham, NG8 3EH

Oxfordshire
Mr P Coldwell, Vale of the White Horse Industrial Archaeology Group, 4 Hyde Road, Denchworth, Wantage, Oxfordshire, OX12 ODR

Shropshire
Mr K B Jones, Friends of Ironbridge Gorge, 2 Glee Rise, Little Wenlock, Telford, Shropshire, TF6 6AT

Somerset
Hon Secretary Somerset Industrial Archaeology Society, 2 Blake Green, Ashcott, Bridgwater, Somerset, TA7 9QF

South Yorkshire
Harold Taylor, Sheffield Trades Hist Society, 9 Hoober Road, Sheffield, South Yorkshire, S11 9SF

Staffordshire
Mrs E G Crabb, Staffs Industrial Archaeology Society, 'High Oaks', 13 Holly Hill Road, Cannock Wood, Rugeley, Staffordshire, WS15 4RE

Suffolk

© Lancaster University Archaeological Unit March 1996

Mr Steve Worsley, Suffolk Industrial Archaeology Soc, 24 Abbotsbury Close, Ipswich, Suffolk, IP2 9SD

Surrey
P Tarplee, Hon Secretary Surrey Industrial History Group, 'Donard', East Street, Bookham, Leatherhead, Surrey, KT23 4QX

Sussex
Ron Martin, Gen Secretary Sussex Industrial Archaeology Society, 42 Falmer Avenue, Saltdean, Brighton, Sussex (East), BN2 8FG

Tyne & Wear
Miss M Norwell Librarian, Literary & Philosophical Society, Newcastle Upon Tyne, Tyne & Wear, NE1 1SE

Warwickshire
Mr Martin J Green, Warwickshire Industrial Archaeology Society, 'Argyll', 2B Union Road, , Leamington Spa, Warwickshire, CV32 5LT

West Midlands
Mr Ron Moss, Black Country Society 56 Lawrence Lane, Cradley Heath, Warley, West Midlands B64 6EU

West Yorkshire
J A E Robinson, Halifax Antiquarian Society, 8 Savile Royd, Savile Park Road, Halifax, West Yorkshire, HX1 2EY

Wiltshire
The Secretary, Wilts Archaeological & Natural History Society, The Museum, 41 Long Street, Devizes, Wiltshire, SN10 1NS
Mr W Ineson, Halcrow Industrial Archaeology Group, Sir W Halcrow & Partners, Burderop Park, Swindon Wiltshire, SN4 0QD
Pam Slocombe, Wiltshire Buildings Record, Library & Museum Service Hq, Bythesea Road, Trowbridge, Wiltshire, BA14 8BS
John Watts, South Witshire Industrial Archaeology Society, 29 Salisbury Road, Fordingbridge, Hampshire, SP6 1EH

Worcestershire
Mr J Cooper, ISSES, 73 Coniston Way Blossom Hill, Bewdley, Worcestershire, DY12 2QA
Mrs J Wheatley, Worcestershireindustrial Archaeology & Local History Society, 4 Hazewood Close, Worcester, WR5 1RH
The Library, Worcestershire Archaeology Society, Commandery, Sinbury Worcester, Worcestershire WR1 2HU

Yorkshire
Margaret Smith Secretary Yorkshire Archaeological Society, 8 Roxholme Place, Leeds, West Yorkshire LS7 4JQ

© Lancaster University Archaeological Unit March 1996