

Peter J. Priess

**An Annotated
Bibliography
for the Study of
Building Hardware**



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21 History and
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An Annotated Bibliography for the
Study of Building Hardware

Peter J. Priess

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Abstract

Building hardware is an important subject for both the historical archaeologist and the restorationist. However, neither profession appears to be involved in any extensive research of it. To provide some degree of assistance, comments are provided for several hundred references. These are arranged in categories of general references, bolts (including nuts), brackets, fasteners, grilles and railings, gutter supports, grates, hasps, hinges, knockers, latches, locks (including keys and padlocks), nails, roofing, screws, shutter catches, sliding bolts, timber anchors and wall anchors. The references come from a variety of sources, have been written for various purposes and often are only of limited value.

Submitted for publication 1976
by Peter J. Priess,
Parks Canada, Winnipeg.

Introduction

The subject of building hardware is important to both the historical archaeologist and the restorationist. The historical archaeologist, involved in the excavation and interpretation of structural remains, needs an understanding of the building hardware recovered to better understand such structures and the people who built and used them. The restorationist, involved in the restoration or reconstruction of a building, must consider the question of appropriate hardware to be installed. However, an examination of the published works in either of these professions suggests that a strong or widespread interest or concern does not exist. This lack is further reflected in the fact that a request for information on references, made through the newsletters of an association for historical archaeologists and an association for restorationists, produced no more than a single response. Presentations on building hardware in the reports of archaeologists are often brief, general and occasionally inaccurate, therefore contributing little for comparative purposes. The restorationist, on the other hand, seldom bothers to record for publication the process of selecting hardware for a building. The researcher in either profession who may wish to do more extensive research finds little encouragement or assistance in the published works of his associates.

An annotated bibliography can not offset existing deficiencies. It can do no more than direct attention to existing sources of information and offer some comment on their relative merits as an aid for anyone who may wish to venture into the subject. It is not a substitute for what has not been done in the past but can be of some help for work in the future.

The references considered indicate the diversity of sources for information and also the fact that a sustained research effort does not exist for the subject. Many have been written from a diversity of perspectives and for a multitude of purposes, often not providing adequate answers for the questions of the archaeologist or restorationist. Early interests, such as those of Henry C. Mercer of Albert H. Sonn during the early 20th century, were not continued by others. At present the writings of Donald Streeter represent the most substantial effort to publish

information, based on many years experience as a blacksmith and collector.

The bibliography is not an attempt to include any and all sources which include some mention of building hardware. In particular, it does not include every archaeological site report which mentions building hardware. Most contain no more than brief descriptions, inadequate illustrations and little discussion or interpretation. The inclusion of all such reports would have considerably lengthened the bibliography but little else would have been gained by it. The objective has been to consider references which set out to discuss building hardware, whether the results be good or bad, useful or not.

The annotations consist primarily of comments on content but occasionally also include comments on limitations or acknowledgement of items considered particularly worthwhile. In many instances the value of a reference will depend on the concerns and interests of the particular researcher and a specific research problem. Therefore, it is not entirely appropriate to provide recommendations on many of the items.

One type of reference which has not been searched extensively is the carpenters' manual of the 18th or 19th centuries. A number were examined and found to contain little or no mention of the subject. Therefore, a sustained effort to locate and evaluate a larger number of them was not undertaken.

A general note of caution must be introduced on the various encyclopaedias of the late 18th and 19th centuries. It is obvious that the authors borrowed freely from each other but usually without acknowledgement of the debt. The value of such contributions is lessened considerably as information is repeated without being brought up to date. Information may easily be out of date by as much as half a century.

The references are grouped by subject and presented in alphabetical order, preceded by a general section for those studies which consider more than one category of hardware. For some categories there are no entries within their own section, either because no references exist or because they are considered only by references in the general section. The categories considered are bolts (including nuts), brackets, fasteners, grilles and railings, gutter supports, grates, hasps, hinges, knockers, latches, locks (including keys and padlocks), nails, roofing, screws, shutter catches, sliding bolts, timber anchors and wall anchors.

General References

Many of the items considered in this section are dictionaries or encyclopaedias of the late 18th or 19th centuries. This type of source has not been exhausted by any means.

American Architect and Building News, The (title varies)
1888

"Builders' Hardware - I." Vol. 24, No. 657, p. 39. Boston.
A brief introduction to a series of articles on building hardware, providing no substance for hardware research.

1888

"Builders' Hardware. - II. Metals and Varieties of Finish."
Vol. 24, No. 659, pp. 61-3. Boston.
An article intended for architects and builders of the time, providing an outline of the various metals used for building hardware and the ways in which they can be finished.

1927

"Door Furniture." Vol. 131, pp. 249-53. New York.
The concern is with the criteria to be applied for the successful design of modern hardware. Historic hardware is considered only briefly, as a source of some inspiration for modern designs, but the discussion provides no substance for the research of early hardware.

Aitken, W.C.

1876-77

"Guns, Nails, Locks," in George Philips Bevan, ed. British Manufacturing Industries. E. Stanford, London. 15 vols.
Vol. 3.

This item has not yet been examined.

A New Royal and Universal Dictionary of Arts and Sciences:
Or the Complete System of Human Knowledge
1770-71

Printed for J. Cooke, London. 2 vols.
 Brief entries for locks, hinges and bolts are included. The section on bolts is concerned primarily with bolts for ships. The sections on locks and hinges list types and some uses. The principle parts for spring locks are also listed.

Architecture moderne ou l'Art de bien batir
 1728

Claude Jombert, Paris.

The types of hardware required, especially for windows and doors, are listed and briefly described.

Benjamin, Park, ed.
 1882

Appletons' Cyclopaedia of Applied Mechanics: A Dictionary of Mechanical Engineering and the Mechanical Arts. D. Appleton and Co., New York. 2 vols.

Entries are included for screws, bolts, nails and locks. The major emphasis, at least for the screws and nails, is on manufacture and the description of various production machines. The concern is more with contemporary production with little mention of earlier forms or the development of technology. One of the nail machines described cuts a nail blank on the forward and return pass of the blade, thereby cutting from opposite sides without having to turn the plate over.

Blankley, Thomas Riley
 1750

A Naval Expositor, Shewing and Explaining the Words and Terms of Art Belonging to the Parts, Qualities, and Proportions of Building, Rigging, Furnishing, and Fitting a Ship for Sea also all Species that are Received into the Magazines, and on what Services they are Used and Issued Together with the Titles of all the Inferior Officers belonging to a Ship, with an Abridgment of their Respective Duties. Printed by E. Owen, London.

The emphasis is naturally on ships and ship building but brief entries for bolts, hasps, hinges and locks are included, listing types and to some extent functions.

Blondel, J.F. and M. Patte
 1777

Cours d'architecture ou traite de la décoration, distribution et construction des batiments. Dessaint, Paris. A section on ironwork or hardware includes a list of types of available bar stock and goes on to list and describe, with some illustrations, the types of hardware required for various parts of a building.

Brownell, Adon H.
1940

Taking the Mystery out of Builders' Hardware. Hardware Age, New York.

Based on comments made by the author in a later work, Hardware Age Builders' Hardware Handbook, this appears to be concerned only with modern hardware.

1956

Hardware Age Builders' Hardware Handbook. Chilton Co., Philadelphia.

This work is considered as "a text for the use of individuals, for manufacturers' training classes, and for regional group instruction" to provide the "builders' hardware consultant" with a "firm start" in his career. The subject matter is modern hardware only. It is of some value as a source of terminology.

Bullock, Orin M., Jr.
1966

The Restoration Manual. Silvermine Publishers Inc., Norwalk.

Only a brief mention of the importance of hardware in restoration is included, not going beyond a general indication of where to look for clues for the original hardware on a building. There is no information on hardware categories, differences in form or manufacture or other characteristics.

Butter, F.J.
1968

An Encyclopaedia of Locks and Builders Hardware. Josiah Parkes and Sons, Willenhall, England.

Although intended for the present-day distributor and user of locks and builders hardware, this is an excellent source for terminology and explanations of the details of building hardware with an emphasis on locks of all types. Historical information is included in some of the entries. Many readers may be surprised at the amount of terminology available. Of all the available glossaries this is by far the most extensive and most useful.

Chamberlain, Samuel
1928

"Notes on Old Wrought Iron." The American Architect, Vol. 133 (January 20), pp. 101-7. New York.

A collection of illustrations of building hardware from various European countries and time periods in the collection of the Victoria and Albert Museum; of limited value for comparative purposes.

Cleere, H.F.

1958

"Roman Domestic Ironwork as Illustrated by the Brading, Isle of Wight, Villa." London University Institute of Archaeology, Bulletin, No. 1, pp. 55-74. London.

The material presented is much earlier than any hardware in North America but is of some interest for comparative purposes.

Collison, Robert

1966

Encyclopaedias: Their History Throughout the Ages. 2nd ed. Hafner Publishing Co., New York.

A useful source for evaluating a large number of early encyclopaedias, some of which may include entries for categories of building hardware. German and French encyclopaedias are included.

Dow, George Francis

1926

"Old English Pattern Books of Hardware Used in the Building and Cabinet Maker's Trades." Old Time New England, Vol. 17, No. 1, pp. 30-41. Boston.

A brief mention of a number of late 18th- or early 19th-century pattern books discovered in Salem, Massachusetts. A small number of illustrations are included. This item is of greater value for recording the existence of the pattern books than for its discussion of building hardware.

1927

The Arts and Crafts in New England, 1704-1775: Gleanings from Boston Newspapers. The Wayside Press, Topsfield, Mass.

The relatively brief chapter on hardware contains some listings of building hardware; the chapter on trades and occupations includes infrequent mention of crafts relating to building hardware.

DuHamel du Monceau, H.

1767

Art du serrurier. Descriptions des arts et metiers, faites ou approuvées par Messieurs de l'Academie Royale des Sciences. L.F. deLatour, Paris.

An extensive discussion of hardware, with an emphasis on locks, accompanied by numerous illustrations. The total value of this work has not yet been established. It should be noted that some of the plates date half a century before publication of the text.

Eastlake, Charles L.
1872

Hints on Household Taste in Furniture, Upholstery, and Other Details. James R. Osgood and Co., Boston.

Much of this work is not directly relevant but the author includes criticisms of contemporary hardware styles, reflecting his preference for earlier styles over butt hinges and door locks with bolts and spindles.

Félibien, André
1697

Des principes de l'architecture, de la sculpture, de la peinture, et des autres arts qui en dependent. 3rd ed.

Chez la Veuve and Jean Baptiste Coignard, fils, Paris.

A chapter on hardware (serrurerie) is included in the section on architecture. The various types of iron and steel are described briefly, the tools of manufacture are listed and hardware types and some manufacturing techniques are described briefly. Two plates of building hardware illustrations are included. According to Smith and Sisco (1961) most of the information is derived, without credit, from Jousse (1627).

Ferguson, Eugene S.
1968

Bibliography of the History of Technology. The Society for the History of Technology and the MIT Press, Cambridge, Mass.

Although not specifically intended for building hardware, this work provides useful assessments of references which may include building hardware among their subject matter and can direct attention to references which have not been included in the present compilation.

Forman, Hanry Chandlee
1941

"The Old Hardware of James Towne." Antiques, Vol. 39, No. 1 (January), pp. 30-2. New York.

A brief article touching on the history of the site and examples of some of the hardware recovered during archaeological excavations. Most of the hardware mentioned and illustrated is building hardware, including hinges, locks and keys. There is more emphasis on historical

records than archaeological context. The data is of some general value for comparative purposes.

Frank, Edgar B.
1950

Old French Ironwork. Harvard University Press, Cambridge, Mass.

Approximately half of the book is concerned with building hardware, primarily locks, padlocks and keys. The developments in each category are briefly described and numerous examples are illustrated. Most of the illustrated material is relatively ornate.

Gardner, J. Starkie
1911

English Ironwork of the XVIIth and XVIIIth Centuries; An Historical and Analytical Account of the Development of Exterior Smithcraft. B.T. Batsford, London.

The subjects consist of gates, railings, grilles, balustrades, balconies, stair ramps, lampholders, brackets, signs and vanes. The section on gates comprises approximately two-thirds of the text. The information is more likely to be of particular interest to the restorationist.

1922

Ironwork Part III. - A Complete Survey of the Artistic Working of Iron in Great Britain from the Earliest Times. Victoria and Albert Museum, London.

1927

Ironwork Part I. From the Earliest Times to the End of the Mediaeval Period. 4th ed., rev. by W.W. Watts. Victoria and Albert Museum, London.

1930

Ironwork Part II. Continental Ironwork of the Renaissance and Later Periods. Rev. by W.W. Watts. Victoria and Albert Museum, London.

In these three works, ironwork is considered as an architectural and decorative art form. The information provided is more likely to be of interest to the restorationist.

Goodwin-Smith, R.
1937

English Domestic Metalwork. F. Lewis (Publishers) Ltd.,
Leigh-on-Sea, Essex.

The presentation is divided into three sections: old, reproduction and modern metal. Only the first of these is directly relevant for building hardware research and then only where it considers "Metal-Work of the Door" and key escutcheons. Most of the first part deals with domestic metalwork. Each category is accompanied by a brief introduction and a number of illustrations. The sources for the illustrated items are usually noted and general dates, such as 16th or 17th century, are given. Much of the material is earlier than most hardware in North America.

The opening section on metal working includes the assertion that old ironwork, if it has been used on the inside of a house, will have "a 'housey', domestic sort of smell, hard to describe, but unmistakable" when heated. Furthermore, this feature is supposed to persist no matter how long the piece has been removed from the house.

Graham, Frank D. and Thomas J. Emory
1923

Audels Carpenters and Builders Guide #1. Theo. Audel and Co., New York.

Nails, screws and bolts are each discussed in a separate chapter, giving information on types, terminology and attributes. The chapter on nails also has a brief, undocumented historical sketch. Other editions of this work are presumably similar.

Great Britain. War Office.
1832

Orders and Regulations for the Guidance of the Corps of Royal Engineers and Royal Sappers and Miners at Home and Abroad. HMSO, London.

Building hardware is mentioned briefly in three instances, providing regulations for the use of locks, nails and window hardware.

1898

Priced Vocabulary of Stores used in her Majesty's Service. HMSO, London.

In addition to the information on prices of the period, this work provides an extensive indication of the varieties of hardware being used. For example, there is still a heavy emphasis on the use of wrought nails at a time when wire nails were already gaining popularity in North America. Earlier editions of such a work would also be extremely useful but their existence has not yet been established.

Greeley, Horace, et al.
1872

The Great Industries of the United States: Being an Historical Summary of the Origin, Growth, and Perfection of the Chief Industrial Arts of this Country. J.B. Burr and Hyde, Hartford.

Chapters on hinges, nails and screws are included. For the most part the discussions are general and provide little substance for research. A number of patents for hinges are described and the technology of production of screws and some of the significant patents are outlined. The screw-nail is mentioned, but there is no discussion of its origin.

Hebert, Luke
1836

The Engineer's and Mechanic's Encyclopaedia, Comprehending Practical Illustrations of the Machinery and Processes Employed in Every Description of Manufacture of the British Empire. Thomas Kelly, London. 2 vols.

Entries are included for hinges, locks, nails and screws. Various hinge types are described, including more detailed descriptions of several recently developed types. A range of lock forms and functions and a number of contemporary patents are discussed at some length. The section on nails considers wrought, cut and cast types; for wrought nails the concern is primarily with types and uses, for other nails the focus is on manufacture. Although the gains of cut nails over wrought nails are not acknowledged, the description of cut-nail technology is considerably longer. The section on screws is primarily a brief description of manufacture. To date it has not been established that the material in this encyclopaedia was borrowed from any earlier work.

Holland, John
1831-33

A Treatise on the Progressive Improvement and Present State of the Manufactures in Metal. Printed for Longman, Rees, Orme, Brown, Green and Taylor, London. 3 vols. Vols. 1-2, Iron and Steel.

The consideration of building hardware is limited to two chapters. The chapter on nails and screws presents a general and outdated description of cut-nail technology; heading is seen as still primarily a hand operation with the mention of heading machines limited to one sentence. Screw nails are mentioned but no future is foreseen for them. The chapter on locks is concerned mainly with a small number of patents such as those of Bramah and Chubb.

Innocent, C.F.

1971

The Development of English Building Construction. David and Charles, Newton Abbott, Devon. Reprint of 1916 ed.

The very early development of locks and latches is traced briefly.

Jousse, Mathurin

1627

La fidelle ouverture de l'art de serrurier, ou l'on void les principaulx préceptes desseings et figures touchant les expériences et opérations marvelles dudict art. Georges

Griveau, La Flèche.

This work is important in being one of the earliest on the subject and in the amount of information it provides. The descriptions include metals and tools and although they focus on the manufacture of various types of locks, they also include other types of building hardware and hardware for such items as wheelchairs and artificial limbs. In some instances a considerable amount of detail is provided as, for example, one chapter which lists and illustrates 74 different wards for the bit of a key.

1889

Reproduction of Illustrations of Ornamental Metal Work forming l'Art du Serrurier: Fleche; G. Griveau, Printer 1627. W. Griggs, London.

Although this work has not been examined, it has been characterized by Smith and Sisco (1961: 132) as inspired because of the author's florid designs but reproducing nothing of technological interest.

Kauffman, Henry J.

1966

Early American Ironware; Cast and Wrought. Charles E. Tuttle, Rutland, Vt.

Chapters on locks and nails are relatively brief and provide a general discussion of forms and history. The nail chapter briefly characterizes hand-manufacture and the introduction of cut-nail technology. The chapter on locks is occasionally incomplete - for instance in not differentiating adequately between plate and plain stock-locks - and occasionally inaccurate, such as in its opinion of what is the most frequently used padlock form in North America.

Kelly, J. Frederick

1924

The Early Domestic Architecture of Connecticut. Yale University Press, New Haven.

In contrast to similar works by others, this book includes a chapter on hardware in which various forms and the general historical development of a number of categories is briefly discussed and illustrated.

Knight, Charles
1851

Cyclopaedia of the Industry of all Nations. Charles Knight, London.

Locks and nails are each considered to the extent of approximately one page. The section on locks is mostly a general description of the ward and the tumbler as the two major types of mechanisms, the forms of keys, lock types and the British lock industry; the section on nails provides a brief description of a number of manufacturing techniques, including nail cutting.

Laboulaye, Ch., ed.
1881-82

Dictionnaire des arts et manufactures et de l'agriculture: descriptions de l'industrie française et étrangère. 5th ed. Librairie du Dictionnaire des Arts et Manufactures, Paris. 4 vols.

The sections on serrurerie in volumes 3 and 4 describe and illustrate a variety of building-hardware types, as well as other categories of metal work.

Lessard, Michel and Hugette Marquis
1972

Encyclopédie de la maison québécoise. Les Editions de l'Homme Ltée., Montreal.

Building hardware is considered in a relatively brief section, consisting of general comments on the nature of various categories with some illustrations. The specific context of some of the illustrated items is noted; dates given are usually general such as 18th or early 19th century. A brief section on sheet-metal roofing is also included.

Lindsay, John Seymour
1964

An Anatomy of English Wrought Iron. Alec Tiranti, London. The last section on casement fasteners and door mounts is most relevant, providing illustrations and some description of latches, hinges, sliding bolts and door knockers. The treatment of any one category is brief. Elsewhere the presentation is organized chronologically, beginning with

Nordic influences, and consists primarily of illustrations. Many of the illustrations are of railings or other similar devices. Several Suffolk-type latches are illustrated but designated as Norfolk. One Suffolk latch, dated 1630, has a pivot section for the lift bar.

McKenna, Edward L.
1929

Hardware. R.M. McBride, New York.
A novel, of no relevance!

Mercer, Henry C.
1924

"The Dating of Old Houses." Old Time New England, Vol. 14, No. 4, pp. 170-90. Boston.

This is one of a small number of studies from the early 20th century providing a discussion of nails, screws, hinges and thumb latches. Most of its conclusions should be considered as dated; a number are inadequate, and others have been shown to be incorrect. Unfortunately, it has been used even recently as the major, if not the only, source for the interpretation of building hardware from some archaeological sites. It can be read for historical interest but many of its conclusions should no longer be taken too seriously.

Miche, Alexandre
1812

Nouvelle architecture pratique, ou bullet. H.-J. Hoyois, Mons.

The various types of building hardware are listed and briefly described.

Moxon, Joseph
1703

Mechanick Exercises: Or the Doctrine of Handy Works. 3rd. ed. Printed for D. Midwinter and T. Leigh, London. Relevant information is found in the sections on smithing and house carpentry in which the forging of hinges, locks and screws and the hanging of doors and windows are described in some detail.

Nash, George
1913

"Some Early American Hardware, an Interesting Collection of Dutch Colonial Examples." The Architectural Record, Vol. 34, pp. 329-33. New York.

Consisting of brief comments, with illustrations, of a number of categories of building hardware. All of the items discussed are considered to be Dutch. The information provided is slight and the identification of some of the

material as Dutch is questionable. Among others, the designation of Dutch is applied to H and HL hinges and Norfolk-type thumb-latches.

Neve, Richard
1726

The City and Country Purchaser, and Builder's Dictionary: Or the Compleat Builders Guide. 2nd ed. Printed for Brown, Sprint, Conyers and Rivington, London.

Information on building hardware is included in the entries for bolts, hinges, hooks, latches, locks and nails. For the most part these consist of lists of types with further information on sizes, functions and prices. This is one of the few sources of the period which provides this type of information.

Noël Hume, Ivor
1970

A Guide to the Artifacts of Colonial America. Alfred A. Knopf, New York.

This is an attempt to consider artifacts discovered during the excavation of sites in the New World with the further limitation that the discussions are concentrated on British American materials of the 17th and 18th centuries. The presentations on building hardware are limited to hinges, locks and padlocks, and nails. Each presentation is relatively brief and, although some useful information is provided, the serious researcher must soon turn to other sources for further details. A major shortcoming is the absence of any consideration of a number of other categories of building hardware.

Although the information provided for each artifact category is brief, the book should be considered important for its introductory discussion on the contribution of artifacts and artifact research to the study of North American history.

Nutting, Wallace
1965

Furniture of the Pilgrim Century (of American Origin) 1620-1720. Dover Publications, New York. Reprint of 1924 ed.

In the opening of the section on "wrought iron in America," the author states that "within a recent period much interest has been aroused in this subject" and then sets out to describe and illustrate some examples of wrought-iron hardware. Unfortunately this appears to have been the interest of the collector rather than the serious student. The building hardware considered is primarily thumb latches and hinges, consisting of examples from various collections

and sources. The descriptions accompanying the illustrations are brief and general; dates are usually not given in any detail. Some items are characterized as interesting, quaint or important but the reasons for this are not made apparent. The section as a whole has a limited value: it may demonstrate the diversity of forms of wrought-iron building hardware but this purpose is achieved better by Sonn who has better illustrations and documentation.

Prechtl, Johann Joseph, Ritter von, ed.
1830-55

Technologische Encyklopädie oder Alphabetisches Handbuch der Technologie, der Technischen Chemie und des Maschinenwesens.
J.G. Cotta, Stuttgart. 20 vols.

This is a work worth consulting if only copies of it were more readily available. Its value lies in the information it provides on form, technology and manufacture. As an example, the section on nails provides a better discussion on cast nails and nail casting than is available almost anywhere else, but the contribution of French technology to the development of wire nails is mentioned only briefly and there is no acknowledgement of American contributions to the development of cut-nail technology. The discussion of both cut and wire nail technologies includes information not considered in other sources. The section on locks is 140 pages in length and one on screws is over 270 pages.

Priess, Peter J.
1971

"History Swings on a Poorly Described Hinge: Reflections on the State of Research in Building Hardware." Association for Preservation Technology, Bulletin, Vol. 3, No. 4, pp. 31-9. Ottawa.

This is an evaluation of the state of research on building hardware, generally lamenting the lack of adequate research. Although the sentiments were first expressed several years before publication, they are still valid today.

Pruden, Theodore, ed.
1974

"Historic Hardware in the United States and Canada." Association for Preservation Technology, Newsletter, Vol. 3, No. 3, supplement.

This represents another attempt at compiling a bibliography, without annotations, intended more for the restorationist. In addition to information on references, it includes lists of authorities, collections and manufacturers of reproductions. The entire effort is only partially

successful because of the limited response to appeals for information.

Rempel, John I.
1967

Building with Wood and other Aspects of Nineteenth-Century Building in Ontario. University of Toronto Press, Toronto.
The mention of building hardware, mainly nails, appears in extracts of agreements of the 18th century and in a history of nail technology. The latter is also related to changes in construction techniques, primarily the introduction of balloon framing. The overall contribution to the study of building hardware is slight.

Salzman, L.F.
1967

Building in England Down to 1540: A Documentary History. Clarendon Press, Oxford.
The period under consideration here is earlier than for sites in North America but the listing and discussion of hardware categories, in the chapter on ironwork and nails as well as scattered through other chapters, provide a good indication for the antiquity of some of the hardware types and terminology of the New World, especially as it relates to the English colonies. The presentation is enhanced by numerous quotations from various early documents.

Schiffer, Herbert
1966

Early Pennsylvania Hardware. Whitford Press, Whitford, Pennsylvania.
This brief work is intended as an aid in the selection of appropriate hardware for period restorations. Various categories of building hardware are considered through brief descriptions and a number of illustrations. The information provided, including dates and date ranges, is general and intended only for application to situations in Pennsylvania.

Small, Tunstall and Christopher Woodbridge
1931a

English Wrought Ironwork Mediaeval and Early Renaissance: A Portfolio of Full Size Details. The Architectural Press, London.

1931b

English Wrought Ironwork of the Late 17th and Early 18th Centuries. A Portfolio of Full Size Details. The Architectural Press, London.

Both publications are concerned primarily with ironwork as an art form.

Sonn, Albert H.
1928

Early American Wrought Iron. Charles Scribner's Sons, New York. 2 vols.

In the foreword the author notes his intention to compile a record of examples of early hardware for "the edification and enjoyment of future generations" before all such examples disappear. To accomplish this task he has put together a collection of 320 plates, arranged into categories of building hardware, with a brief introductory discussion for each category. Each item illustrated is identified, as is the building on which it is or was located. Where possible the date of the building, which need not be the date of the hardware, is noted. The total collection provides a good indication of the variety of hardware types and forms used in early America. The introductions for each category make some reference to the illustrations but there still remains a feeling that more could have been gained by a more extensive study of the material. The importance of the work lies more in its illustrations and notes than in its evaluation of the data.

Stotz, Charles Morse
1974

"The Reconstruction of Fort Ligonier: The Anatomy of a Frontier Fort." Association for Preservation Technology, Bulletin, Vol. 6, No. 4, pp. 2-103. Ottawa.

This report is considered here as an example of the kind of report put out by a restorationist. The author is an architect and consultant to the Fort Ligonier restoration project. Although structures are discussed extensively, there is virtually no discussion of the hardware used for the reconstruction. The archaeological excavations of the site are acknowledged in no more than a page and the reader is then referred to the report by the archaeologist (Grimm 1970). The discussion of building hardware is limited to stating that it was of value in restoration (p. 12) and that the artifacts "provided models for making replicas" (p. 39). Data on the building hardware is limited to a measured drawing and a few photographs. Reference to the archaeologist's report is of little further value since, unfortunately, the hardware receives little better consideration there. The hardware used in the restoration may be entirely accurate but from this report and that of the archaeologist, there is virtually no evidence to support such a conclusion. A similar situation exists for other restoration projects, if there is even a report prepared for them. The report considered here has been selected only as an example of a situation: it should not be seen as having been singled out as a particularly obvious or bad example.

Streeter, Donald A.
1975

"Wrought Iron Hardware for Exterior Shutters." Association for Preservation Technology, Bulletin, Vol. 7, No. 1, pp. 38-56. Ottawa.

An extensive and useful presentation, consisting primarily of illustrations, on the various types and forms of hardware required for exterior shutters.

Thomas, W.H.

[19__]

Builders' Hardware from the Ground Up. [Hardware Age, New York.]

[19__]

Builders' Hardware Door by Door. [Hardware Age, New York.] According to comments in Brownell's Hardware Age Builders' Hardware Handbook (considered earlier in this section), both of these books deal with modern hardware and the requirements for modern construction. More complete publishing information can not be located.

Timmins, Samuel, ed.

1967

The Resources, Products, and Industrial History of Birmingham and the Midland Hardware District. Frank Cass and Co. London. Reprint of 1866 ed. Cass Library of Industrial Classics, No. 7.

A number of chapters by different authors on different categories of building hardware are included. Each has been considered separately in its appropriate subject category.

Tomlinson, Charles, ed.

1854

Cyclopaedia of Useful Arts, Mechanical and Chemical, Manufactures, Mining, and Engineering. James S. Virtue, London. 2 vols.

Locks, hinges, nails and screws are considered. The lock section consists of descriptions of various types of mechanisms and lengthy descriptions of a small number of patents. Various hinge types are listed and briefly described, followed by a longer section of brief descriptions of a number of patents. The sections on nails and screws describe manufacturing techniques and, for nails, includes a list of wrought nail types.

Towne, Henry R.

1904

Locks and Builders Hardware: A Hand Book for Architects.

John Wiley and Sons, New York.

A lengthy book (over 1,100 pages) in which the intention is "to record the modern development of the art in the United States and to furnish technical information relating to it which will be of interest and use to the practicing architect." The major emphasis of the discussion is on locks and locksmithing. Over half of the book is taken up by a catalogue of the products of the Yale and Towne Manufacturing Company. For the research of building hardware the first 225 pages, providing a glossary and discussions on historical and mechanical aspects of the subject, is the most useful although the information given is not particularly extensive. The 20-page glossary may be the most useful section.

Traquair, Ramsay

1947

The Old Architecture of Quebec. MacMillan, Toronto.

Information on building hardware is restricted to three illustrations of various types. The book provides sources but does not provide dates for many of the illustrated pieces.

Twopeny, William

1904

English Metal Work. Intro. by Laurence Binyon. Archibald Constable, London.

A collection of examples (93 drawings by the author) of various types of building hardware recorded, for the most part, from standing buildings. The context is noted for each item but not its date.

Wallace, Philip B.

1930

Colonial Ironwork in Old Philadelphia: The Craftsmanship of the Early Days of the Republic. Architectural Book Publishing Co., New York.

A consideration, with numerous illustrations, of various types of building hardware with attention focused on fences, railings and grilles. Many of the illustrated items are ornate and may have been individually conceived. At least for many archaeologists, such material has little relevance.

Warner, Roger

1923

"Latch and Door Knocker." Antiques, Vol. 3, No. 2 (February), pp. 67-9. New York.

This short article is introduced as a "brief appreciation" or "outline sketch." Latches and door knockers are discussed briefly and some forms are described but there is little information on historical development. The author is also of the opinion that the iron work for early America was provided by "the village blacksmith."

Whiffen, Marcus

1960

The Eighteenth-Century Houses of Williamsburg; a Study of Architecture and Building in the Colonial Capital of Virginia. Colonial Williamsburg, Williamsburg, Va.

A number of categories of building hardware are discussed briefly, supplemented with excerpts from contemporary documents. There is little substance available in the presentations.

Williams, Henry Lionel and Ottalie K. Williams

1957

Old American Houses: How to Restore, Remodel, and Reproduce Them. Bonanza Books, New York.

Nails, hinges and latches are discussed in the chapter on "Guides to Antiquity." A general historical development for each category is noted and various types and styles are described. The data is undocumented.

Young, W.A.

1913

Old English Pattern Books of the Metal Trades. Victoria and Albert Museum, London. Publication 87.

A catalogue of pattern books held by the Victoria and Albert Museum. Such pattern books are useful sources of information on metal work, including building hardware, although they generally date no earlier than the latter part of the 18th century.

Bolts

There are no known references available specifically on the subject of bolts. For the most part they are considered with screws or other fastenings. References to them are available either in the section on fastenings or in a number of encyclopaedias considered in the "General References" section.

Brackets

The subject is considered in one brief article, one in which the intention is not even to consider brackets specifically.

Carleton, R.L.

1975

"Marks on the Iron Stirrups of the Roof Trusses at Christ Church, Lancaster County, Virginia: A Query." Association for Preservation Technology, Bulletin, Vol. 7, No. 1, pp. 108-12. Ottawa.

A request for information for the identification of marks on a set of 28 straps used as brackets or stirrups in the roof structure of a church constructed in 1732, providing some indication of the use of iron work in a particular type of construction.

Fasteners

Fasteners are seldom considered as a separate subject: either they become part of a more general discussion or the different types of fastenings, such as nails or screws, are considered individually. The reference to tests on the adhesion of nails and wood screws by a Mr. Bevan, mentioned in the note for the Tredgold reference in this chapter, also appears in other sources. Although the Bevan data was presumably published, no source or specific date has yet been established for it.

Davidson, Ruth Bradbury
1949

"The ABC's of Nails and Screws." Antiques, Vol. 55, No. 3 (March), pp. 188-89. New York.

A brief article outlining the form and history of nail and screw technology, including illustrations of the steps in the production of wrought nails. The dates given for the major events in the development of nail technology are taken from Mercer (1924) and are thus subject to the same limitations and criticisms.

Durbahn, Walter E.
1961

Fundamentals of Carpentry. 3rd ed. American Technical Society, Chicago. Vol. 1: Tools Material Practice.

An extensive section on fasteners and other forms of building hardware constitutes a part of this work. The fasteners considered are all modern but the section is of some value for terminology. Other modern carpentry manuals provide similar information.

Industrial Fasteners Institute
1974

The Heritage of Mechanical Fasteners. Cleveland.

A discussion of the origin and development of fastenings from earliest times, the importance of fastenings during the Industrial Revolution; and the history and development of fastenings and their significance in the history of the

United States with an emphasis throughout on threaded fastenings. Although considerable data is presented, it is unfortunately undocumented. A portion of this work also appeared in Fasteners, the periodical of the Industrial Fasteners Institute.

Knights Pictorial Gallery of Arts
n.d.

Useful Arts - Agriculture and Manufactures. The London Printing and Publishing Co., London. Vol. 1.

A brief section on making wire, nails and screws is included. This consists of a brief description of the process of drawing wire and making wrought and cut nails and screws.

Manufacturer and Builder, The
1869

"Manufacture of Tacks and Rivets." Vol. 1, No. 11 (November), pp. 326-7. New York.

A brief description of the manufacturing process for tacks and rivets. For tacks there is a list of the steps involved in manufacture. The manufacture of rivets is of greater interest possibly since it involves the cutting of wire into sections which are then headed, a process similar to that for wire nails at a time when wire nails were being produced extensively in some parts of Europe but probably not to any great extent in North America.

Tredgold, Thomas
1853

Elementary Principles of Carpentry; A Treatise on the Pressure and Equilibrium of Timber Framing, the Resistance of Timber, and the Construction of Floors, Centres, Bridges, Roofs; Uniting Iron and Stone with Timber etc. with Practical Rules and Examples. 4th ed. John Weale, London.

A brief statement provides data on the holding power or adhesion of nails and wood screws based on tests carried out by a Mr. Bevan in England.

United States. War Department.
1886

"Adhesion of Nails, Spikes and Screws in Various Woods. Experiments on the Resistance of Cut-Nails, Wire Nails (Steel), Spikes, Wood Screws, Lag Screws," in Report of the Tests of Metals and Other Materials for Industrial Purposes made with the U.S. Testing Machine at Watertown Arsenal, Mass., 1884. Printed in U.S. Senate Executive Document No. 35, 49th Congress, 1st Session, 1885-86, pp. 448-71, U.S. Government Printing Office, Washington.

This report presents tabulated data on the results of tests to determine the adhesion of a variety of fastenings in various woods, with less than a page of comments on these results. Among the findings are the facts that wire nails or other nails of uniform cross-section have a lower adhesion than cut nails; barbed nails have no advantage except in very soft woods, and screws have a much higher adhesion than nails.

Grates

The term grate is used here for devices used in building drainage. Although such items appear occasionally in archaeological contexts, they have not yet been considered in a published report or discussion.

Grilles and Railings

Although there is no reference available specifically for grilles and railings, they are considered extensively in the works of Gardner, Sonn and Wallace (see the "General References" section).

Gutter Supports

Gutter supports are considered briefly by Sonn (see the "General References" section).

Hasps

The hasp is a relatively simple piece of hardware that does not appear to have inspired much interest; some examples are considered by Sonn which is cited in the "General References" section.

Hinges

A number of references are available on the subject of hinges but for the most part they do not provide particularly useful data. The two articles by Donald Streeter are an exception. Hinges are also included in studies by Mercer, Moxon and Neve cited in the "General References" section. Hinges for shutters are also discussed in another article by Streeter, also cited in the "General References" section.

Brown, Harry
1953

"Standard Door Butts." Royal Architectural Institute of Canada, Journal, Vol. 30, pp. 111-3. Toronto.

This article concerns itself with the present-day use of butt hinges; various types are defined and the types required for various applications are listed. Some terminology for hinge parts is included.

Hommel, Rudolf
1944

"The Secret Joint Hinge." Early American Industries Association, Chronicle, Vol. 3, No. 1 (July), pp. 3-4.

A brief note on the method of manufacture of a cast-iron butt-hinge with a secret joint; that is, with the pin not extending to the ends of the joint. The hinge considered is marked "BALDWIN PATENT."

Isham, Norman Morrison
1967

A Glossary of Colonial Architectural Terms. DaCapo Press, New York. Reprint of 1939 ed.

A brief description of some hinge types is included.

Martineau, F.E.
1967

"Patent Wrought-Iron Hinges," in Samuel Timmins, ed., The Resources, Products, and Industrial History of Birmingham

and the Midland Hardware District. Frank Cass and Co. Ltd., London. Reprint of 1866 ed. Cass Library of Industrial Classics, No. 7.

This short article gives a brief description of machine methods for manufacturing hinges, using dies to form the joint knuckles. The beginning of such production in Birmingham is given as 1840 and the development of the method is attributed to independent invention in England and the United States. There is also a brief summary of Birmingham production and trade of such hinges.

Priess, Peter J. and Donald A. Streeter
1974

"Priess and Streeter Correspondence on Hinges." Association for Preservation Technology, Bulletin, Vol. 6, No. 2, pp. 24-33. Ottawa.

An exchange of correspondence on different manufacturing techniques for cast butt, H-HL and T-strap hinges. The validity of some of the points has not yet been checked against any large quantity of historical hinges.

Prosser, Richard B.
1970

Birmingham Inventors and Inventions; Being a Contribution to the Industrial History of Birmingham. S.R. Publishers, East Ardsley, Wakefield, Yorkshire. Reprint of 1881 ed. The chapter on "Miscellaneous Inventions" includes a brief note on the invention and method of manufacture of the secret-joint cast-iron hinge.

Romaine, Lawrence B.
1936

"Butterfly Hinges." Early American Industries Association, Chronicle, Vol. 1, No. 19 (September), p. 7.

A brief expression of the author's appreciation of the butterfly hinge; "there is no hinge or other example of the blacksmith art that surpasses the butterfly in skill of manufacture, detail of design or final ensemble." The method of manufacture is described briefly and the function is mentioned.

Smith, Peter O.
1929

"Sickle Hinges." The Architectural Review, Vol. 65, pp. 149-58. Boston.

This item has not yet been examined.

Streeter, Donald A.

1973

"Early American Wrought Iron Hardware: H and HL Hinges, Together with Mention of Dovetails and Cast Iron Butt Hinges." Association for Preservation Technology, Bulletin, Vol. 5, No. 1, pp. 22-49. Ottawa.

1974

"Early American Wrought Iron Hardware Cross Garnet, Side, and Dovetail Hinges." Association for Preservation Technology, Bulletin, Vol. 6, No. 2, pp. 6-23. Ottawa.

These two articles constitute the best present-day introduction to the subject of hinges. They consider the different hinge types, differences in style and manufacture and use. Reliance is to a great extent on the use of illustrations and legends to convey information.

Knockers

Door knockers have not been studied separately; some information on them is available in Sonn and Warner cited in the "General References" section.

Latches

The latch, in its various forms, has attracted the attention of a few authors although it has not been discussed in a large number of references. In addition to the sources considered here, latches are considered in the "General References" section in articles by Mercer, Nutting and Sonn and are extensively illustrated by Sonn and, to a lesser extent, by Nutting. The latch has inspired many craftsmen and the variety of shapes is vast, making it more difficult to identify trends or technological advances. Stylistic variation may, however, be of some value for identifying source of manufacture for locally made products.

Mercer, Henry C.

1923

"Notes on Wrought-Iron Door Latches." Old Time New England, Vol. 13, No. 3, pp. 139-42. Boston.

A general classification of thumb latches, with some dates for formal and stylistic changes. The conclusions are based on the author's experience with hardware from Pennsylvania and New England and should be considered in association with more recent work on the subject.

Nutting, Wallace

1923

"Early American House Hardware. I." Antiques, Vol. 4, No. 2 (August), pp. 78-81. New York.

A brief description of the nature of a thumb latch and some of the forms which its parts may take. The discussion is restricted to Suffolk-type latches and approximately three-quarters of the presentation consists of illustrations. The existence of Norfolk-type latches is acknowledged but they are not considered worthy of attention. Although little historical data is provided, the author considers the short, straight lift bar to belong to the 19th century, and to be a development from the longer, curved end. This opinion is at variance with all other authors on the subject.

Stevens, John R.
1969

"Early Cast Iron Latches." Association for Preservation Technology, Bulletin, Vol. 1, No. 3, pp. 11-3. Ottawa.
A brief article to demonstrate that cast-iron latches were being produced by the late 18th century and that, consequently, Blake's American patent of 1840 was not the first cast-iron thumb latch. The article is partly to refute claims made by Mercer on behalf of Blake's patent. The subject of cast latches is also considered by Streeter in an article included in the present section.

Streeter, Donald A.
1954

"Early Wrought Iron Hardware: Spring Latches." Antiques, Vol. 66, No. 2 (August), pp. 125-7. New York.
A brief description, with numerous illustrations, of the history, form, manufacture and dating for one type of latch.

1971

"Early American Wrought Iron Hardware: Norfolk Latches." Association for Preservation Technology, Bulletin, Vol. 3, No. 4, pp. 12-30. Ottawa.
This article constitutes one of the best introductions to the subject of thumb latches and includes numerous illustrations. Although the main subject is Norfolk latches, discussion includes the earlier Suffolk-type and cast forms of both the Suffolk and Norfolk type.

Locks

The lock is probably the most complex item of building hardware and possibly also one of the more interesting. Since most early locks were attached to the surface of the door, they were at times subject to more ornamentation to improve their aesthetic appeal and to demonstrate the skill of the craftsman.

The number of references available is greater than for most other categories, discussing door locks for the most part and padlocks and keys to a lesser extent. Unfortunately many of these are concerned with the very early types or with more spectacular examples. More ordinary locks used during the period of the 17th to the 19th century have not received the same attention. For example, lock histories will trace the development of lock technology beginning with the last quarter of the 18th century, describing in some detail the various patents registered since that time. Unfortunately, many of the locks excavated at historic sites are not any of such types. Discussions of locks may have two further shortcomings as far as their value for research is concerned: either they become too involved in spectacular tales of robberies in which various lock types play a role, or they are most interested in the "lock controversy" of the mid-19th century in which various experts attempted to pick various lock types with varying degrees of success.

A number of other references are known to exist but can not be included at this time because virtually nothing is known about them, not even their titles. Both Butter (1931: 20) and Eras (1957: 59) mention Andreas Dillinger of Vienna as an authority and author on early locks. Eras (1957: 59) also mentions Hermann Diels of Berlin and Louis Berthaux of Paris. Unfortunately nothing else is said about them.

Alth, Max
1972

All About Locks and Locksmithing. Hawthorn Books, New York. A general presentation, providing some discussion of the history of locks but concerned primarily with modern types, their operation, repair, key manufacture and maintenance. One chapter describes lock picking for a variety of types and another discusses security. The glossary is of some

value but the remainder of the text is of less relevance because of its emphasis on present-day types.

Arnall, Franklin M.

1973

The Padlock Collector: Illustrations and Prices of 350 Padlocks of the Past 100 Years. 2d ed., rev. The Collector, Mentone, Calif.

The sub-title probably best characterizes this work. Numerous padlocks are considered and illustrated, within general categories, but these are accompanied only by the briefest descriptions, virtually no documentation and only very general comments on dating.

Bramah, Joseph

1815

A Dissertation on the Construction of Locks. 2d ed. Printed for the author, London.

Described by Tomlinson (1854) as containing "reasons and observations, demonstrating all locks which depend on fixed wards to be erroneous in principle, and defective in security," and also containing "a specification of a new and infallible principle which, possessing all the properties essential to security, will be certain protection...against thieves of all descriptions." A copy of this work has not been examined.

Buehr, Walter

1953

The Story of Locks: A Picture History of the Development of the Lock. Charles Scribner's Sons, New York.

The story traces the development of the lock beginning with the caveman and progressing through to the modern lock. The discussion includes both decorative and mechanical developments. The information provided is basically factual but is presented in a brief and simplified manner, presumably intended for an uninformed or juvenile reader.

Butter, Francis J.

1931

Locks and Lockmaking. 2nd ed. Forward by Sir G.H. Chubb. Sir Isaac Pitman and Sons, Ltd., London.

The more useful parts of this book will probably be the first three chapters entitled "A Preliminary Survey," "Warded Locks" and "Old Locks and Keys." These provide a history of locks into the 18th century as well as data on types and terminology. British lock patents, which begin in 1774, are discussed in two further chapters. Other chapters consider "House Door Locks and Padlocks," "Safe Deposit,

Change Key and Springless Locks," "Differing and Master Key Systems," "Locks without Keys" and "The Industry." The data in these last chapters are of less relevance to the archaeologist. The existence of published sources is acknowledged in the introduction but throughout the text sources for information given are not noted nor is there any list of references.

Chubb, John
1850

"On the Construction of Locks and Keys." Excerpts, Minutes of the Proceedings of the Institution of Civil Engineers. More complete publishing information is not available; the item has not been examined.

Clover, E. Blaine
1974

"Comment on a Mortise Lock." Association for Preservation Technology, Bulletin, Vol. 6, No. 2, pp. 34-5. Ottawa. A brief description with illustrations of a mortise lock from a house constructed in 1819. On the basis of its form, it is considered to be of French or American origin.

Courtney, Charles
1942

"Locks, Ancient and Modern." Early American Industries Association, Chronicle, Vol. 2, No. 21 (August), pp. 179, 183. A few general comments on locks, providing little useful information.

Crowell, Ivan H.
1967

"An Early Lock." Early American Industries Association, Chronicle, Vol. 20, No. 4 (December), p. 54. A brief description of a plain stock lock reputed to be three centuries old from a site in New Brunswick.

1968

"Interesting Locks." Early American Industries Association, Chronicle, Vol. 21, No. 2 (June), p. 25. A brief description of two unusual locks in the York-Sunbury Historical Society collection in Fredericton, New Brunswick. One is a chest lock and the other may be a door lock.

Currer-Briggs, Noel
n.d.

Contemporary Observations on Security from the Chubb Collectanea 1818-1968. Chubb and Son's Lock and Safe Co., London.

This consists of a collection of Chubb memorabilia, dealing primarily with personalities and general history. It provides little technical detail required for research.

Eastwood, Maudie

1976

The Antique Doorknob. Published by the author, Tillamook, Oregon.

This book is presented as the result of the author's "attempted search for the information through which to identify and classify the knobs" in her collection. It grew out of difficulties in locating information and is presented with the feeling that there is a need by others for similar information. The book may find some favour with the collectors for whom it is intended. Researchers, however, will undoubtedly have more difficulty. It consists primarily of excerpts from patent records, numerous illustrations, often without any identification, and a scattering of comments, not all of which are particularly relevant. The discussion is organized by material for door knobs and concludes with sections on collecting and collections. Although there may be ample useful information present it is put together in such a fashion as to make it difficult to realize this fact or find what one may be looking for.

Eras, Vincent J.M.

1957

Locks and Keys Throughout the Ages. Lip's Safe and Lock Manufacturing Co., Dordrecht.

The author expresses his purpose as being to publish his "experiences in the field of locks and keys and allied accessories in the hope that those interested may become better acquainted with the subject," and "to pay homage to the immortal memory of the Founder of the Lip's Concern." As a reference for locks, its use is limited. Much of the discussion is concerned with specific and exotic examples or collections of locks and keys. Furthermore chapters such as "What is a Lock?," "Metallurgy" or "The First Metal Locks" consist to a great extent of text which has little to do with the chapter titles. Unfortunately the author provides no bibliography, gives no indication of sources for his data and makes only general reference to other sources.

Hennessey, Thomas F.

1976

Early Locks and Lockmakers of America. Nickerson and Collins Publishing Co., Locksmith Ledger Division, Des Plaines, Illinois.

There is little to recommend this work. Its history of locks is sketchy, told to a great extent with listings and excerpts from patents and in some instances presenting data which is at best misleading. The section on lockmakers, comprising 16 of the book's 18 chapters, consists primarily of names, dates, figures, mergers and similar data but provides little information on the locks being produced. Its greatest value for researchers may lie in the many names and dates mentioned although even here there is no index to help in locating specific information. An appendix provides a list of some lock companies, organized by cities, again a difficult format for someone needing to identify a lock and having only the company name to start with.

Hobbs, A.C.
1970

The Construction of Locks. Comp. and ed. Charles Tomlinson. Kingsmead Reprints, Kingsmead Square, Bath. Reprint of 1868 ed.

This work covers the history of locks, lock patents and the "lock controversy" of the mid-19th century. The section on lock history is extensively illustrated but does not include the common type of lock discovered so often in excavations. The section on patents includes a list of patents to 1849 with an emphasis in discussions on the better known patents such as Chubb or Bramah. The lock controversy is considered extensively but is of little relevance for historical archaeology or restoration. A concluding chapter is on iron safes.

Hogg, Gary
1961

Safe Bind Safe Find: The Story of Locks, Bolts and Bars. Phoenix House, London.

Contains some general but occasionally useful information on the history of locks. Unfortunately the author appears to be more interested in stories of lock picking and famous bank robberies.

Hopkins, Albert A.
1928

The Lure of the Lock. The General Society of Mechanics and Tradesmen, New York.

A short treatise on locks to elucidate the John M. Mossman collection of locks in the museum of the General Society of Mechanics and Tradesmen. The book is divided into three parts, the first dealing with the history of locks, the

second being a catalogue of the collection, with extensive illustrations, and the third consisting of extracts from the Mossman papers. The last is concerned primarily with robberies. Of these three, only the first is relevant but not particularly useful; the definition of a lock is brief and the glossary is largely abridged from Towne (1904) (see "General References"). Various locks including early American types are described.

Hughes, G. Bernard
1957

"English Domestic Locks." The Connoisseur Year Book, 1957, pp. 100-8. London.

Intended primarily for the collector, this short article touches briefly on the history of locks and lock types, the types and qualities of materials, lock ornamentation and the manufacturing industry. A few technical details are mentioned as an aid to dating specific lock types.

Kraske, Robert
1969

Silent Sentinels: The Story of Locks, Vaults, and Burglar Alarms. Doubleday and Co., Garden City, New York.

A general discussion, intended for young readers, with an emphasis on vaults, banks and burglar alarms. There is little substance here for serious research.

L-W Promotions
n.d.

Collectors Guide to Locks and Keys. Gas City, Indiana. Primarily a reprint of portions of an unidentified and undated catalogue or catalogues. The value of such data for research is seriously curtailed because of the limited information provided.

McNeil, Ian
1968

Joseph Bramah; A Century of Invention, 1749-1851. David and Charles, Newton Abbot.

One of the chapters in this work deals with Bramah's contribution to lock technology. The nature of locks of the period is reviewed briefly as is the lock industry. The chapter deals primarily with the development of Bramah's patents.

Monk, Eric
1974

Keys; Their History and Collection. Shire Publications Ltd., Aylesbury.

This work "is offered as a simple guide to the bewildering variety of types that may be found" in the realm of keys and is intended primarily for the collector. However, the discussion is concerned more with locks, presenting a brief history of styles, mechanisms and manufacture.

Unfortunately a reader would be hard pressed to find such basic information as the definition of a stock or rim lock. Some suggestions are offered for the collector in the concluding chapter. In general this work is of limited value as an introduction to the subject.

Mertz, Martha

1948

"Keys for Collectors." Antiques, Vol. 54, No. 2 (August), pp. 110-1. New York.

A brief, general comment on the history and forms of locks and keys, providing little of substance.

Nägele, Adam and Ferdinand Nägele

1836

Darstellung der schönen Schlosser-Profession in ihrem ganzen Umfange. Herausgegeben vom Verfasser der Schmiede-Profession.

I have not yet been able to examine a complete copy of this work. According to the illustrations and a translation of part of the text, copies of which were provided through the courtesy of Donald Streeter, concern is with lock types and the techniques of manufacture for locks and keys. This is probably a useful reference for the detail it provides.

Pitt-Rivers, Augustus Henry Lane

1883

On the Development and Distribution of Primitive Locks and Keys. Chatto and Windus, London.

This work has not yet been examined but is likely to consider very early lock forms.

Price, G.

1856

A Treatise on Fire and Thief-Proof Depositories and Locks and Keys. Simpkin, Marshall, and Co., London.

This is one of the longest sources available on the subject of locks. Of its more than 900 pages, all but the first 175 deal with locks and keys. The presentation is divided into old locks (pre-1851) and modern locks (post-1851) using the Great Exhibition of 1851 as the dividing point. A chapter of "Early History" discusses the earliest references to locks, consisting of Biblical, Roman and Greek examples. The chapter on old locks begins with Egyptian examples but

consists primarily of descriptions of lock types developed, and often patented, during the period between 1774, the year of the first British lock patent, and 1851. This portion of the chapter consists of 270 pages. A similar chapter, of almost 100 pages, provides a similar description for lock types developed between 1851 and 1856. Keys are considered in a separate, shorter chapter. Lock types, prices and the Wolverhampton lock trade are discussed in one chapter, and the lock controversy is considered in two chapters totalling over 100 pages.

Although this work is longer than any other, it is not entirely an original contribution. In his preface the author, who was a lock manufacturer in Wolverhampton, acknowledges the use of extracts from other sources such as Chubb, Tomlinson or Hobbs but these extracts are not specifically identified. The illustrations are very similar to those of Tomlinson (1854). In general, the discussions are of value for the terminology they provide as well as the information on British locks, patented or otherwise. The total discussion of lock types and lock patents is more extensive than is available in any other single source.

Ramsell, H.G.

1936-37

"Locks and Lock Manufacture." Proceedings of the Birmingham Association of Mechanical Engineers, Birmingham.

Consisting of a collection of notes, which originally accompanied a slide lecture, touching on history, form and technology. Because of the origin of the article, it is of little use for research.

Repertory of Arts and Manufacturers: Consisting of Original Communications, Specifications of Patent Inventions, and Selections of Useful Practical Papers from the Transactions of the Philosophical Societies of all Nations, The
1796

"Specifications of the Patent granted to Mr. Joseph Bramah, of Piccadilly, in the County of Middlesex; for his Invention of Locks upon a new Construction." Vol. 5, pp. 217-32, London.

A description of Bramah's patent preceded by a discussion on the inadequacy of wards as a security system for locks. The contents may be similar to the Bramah treatise of 1818 listed earlier in this section.

Rodger, William

1975

"Collecting Locks." Canadian Antiques Collector, Vol. 10, No. 1 (January/February), pp. 38-41. Toronto.

A brief article directed at the collector, discussing some lock types and prices but providing little substance for research.

Romaine, Lawrence B.

1936

"Padlocks." Early American Industries Association, Chronicle, Vol. 1, No. 20 (November), p. 7.

A brief description, with some illustrations, of the form and operation of one kind of padlock.

Stephen, John

1962

The Story of Keys and Locks. Sterling Publishing Co., New York.

This is one title in a "The Story of..." series, providing a relatively brief general history of locks. Unfortunately, the items considered appear to have been selected because they are of some interest to the author rather than to provide a complete picture of the subject. Much of the discussion is taken up by modern locks. Overall, the subject is considered at too general a level without an adequate history being provided. The work is presented without documentation.

Streeter, Donald A.

1970

"Early American Stock Locks." Antiques, Vol. 98, No. 2 (August), pp. 351-5. New York.

1973

"Some Signed American Iron Rim Locks." Association for Preservation Technology, Bulletin, Vol. 5, No. 2, pp. 9-37. Ottawa.

1974

"Early American Wrought Iron Hardware English Iron Rim Locks: late 18th and early 19th Century Forms." Association for Preservation Technology, Bulletin, Vol. 6, No. 1, pp. 40-67. Ottawa.

These three articles provide the best introduction to door locks for the historical archaeologist because they deal specifically with the types of locks usually found in excavations. The subject is again extensively illustrated, as is the case for most other Streeter contributions on building hardware. The illustrations on stock locks are particularly helpful in demonstrating the differences between plain and plate forms.

Stuart, Charles

1959

"Locks," in L.G.G. Ramsey, ed., The Concise Encyclopedia of Antiques. Hawthorn Books, New York.

Consisting of a page-and-a-half introduction followed by a brief glossary; of limited value for terminology.

Tildesley, J.C.

1967

"Locks and Lock-Making," in Samuel Timmins, ed., The Resources, Products, and Industrial History of Birmingham and the Midland Hardware District. Frank Cass and Co., London. Reprint of 1866 ed. Cass Library of Industrial Classics, No. 7.

The article provides an historical sketch of locks and considers the major lock patents, the Willenhall lock trade and the lock types manufactured. The discussion of the technology of lock manufacture is minimal.

Trump, Robert Townsend

1954

"The Carpenter-Type Lock." Antiques, Vol. 66, No. 6 (December), p. 482. New York.

This one-page article provides a brief history and description of one specific lock type. It is useful in providing a gross means of identification of the type; the existence of a number of variations is acknowledged.

Yale and Towne Manufacturing Co.

1952

Style and Security, The Yale Lock Collection. New York.

A brief history of locks and a catalogue of the Yale lock collection, providing little substance for research. Examination of the collection itself would be of value, however.

Zara, Louis

1969

Locks and Keys. Walker and Co., New York.

This is one of a series of "Collectors' Blue Books," providing brief descriptions and numerous illustrations of the development of locks and keys. A one-page glossary and a selected bibliography are included. The illustrations are relatively good, providing better views of lock mechanisms than are available in many other sources. Although this work is relatively brief, it is somewhat better than other similar works.

Nails

The nail is an important but not particularly complex item of building hardware. The references available for nails probably appear in greater abundance than for any other category of building hardware, although many of these are not the result of present-day research. References of the 19th century, especially the variety of encyclopaedias, have the additional problem of extensive borrowing, making the use of their data more difficult.

American Architect and Building News (Title varies)

1876

"Nails." Vol. 1, p. 296. Boston.

A brief note explaining the penny system for designating nail lengths.

1888

"Builders' Hardware - III. Nails." Vol. 24, No. 660, pp. 72-4. Boston.

A brief article including lists of types for cut and wire nails and tacks, with some indication of prices, some comments on uses and a brief description of nail-cutting technology. Wire nails are noted as "fast superceding common cut-nails for many purposes."

1903

"Coated Wire Nails." Vol. 82, No. 1449. Boston.

Advertisers' Trade Supplement.

An advertisement for coated wire-nails presenting results of tests made in 1902 and 1903 with the United States Testing Machine at the Watertown Arsenal; and coated nails are shown to have a superior holding strength.

Angus, N.S., G.T. Brown and H.F. Cleere

1962

"The Iron Nails from the Roman Legionary Fortress of Inchtuthil, Perthshire." Journal of the Iron and Steel Institute, Vol. 200, pp. 956-68. London.

The artifacts being considered are not directly relevant to North America but are of some interest for comparative purposes. The nails constituted a hoard discovered in a pit 12 feet deep and 6 feet in diameter. The nails filled the bottom 6 feet of the pit and were estimated to total over 875,000. They are grouped into six types and are interpreted in terms of the technology of nail manufacture and forge practices.

Baackes, Michael
1896

"The History of the American Wire Nail Industry." The Iron Age, Vol. 57, pp. 105-6. Middletown, N.Y.

A brief article outlining the development of wire-nail manufacture in North America. The introduction of manufacture is attributed to Baackes and Goebbels in Covington, Kentucky in 1875. The beginning of manufacture by William Hassall of New York (see also entry under this name in the nail section) is given as between 1876 and 1879. Some early uses of wire nails are mentioned and some statistics on production are given. The invention of wire nails is attributed to Paris early in the 19th century. A statement on the development of wire-nail machinery in France appears to be based on inadequate information.

Ball, Ephriam
1967

"The Hand-Made Nail Trade," in Samuel Timmins, ed., The Resources, Products, and Industrial History of Birmingham and the Midland Hardware District. Frank Cass and Co., London. Reprint of 1866 ed. Cass Library of Industrial Classics, No. 7.

The discussion is concerned with the industries of Birmingham and concentrates on the industry of nail manufacture rather than its technology.

Barlow, Peter
1851

The Encyclopaedia of Arts, Manufactures, and Machinery. John Joseph Griffin and Co., London.

In the section on nails the author indicates his intention to consider only production by machinery, but precedes his descriptions with a brief outline of hand manufacture. A number of patents are described, the latest being from 1827. Several of the descriptions are similar to those of Rees and Martin early in the 19th century. American activities in nail technology, such as the development of nail cutting, are not mentioned. The section on nails appears to be based on earlier statements and is, therefore, out of date and incomplete.

Bolles, Albert S.
1889

Industrial History of the United States, from the Earliest Settlements to the Present Time. The Henry Bill Publishing Co., Norwich, Connecticut.

The development of cut-nail technology and the production of cut nails are described briefly, with the addition of a few statistics on prices and quantities.

Buggey, Susan
1976

"Supplying Building Materials to the British Army in the Colonies: An Illustrated Example." Association for Preservation Technology, Bulletin, Vol. 8, No. 3, pp. 89-118. Ottawa.

A complete reprint of an 1812 catalogue of nails issued by the British Board of Ordnance. A brief introductory comment has been added. The illustrations have been reproduced full-size.

Canada. Public Archives.

RG8, C Series, C24, Vol. 1433, Miscellaneous Records of the Commanding Royal Engineer, 1761-1892, "Royal Engineers Office, Halifax, List of Nails and Spikes required for the Service of the Office of Ordnance. Approved by the Honorable Boards Order of the 29 July 1812."

A catalogue of nails to be used in construction by the Office of Ordnance. Each nail is identified by its form or intended use and each type and size variation is accompanied by a full size drawing. Most of the nails are wrought; only one cut type in several sizes is present. The document is useful for the identification of forms although their similarity with actual or excavated examples may not always be too apparent. The distribution of such a document or the extent of its use is not known at present; a copy is also held by the Public Record Office, London (W055/2268). A recent reprint is also available (see preceding entry for Buggey).

Canadian Engineer, The
1901

"Something about Wire Nails." Vol. 8, No. 20, pp. 474-5. Toronto.

A brief note summarizing the introduction of wire-nail production in North America. First production in the continent is attributed to Pillow and Hersey Manufacturing Company of Montreal in 1870 or shortly thereafter, and the first production in the United States is attributed to A.

Field and Son of Taunton, Massachusetts. A comment on quantity of production and type of machine used is also included. There is some question on the accuracy of the facts presented.

Chapman, S.D. and J.D. Chambers
1970

The Beginnings of Industrial Britain. University Tutorial Press, London.

The hand-made nail trade of the West Midlands is described briefly as part of a characterization of small industries prior to the Industrial Revolution.

Clark, Victor S.
1949

History of Manufactures in the United States. Peter Smith, New York.

Brief references to nail manufacture and the development of the nail-manufacturing industry in the United States are scattered throughout the three volumes. One statement, unfortunately undocumented, attributes the production of wire nails in the 1860s or 1870s to a Catholic priest in Kentucky, using German machines.

Court, W.H.B.
1938

The Rise of the Midland Industries 1600-1838. Oxford University Press, London.

This work includes an extensive discussion of the history, development and nature of the hand-forged nail industry of the Midlands. Social conditions, the relationship of nail making to other industries in the Midlands and the relationship to domestic capitalism form a major portion of the presentation.

Croker, Temple Henry
1764

Complete Dictionary of Arts and Sciences. Thomas Williams and Samuel Clark, London. 3 vols.

The entry for nails consists almost entirely of a listing of types, based on both form and function, and is derived almost completely from Neve (1726). (see "General References").

Dempsey, G. Drysdale
1851

The Builder's Guide: A Practical Manual for the Use of Builders, Clerks of Works, Professional Students, and Others

Engaged in Designing or Superintending the Construction of Buildings. Atchley and Co., London.

Included here is a list of nails giving names, lengths and price and weight per thousand. For flooring nails there is a listing of thicknesses of floor for specific nail lengths. The nails listed are a mixture of wrought and cut with wrought predominating.

deValinger, Leon, Jr.
1960

"Nail-Making Device at the Delaware State Museum." Early American Industries Association, Chronicle, Vol. 13, No. 2 (June), p. 17.

A brief description of a nail-making device.

Didsbury, J.
1959

"The French Method of Nail-Making." Early American Industries Association, Chronicle, Vol. 12, No. 4 (December), pp. 47-8.

A brief description of a method of nail making derived from Diderot's Encyclopédie, including copies of two of the original illustrations.

Dove, Allan B.
1955

"The Influence of Nail Design and Manufacturing Practices on Joint Strength." Wire and Wire Products, Vol. 30, No. 6, pp. 657-66, 724-5. Jersey City.

Although a few historical comments are included in the introduction, the concern is with modern nails and problems of modern construction.

Dreppard, Carl
1946

"Spikes, Nails, Tacks, Brads and Pins." Early American Industries Association, Chronicle, Vol. 3, No. 8 (August), p. 69.

A note on the manufacture of nails and the American need for nails in the early 19th century. Some statistics on cut-nail machinery and production are given. Wire-nail manufacture is considered as an "enlargement of the pin-making industry."

Early American Industries Association
1960

"Industrial Information from our Colonial Ancestors." Early American Industries Association, Chronicle, Vol. 13, No. 4 (December), p. 45.

A brief quote from the Jones Family papers, Library of Congress, listing the sizes and quantities of nails required for the construction of several different sized buildings.

1961

"Nail-Headers." Early American Industries Association, Chronicle, Vol. 14, No. 3 (September), p. 36.

A brief description of several nail headers.

1963

"17th Century Colonial Inventory of Tools." Early American Industries Association, Chronicle, Vol. 16, No. 3 (September), p. 30.

A brief inventory of hardware extracted from an inventory of 1671-72 from York County, Virginia. Several nail sizes with quantities and prices are included.

Edgerton, Charles E.

1897

"The Wire-Nail Association of 1895-96." Political Science Quarterly, Vol. 12, No. 2, pp. 246-72. Boston.

Primarily a description of an association of wire-nail manufacturers and jobbers in an effort to control prices, production and competition but including a few introductory comments on the history of wire nails.

Falconer, William

1815

A New Universal Dictionary of the Marine; being a Copious Explanation of the Technical Terms and Phrases Usually Employed in the Construction, Equipment, Machinery, Movements, and Military as well as Naval, Operations of Ships: With such Parts of Astronomy, and Navigation, as will be Found Useful to Practical Navigators. Modernized and enlarged by William Burney. Printed for Cadell, Davies and Murray, London.

The entry for nails consists of a list of types with names, form, use and equivalent French terms.

Fontana, Bernard L.

1965

"The Tale of a Nail: On the Ethnological Interpretation of Historic Artifacts." Florida Anthropologist, Vol. 18, No. 3, Pt. 2 (September), pp. 85-102. Gainesville.

A consideration of the potential for interpretation of nails from historic sites using Linton's categories of form, function, use and meaning. A reprint of the nail section from the 1876 catalogue of S.D. Kimbark of Chicago is included, with the illustrations reduced slightly from the size of the original.

Fontana, Bernard L., J. Cameron Greenleaf et al.
1962

"Johnny Ward's Ranch." The Kiva, Vol. 28, No. 1-2
(October-December). Tucson.

This report is somewhat of an exception to the usual archaeological site report in that it attempts to research and report on all artifact categories recovered. The section on nails takes up 23 pages and presents an extensive summary of wrought-nail technology and the development of cut- and wire-nail technology in the United States. The discussion includes a list and brief descriptions of "the more usual forms of square cut nails," presumably derived from an unidentified trade catalogue. Some of the information is derived from the earlier work of Mercer (1924), see "General References") repeating some of his incorrect interpretations and conclusions.

Fremont, Ch.
1912

"Le clou." Société pour l'Encouragement de l'Industrie Nationale, Bulletin, Année lll, pp. 193-221, 365-97, 522-48, 672-700, 808-28. Paris.

The first two parts of this lengthy discussion are of the greatest relevance. In these the author traces the history of nails including manufacture by hand and early manufacture by machine. Cut nails are barely mentioned. The information on early wire nails is important and is not available in any known English source. Part of the second section and all of the final three sections are on technical studies, such as driving force, adhesion and wood deformation, all apparently dealing with wire nails.

Graells, Eudald
1972

La industria dels claus a Ripoll. Contribucio a l'estudi de la farga catalana. Fundacio Vives Casajuana, Barcelona.

This study has been characterized by Glick (1973: 449) as a "better example of local chauvinism than scholarship" with only superficial analysis. The work describes the Ripoll nail industry with illustrations of the forge and nail types.

Harper's New Monthly Magazine

1860

"Among the Nail Makers." Vol. 21, No. 122 (July), pp. 145-64. New York.

The article is in the form of a travelogue to a nail-producing area, including a lengthy description of the trip to arrive at the site. The description of nail production, beginning with the smelting of the ore and ending with the packing of the finished cut nails, is largely general.

Hassall, John

1896

"The Early History of Wire Nail Manufacture." The Iron Age, Vol. 57, pp. 997-8. Middletown, N.Y.

A letter to the editor outlining the development of wire-nail manufacture in New York, primarily by the author's father. The beginning of wire-nail manufacture is given as the 1850s - at least prior to 1857. It is also noted that during the 1860s one manufacturer in New York was already producing 5-in. nails.

Heite, E.F.

1969

"A Question of Nail Sizes." Archaeological Society of Virginia, Quarterly Bulletin, Vol. 24, No. 1, p. 79. Richmond.

A brief note suggesting the use of the penny system for the description of lengths for nails from archaeological sites.

Hey, David

1972

The Rural Metalworkers of the Sheffield Region: A Study of Rural Industry Before the Industrial Revolution. Leicester University Press, Leicester. Department of English Local History Occasional Papers, 2nd ser., No. 5.

Two chapters or approximately one-quarter of this short work are concerned with nailmakers and the nail trade, providing a picture of the nature and organization of the nail industry in one part of England prior to the middle of the 18th century.

Hodges, John

1966

"Nails, 1869 Style." Saskatchewan Archaeology Newsletter, No. 13, pp. 12-3. Regina, Sask.

A brief description of a collection of nails excavated at Last Mountain House, Saskatchewan, built in 1869.

Hommel, Rudolf P.

1937

China at Work. The John Day Co., New York.

Chinese nails and nail manufacture are briefly described and illustrated, providing some basis for comparison with European and American types and techniques.

Jamieson, Alexander

1832

A Dictionary of Mechanical Science, Arts, Manufactures, and Miscellaneous Knowledge. Henry Fisher, Son, and Co., London. 2 vols.

A brief section on nails lists a variety of types, with functions noted for some of them, and notes some statistics on adhesion.

Keene, John T., Jr.

1972

"The Nail Making Industry in Early Virginia." Early American Industries Association, Chronicle, Vol. 25, No. 1 (March), pp. 1-9.

This is an extensively researched and documented study of the sources of nails in the history of Virginia. The discussion includes the importation of nails as well as the various forms of local production which formed the basis for Virginia's 19th-century nail industry. There is a brief summary of wrought-nail technology and the development of cut-nail technology. Unfortunately, Mercer's date of 1800 is still being used as the time when "cut nails almost universally superceded wrought nails."

Kilbourn, William

1960

The Elements Combined: A History of the Steel Company of Canada. Clarke Irwin and Co., Toronto.

A brief mention of early 19th-century nail making by John Bigelow of Montreal is included.

Knight, Charles

1866-68

English Cyclopaedia. Bradbury, London. 8 vols.

The section on nails presents descriptions of nail forging and nail cutting with a briefer mention of machinery for the manufacture of bolts and rivets. The latter is also presented as a method for the manufacture of "spikes" but is not described any further. Although relatively brief, the descriptions appear to be more up-to-date than other sources of the period.

L'Abeille

1850

"Manufacture de clous." Vol. 3, No. 4 (December 19). Petit Séminaire de Québec.

A description of nail manufacture in the District of Quebec (Quebec City and vicinity). From the description it is apparent that only cut-nails are intended, with the beginning of production given as 1830.

Laboulaye, Ch., ed.

1845

Dictionnaire des arts et manufactures; descriptions des procédés de l'industrie française et étrangère. Libraire Polytechnique d'Aug. Decq, Brussels. 2 vols.

The section on nails consists of a description of manufacture for forged, cut, wire and cast nails. The section on wire nails includes an illustration of a well-developed, hand-cranked machine displayed in 1844. The same information on nails is repeated in the fifth edition of this work in 1881. A brief section on adhesion presents some statistics derived from tests carried out in England by a Mr. Bevan.

Larrabee, Edward McM.

1968

"Machine Made Nails from a War of 1812 Site at Sackets Harbor, New York." The Conference on Historic Site Archaeology Papers, 1967, Vol. 2, Pt. 1, pp. 72-84. Columbia, South Carolina.

Although the discussion is relatively brief, it presents a summary of the state of research in building hardware and attempts to set out a research design for nails and report on a small collection of nails from a site.

Lloyd, G.I.H.

1968

The Cutlery Trades: An History in the Economics of Small-Scale Production. Augustus M. Kelley, New York. Reprint of 1913 ed.

The hand-made nail trade of the Midlands is described briefly to provide some basis of comparison for the more extensive descriptions of the cutlery trades.

Magasin Pittoresque

1833

"Fabrication des clous." Vol. 1, No. 24, p. 187. Paris.

A brief note on the advantage for heading nails of using a foot-operated trip hammer with a die of the nail head in its face. The shanks appear to be produced by traditional hand-forging methods.

Manufacturer and Builder, The
1869

"Memoranda Concerning Nails." Vol. 1, No. 4 (April), p. 98.
New York.

A note on the holding power of wrought nails as well as a tabulation of size and number per pound for the various categories of the penny system.

1869

"How to Build a Cheap House." Vol. 1, No. 10 (October), p. 298. New York.

An estimate of the lumber and nails required for the construction of a cheap house.

Martin, Thomas
1813

The Circle of Mechanical Arts, Containing Practical Treatises on the Various Manual Arts, Trades and Manufactures. Printed for Richard Rees, London.

The section on nails provides descriptions of a variety of types and a number of British patents. Cut-nail technology is not mentioned. The list of type is derived largely from Neve (1726) (see "General References").

Martineau, R.F.
1967

"Cut Nails," in Samuel Timmins, ed., The Resources, Products and Industrial History of Birmingham and the Midland Hardware District. Reprint of 1866 ed. Frank Cass and Co., London. Cass Library of Industrial Classics, No. 7.

The discussion of the industry and technology is brief and related primarily to Birmingham. The beginning of cut-nail manufacture in Birmingham is given as 1811.

Michael, Ronald L.
1974

"Cut Nail Manufacture: Southwestern Pennsylvania." Association for Preservation Technology, Bulletin, Vol. 6, No. 1, pp. 99-108. Ottawa.

Primarily a tabulation of cut-nail manufacturers, their locations, machinery and products in southwestern Pennsylvania to about 1870. The author indicates the need for a study of the cut-nail industry on a national scale and

sees his own efforts as being of this type but on a regional level. It is stated that "no startling data" is present and can be concluded that in the region considered "cut nails should have been readily available from at least 1820."

Moogk, Peter N.
1971

"Apprenticeship Indentures: A Key to Artisan Life in New France." Historical Papers 1971, pp. 65-82.
Although not directly relevant, it is interesting to note that apprentice indentures for nailsmiths in Quebec and Montreal during the period 1647-1760 amounted to 1.6 per cent of all indentures in Quebec and nil in Montreal.

Moseley, A.F.
1968

"The Nailmakers." Journal of West Midland Regional Studies, Vol. 2, pp. 6-38.
A discussion of nail making and nail makers of the Midlands, touching on materials, tools and techniques, trade and social conditions. A variety of wrought-nail types as well as other products of the nail makers are listed and described. The manufacture of cast nails is described briefly and several cast-nail types are illustrated. This is a good overall survey of nail makers and their products.

Nelson, Lee H.
1968

Nail Chronology as an Aid to Dating Old Buildings. Rev. ed. American Association for State and Local History, Nashville, Tenn. Technical Leaflet, No. 48.
This is one of the best discussions available for nail technology, particularly for cut-nail technology, which is well illustrated with drawings of the various aspects of the process. The discussion also serves to clarify the relationship between technology and scars left on the nail shank. The conclusions presented on cutting scars are correct and in contrast to the conclusions of Mercer reached almost 40 years earlier. This article first appeared as Technical Leaflet No. 15 of the same association but the present edition is preferable because of its expanded discussion and the inclusion of illustrations.

Nicholson, Peter
1823

The New Practical Builder and Workman's Companion: Containing a full Display and Elucidation of the most Recent and Skilful Methods Pursued by Architects and Artificers, in the Various Departments of Carpentry, Joinery, Bricklaying,

Masonry, Slating, Plumbing, Painting, Glazing, Plastering, &c. &c. Including also, New Treatises on Geometry, Theoretical and Practical, Trigonometry, Conic Sections, Perspective, Shadows, and Elevations; A Summary on the Art of Building; Copious Accounts of Building Materials, Strength of Timber, Cements, &c.; A Description of the Tools Used by the Different Workmen; An Extensive Glossary of the Technical Terms Peculiar to Each Department; and the Theory and Practice of the Five Orders, as Employed in Decorative Architecture. Thomas Kelly, London.

Several brief mentions of nails are included; cast-iron nails are recommended for fir lath, wrought-iron nails for oak lath, copper and zinc nails are recommended for slating. Iron nails can be used for slating if first coated with fluid white lead.

Ogilvie, John
1898

The Imperial Dictionary of the English Language. New ed. rev. Charles Annandale, ed. Blackie and Son, London. 4 vols. Vol. 3.

The entry for nails is brief and not particularly significant beyond the fact that wire nails are not mentioned. The major nail types are given as wrought, cut and cast.

Priess, Peter J.
1970

"Penny Wise, Penny Foolish: The Description of Nail Sizes." Society for Historical Archaeology, Newsletter, Vol. 3, No. 3, pp. 8-9.

A brief statement presenting several reasons why the penny system in any of its versions is not suitable as a means of recording nail length for archaeological specimens.

1973

"Wire Nails in North America." Association for Preservation Technology, Bulletin, Vol. 5, No. 4, pp. 87-92. Ottawa.

A brief article to demonstrate that the extensive use of wire nails for building construction in North America did not begin until about 1880 or shortly thereafter, and that wire nails were the predominant type produced by the end of the 19th century. The same article also appeared in the Society for Historical Archaeology, Newsletter, Vol. 7, No. 1, (1974), pp. 22-8.

Prosser, Richard B.
1970

Birmingham Inventors and Inventions; Being a Contribution to the Industrial History of Birmingham. Reprint of 1881 ed. S.R. Publishers, Wakefield.

A chapter on "the nail trade" describes a number of patents for nail making, including a number for nail casting. The introduction of cut nails to England is described briefly and the chapter ends with mention of a patent of 1852 for a wire-nail machine.

Rees, Abraham
1819

The Cyclopaedia; Or Universal Dictionary of Arts, Sciences and Literature. Printed for Longman, Hurst, Rees, Orme and Brown, London. 39 vols., Vol. 19.

The list of nail types is derived largely from Neve (1726) (see "General References").

Nail cutting and its importance in America are described, chiefly through a lengthy quote from a letter. The existence of cutting and heading machines is mentioned but their significance is not made evident. At the time of publication, a cutting and heading machine was already well developed and in use extensively in America.

Ritchie, T.
1967

Canada Builds, 1867-1967. University of Toronto Press, Toronto.

The production of cut nails in Montreal is mentioned briefly and the beginning of wire-nail production in North America is attributed to Montreal in 1870. The beginning of balloon framing in Canada is given as 1870.

Rylett, Harold, Rev.
1890

"Nails and Chains." English Illustrated Magazine, Vol. 8, pp. 163-75. London.

The author's intention was to obtain sympathy for the makers of nails and chains, especially the women and children, who carried out their trade in their homes under severe hardships. In the course of his discussion, he provides a description of hand forging for nails.

Savary des Bruslons, Jaques
1759

Dictionnaire universel de commerce: d'histoire naturelle et des arts et metiers. New ed. Philbert, Copenhagen.

The section on nails includes descriptions of nail forging and pin manufacture (pins are considered as a form of nail), a listing of tools and a list of types, sizes and uses.

Scientific American

1876

"Messrs. Hadley Brothers' Mitre-Cut Nail Works, Birmingham, Eng." Supplement, Vol. 1, No. 6, pp. 89-90. New York.
A brief description of the steps in cut-nail production, generally lacking in technical detail.

1900

"Objection to Wire Nails." Vol. 82, No. 12, p. 188. New York.

A brief note objecting to the use of wire nails for shingling because of early rusting and consequent damage to the roof. The problem is seen as providing a reason for a revival of the cut-nail industry although the development of a large headed, galvanized wire-nail for shingles is also mentioned.

1903

"Steel Wire and Nail Making." Vol. 89, No. 24 (December 12), pp. 436-8. New York.

A brief description of the properties of steel wire, the steps in its manufacture and the steps in the manufacture of wire nails; generally lacking in technical detail.

Smith, H.R. Bradley

1966

Blacksmiths' and Farriers' Tools at Shelburne Museum: A History of their Development from Forge to Factory.
Shelburne Museum, Shelburne. Museum Pamphlet Series, No. 7.

A brief section outlining the history of nail technology and of several American nail manufacturers is included. The hand forging of a nail is also described. The chronological development of nails is presented in a supplement. Numerous dates and extensive other information is presented without documentation.

Smith, J. Bucknall

1891

A Treatise Upon Wire, its Manufacture and Uses, Embracing Comprehensive Descriptions of the Constructions and Applications of Wire Ropes. John Wiley and Sons, New York.
The manufacture of wire nails is briefly described, accompanied by illustrations of two machines for that purpose.

Society of Architectural Historians
1950

"Burning Buildings for Nails." Journal, Vol. 9, No. 3,
p. 23.

A brief quote from a 1691 court order in Kent County, Delaware, in which consent is given to burn the old courthouse to recover the nails prior to the construction of a new courthouse.

Sorber, James
1964

"Nail Headers." Early American Industries Association, Chronicle, Vol. 17, No. 3 (September), p. 31.

A brief description of several forms of nail headers.

Swank, James M.
n.d.

History of the Manufacture of Iron in all Ages and Particularly in the United States from Colonial Times to 1891. Reprint of 1892 ed. Burt Franklin, New York.

References to nails are scattered throughout the chapters on the development of the iron and steel industry in Europe and America. A separate chapter on cut and wire nails presents a brief history, personal reminiscences and statistics on production up to 1890.

Timmins, Samuel, ed.
1967

"The Miscellaneous Trades," The Resources, Products, and Industrial History of Birmingham and the Midland Hardware District. Reprint of 1866 ed. Frank Cass and Co., London. Cass Library of Industrial Classics, No. 7.

This article includes a short section on nail-making machinery in which it describes a machine for fluted nails, invented, patented and manufactured by a Mr. John Abraham.

Tisch, Arthur S.
n.d.

"Modern Wood Construction Only as Good as its Fastenings." American Society of Precision Nailmakers, Bulletin No. 1. New York.

The major concerns here are the problems of present day construction and the variety of nails available to overcome these problems. The historical comments are brief, general and occasionally inaccurate. Its contribution to the study of building hardware is negligible. To the best of my knowledge, the society is no longer in existence.

Wilson, Kenneth M.

1960

"Nailers' Anvils at Old Sturbridge Village." Early American Industries Association, Chronicle, Vol. 13, No. 2 (June), pp. 17-9.

A brief description of a number of nailers' anvils.

Roofing

The subject of roofing is considered to the extent that it involves metal as a roof covering. For the archaeologist information on metal roofing is important since fragments of metal sheeting are often found in excavations but are usually difficult to identify. Comparisons of metal with other types of roofing material are not necessarily included in the references considered here. The subject is also mentioned briefly by Lessard and Marquis (see "General References" section).

Association for Preservation Technology, comp.
1970

"Early Roofing Materials." Association for Preservation Technology, Bulletin, Vol. 2, No. 1-2, pp. 18-88. Ottawa. A collection of statements, from a variety of sources, on the subject of roofing materials, including numerous examples of the use of metals. The entries are organized by source and each is identified by a subject heading.

Caswell, A.
1837

"On Zinc as a Covering for Buildings." American Journal of Science and Arts, Vol. 31, pp. 248-52. New Haven, Conn. This article, consisting of a letter defending the use of zinc as a roofing material, is abstracted in the Association for Preservation Technology compilation listed immediately above.

Peterson, Charles E.
1968

"Iron in Early American Roofs." The Smithsonian Journal of History, Vol. 3, No. 3, pp. 41-76. Washington. As noted by Nelson (1969) this "fully documented and generously illustrated article covers the early use of iron roofing materials and the development of iron framing to support roofs in America up to 1860 with some mention of their earlier uses in Canada, England and on the continent."

Waite, Diana S.

1971

Nineteenth Century Tin Roofing and its Use at Hyde Hall.

New York State Historical Trust, Albany.

An extensively researched and documented summary of the history of tin plate or tinned iron and its use as a roofing material. The second part of this relatively short book deals with the use of tinned iron on the roof of a specific building. The bibliography includes a list of references which were examined and found not to contain any pertinent data, a point of some value to others who may wish to undertake research on the subject.

Screws

The subject of screws has been considered by a few individuals although it does not receive the same amount of attention as, for instance, nails in the encyclopaedias. In addition to the references considered here, screws are considered in the "General References" section in references by Mercer and Benjamin.

Battison, Edwin A.

1964

"Screw-Thread Cutting by the Master-Screw Method Since 1804." United States National Museum, Bulletin 240, pp. 105-20. Contributions from the Museum of History and Technology, Paper 37.

Chamberlain, Joseph

1967

"Manufacture of Iron Wood Screws," in Samuel Timmins, ed., The Resources, Products, and Industrial History of Birmingham and the Midland Hardware District. Reprint of 1866 ed. Frank Cass and Co., London. Cass Library of Industrial Classics, No. 7.

A short outline of the technology and industry of screw manufacture, particularly as it relates to the industries of Birmingham and district.

Dickinson, H.W.

1946

"Origin and Manufacture of Wood Screws." Newcomen Society, Transactions, Vol. 22, pp. 79-89. London.

A summary of the history and technology of screw manufacture, including the development of a pointed screw in Britain and the United States. There are also brief comments on the manufacture of wood screws in other European countries, the manufacture of cast screws and the standardization of screw production.

Falkenroth, Herbert
1928

"Die Entstehung und Entwicklung der Holzschraubenindustrie mit einem Beitrag zur Geschichte der Schraube."

Dissertation, Cologne.

This work has not yet been examined.

Fluskey, E.E.

1942

"Origin and Development of Screw Making." Machine Shop Magazine, Vol. 1, pp. 55-60. London.

A brief summary of the history of screw technology, including bolts and nuts, with considerable emphasis on the contributions by Henry Maudslay of England.

Kellerman, Rudolf and Wilhelm Treue

1962

Die Kulturgeschichte der Schraube. 2d ed. rev. Verlag F. Bruckmann, Munich.

An extensive discussion on the history of all forms of threaded devices, including screws, bolts and nuts, and covering all aspects of the subject. Data is provided for various parts of Europe and the United States from earliest times to the 20th century. Much of the discussion is on threaded devices other than fastenings and for a time period much earlier than is relevant for historical archaeology in North America, but the work is useful for those discussions which are relevant. I am not aware of an English translation.

Shutter Catches

This type of hardware has not been considered separately; some information is available in the work of Sonn, considered in the "General References" section.

Sliding Bolts

To date these have been considered for study separately only once; in addition they are considered to some extent by Neve and Sonn (see the "General References" section).

Streeter, Donald A.

1975

"Early American Wrought Iron Hardware: Slide Bolts."
Association for Preservation Technology, Bulletin, Vol. 7,
No. 4, pp. 104-22. Ottawa.

Primarily a collection of illustrations with extensive legends attempting to characterize the category of sliding bolts. As is the case with other Streeter articles, this provides one of the best introductions available on the subject. A portion of his study on sliding bolts is included in his paper on shutter hardware, considered in the "General References" section.

Timber Anchors

To date there are no separate studies available on this subject.

Wall Anchors

These are considered briefly by Sonn, listed in the "General References" section.

General Comments and Conclusions

There should be little difficulty in concluding that the references considered here are a diverse lot and furthermore that a number of them are of little or no value regardless of what their titles may suggest. Interests such as those of Mercer or Sonn earlier in the century were not picked up by others and did not lead into the sustained and extensive research required for the subject. There is no evidence that any great interest exists today with the notable exception of Donald A. Streeter, whose works are being published regularly by the Association for Preservation Technology.

It is unlikely that an annotated bibliography alone will provide sufficient motivation for someone to take up research of the subject. It will, however, provide some assistance for anyone who may have questions or problems and who is serious about finding solutions. Hopefully it will also stir the memory of some readers who will be able to recall references which they have encountered in the past but which have not been included here. If information about such references can then also be communicated to the writer, another useful purpose will have been served by the present efforts. If sufficient additions are located it would be feasible to undertake a supplement to this bibliography.

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1973

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Grimm, Jacob L.
1970

Archaeological Investigation of Fort Ligonier 1960-1965. Annals of Carnegie Museum, Vol. 42, Pittsburg.

Mercer, Henry C.
1924

"The Dating of Old Houses." Old Time New England, Vol. 14, No. 4, pp. 170-90. Boston.

Nelson, Lee H.
1969

Review of Charles E. Peterson, "Iron in Early American Roofs." The Smithsonian Journal of History, Vol. 3, No. 3, pp. 41-76. Washington, D.C. Association for Preservation Technology, Bulletin, Vol. 1, No. 3, p. 5. Ottawa.

Neve, Richard
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The City and Country Purchaser, and Builder's Dictionary: Or the Compleat Builders Guide. 2nd ed. Printed for Brown, Sprint, Conyers and Rivington, London.

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1960

"Iron and Steel in 1627: The 'Fidele Ouverture de l'Art de Serrurier' of Mathurin Jousse." Technology and Culture, Vol. 2, No. 2, pp. 131-45. Chicago.

Tomlinson, Charles, ed.

1854

Cyclopaedia of Useful Arts, Mechanical and Chemical,
Manufactures, Mining, and Engineering. James S. Virtue,
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Towne, Henry R.

1904

Locks and Builders Hardware: A Hand Book for Architects.
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