1998

# Central Changes in Domestic Heating: Lingering Traditions and New Technology in Philadelphia, 1690-1890

Mathew E. Grubel
*University of Pennsylvania*

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**Disciplines**
Historic Preservation and Conservation

**Comments**


Suggested Citation:

Grubel, Mathew E. (1998). *Central Changes in Domestic Heating: Lingering Traditions and New Technology in Philadelphia, 1690-1890*. (Masters Thesis). University of Pennsylvania, Philadelphia, PA.

# CENTRAL CHANGES IN DOMESTIC HEATING: LINGERING TRADITIONS AND NEW TECHNOLOGY IN PHILADELPHIA, 1690-1890

MATHEW E. GRUBEL

A THESIS

in

Historic Preservation

Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of Master of Science

1998

Roger W. Moss, Adjunct Associate Professor
Historic Preservation, Advisor

John D. Milner, Adjunct Associate Professor of Architecture
Reader

Frank G. Matero, Associate Professor of Architecture
Graduate Group Chairman

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## PREFACE

This is an analysis of the means employed by Philadelphians to warm themselves, in their homes, prior to 1900. It differs from other studies in that it is primarily based on historical evidence of what was actually in American houses, rather than what might have been.

There are three main sources of evidence that could indicate the methods of warming that had been in use in Philadelphia houses. The most obvious source is datable artifacts, documented in-situ, in various houses; but this is also the least accessible and reliable source. The other two sources, probate inventories and fire insurance surveys, proved to be much more reliable. Together, they provide insight into a significant number of homes from the mid-1700s through the end of the 1800s.

The purpose of this thesis is to provide a greater understanding of how people lived. I hope that there is sufficient synthesis herein that it will be useful for all who investigate, interpret, and restore 18th and 19th-century houses, and the remnants of the technologies they contain.

# INTRODUCTION

The chimney was the most important development in heating prior to the settlement of Philadelphia. It changed the arrangement, utilization, and organization of space within houses. In one form or another, chimneys would remain integral to every dwelling house well into the twentieth century. While the chimney was crucial to carrying away products of combustion, its importance in domestic architecture clearly went beyond that. For cultural, aesthetic, and sometimes technical reasons, it would not be until the twentieth century that the chimney stack would be totally relegated to a smoke pipe.

As we shall see, by the 1830s closed stoves had entered into nearly every Philadelphia house; and by the 1880s there was hardly a house being built without central heat. Yet we shall also see that, at minimum, a symbolic mantel-piece continued to be displayed in every house.

# CHAPTER 1

## HEATING IN SETTLEMENT ARCHITECTURE

Each immigrant group brought distinctive building practices to the New World, and distinctive approaches in utilizing fires for heating in their residences. The imprint of these early cultures on Delaware Valley architecture has been well researched; but by the end of the 18th century, technical improvements and classically derived architecture, would subtly subsume many of the characteristics of the earlier heating methods, at least in the Philadelphia area.[1]

Three main cultural groups are associated with the settlement of the lower Delaware Valley: Swedish, British and Germanic. Of the three, the Swedes were the earliest and numerically the smallest. Once William Penn began promoting Pennsylvania in 1685, the influence of the British grew quickly. Penn's first settlers were mostly English and Welsh Quakers. Later emigrations of both Friends and non-Friends from Britain to the port of Philadelphia reinforced British architectural influence in the region. The large Germanic immigrations started in the 1730s. Although some were Quakers, most were not, having strong ties to the Lutheran, Reformed or the smaller pietist communities.

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[1] Thomas Waterman, *The Dwellings of Colonial America,* 118-168; Richard Pillsbury, "Patterns in the Folk and Vernacular House Forms of the Pennsylvania Culture Region," 12-25; are good academic examples.

Corner fireplaces are one of the significant regional characteristic most often attributed to the Swedes. Corner fireplaces were "familiar to all types of buildings in Sweden." This practice carried over into Swedish buildings in the colonies.[2]

It is believed that non-Swedes who saw the Swedish colonial houses adopted the idea of corner fireplaces, although it is possible to make a case for English precedent as well.[3] Of the areas of colonial settlement in America, only in the Middle Atlantic region is it common to find corner fireplaces in 18th-century houses. William Penn described a simple house with a corner fireplace in one of his promotional pamphlets. Additionally, corner fireplaces can also be found in finer Philadelphia houses such as Stenton (c.1730), and Clivden (1767).[4]

The reasons given for corner fireplaces are somewhat speculative. One advantage was that the corner walls could

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[2] Waterman, *Dwellings of Colonial America*, 123. Waterman supports the association of corner fireplaces with the Swedes by citing Kalm's & Dankaert's contemporary observations and a modern academic study of Swedish prototypes by Sigurd E. Erixon, along with documented Swedish-American colonial examples. Francois Blondel also made a similar observation on this Swedish practice in Louis Savot's *L'Architecture Francoise* (1685 edition), 141 n.

[3] Waterman's belief that corner fireplaces were virtually unknown in England except in academic designs (Waterman, *Dwellings*, 126) must be questioned. For example, fig. 162 in J.T. Smith's *English Houses 1200-1800*, 100; documents 1736 corner fireplace in the best room of a rather ordinary house.

[4] Waterman, *Dwellings*, 125, 134-8.

form two sides of a triangular flue. This simplified construction by avoiding the need for additional framing to support a chimney (in a house of log or masonry construction).[5] Another advantage, mentioned by Francois Blondel, was the belief that they were more efficient. In part, this was because Blondel had seen, in Sweden, registers (dampers) that could be closed to keep out the cold when the fire was out.[6] No evidence of flue registers has been documented in colonial Philadelphia. But, there still should be an advantage in efficiency because heat radiates to nearly every part of the room from a corner fireplace. This is particularly so if the logs are placed upright, as Blondel observed in Sweden, since this encourages bigger and brighter flames.[7]

A disadvantage of these designs is that the junction of a corner chimney and the roof creates a valley that collects water and becomes difficult to maintain. While this could have been solved by placing the chimney and fireplace on the outside of the wall, this was apparently not general Swedish

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[5] Waterman, *Dwellings,* 123.

[6] Blondel in *L'architecture Francoise*, by Louis Savot (1685 edition), 141n.

[7] Heat is transferred by three means; conduction, convection and radiation. Conduction is the transfer through solid materials, like a wall. Convection is heat carried on air currents (and the like). Radiation is heat transferred to any object that could "see" it, if it had eyes. This is the primary way we receive heat from an open fire. It is why we may be warmed by a fire while the air in the house remains cold. It was Count Rumford who understood this, and was why he promoted a large angle in the fireplace jambs.

practice.

On the other hand, the common Delaware Valley practice of placing two (or more) corner fireplaces back to back, generally solved the drainage problem. This arrangement placed a shared chimney between the two rooms, and as a result, generally in direct line with the roof peak.


Fig. 1. Examples of Houses with Corner Fireplaces

Two examples of typical mid-18th century Pennsylvania houses with corner fireplaces. Both are still standing in what is now Valley Forge National Historical Park, although the Pawling house is in poor condition. (Drawings based on Thomas McGimsey, "Untangling the History of the Pawling/Wetherhill House.." [master's thesis, University of Pennsylvania, 1992], and "Stirling's Headquarters" a 1993 Site Analysis class report on file at Valley Forge NHP.)

German peoples have had a profound influence on nearly all characteristics of Pennsylvania life, including architecture. This is because they were both populous and somewhat separatist. Most did not stay in the city of Philadelphia, but moved into the countryside. One of the distinctive features of their farm houses is the way they were heated. The most unique Pennsylvania German characteristic was the use of "German" closed stoves.[8] These stoves projected from the back wall of a large, main fireplace, into the adjacent room. As a result, these houses were built around a large, central chimney.[9]

German stoves had no smoke pipes nor doors, as there was no need for them. Instead, the back side, attached to the fireplace, was open, so glowing embers could be shoveled in. The embers needed little oxygen and the smoke just backed out into the fireplace.[10] Because German stoves were made of five cast-iron plates, held together with long bolts or rods, they have often been called five-plate stoves.[11]

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[8] Closed stove is a term that encompasses all stoves that entirely enclose the flame. This is what most Americans simply term stoves today. Open stoves are fireplace inserts or additions that have one or more sides open.

[9] A.G. Roeber, "The Origin of Whatever is Not English among Us," in *Strangers within the Realm,* edited by Bernard Bailyn & Philip Morgan (Chapel Hill: University of North Carolina Press) 220, 237-244; Allen G. Noble, *Wood, Brick and Stone,* 1:40.

[10] This is my explanation for something understood at the time primarily in terms of Aristotelian physics. Only in 1774, did Joseph Priestly even isolate dephlogisticated air (Oxygen).

[11] The third edition of Henry C. Mercer's *Bible in Iron,* (ed. by

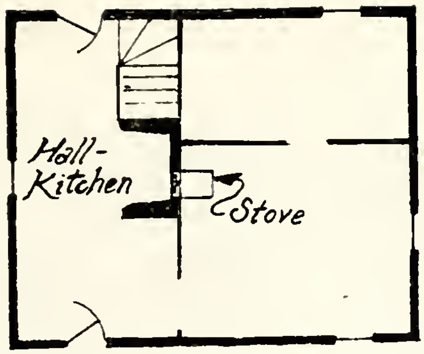


Fig. 2. Pennsylvania German Floor Plan

A representative plan showing the placement of the large cooking fireplace and a five-plate stove. (Based on Glassie, "Eighteenth-century Folk Building," 42; and Noble, *Wood, Brick & Stone,* 43. Very similar is the Miller House illustrated in Waterman, 152 and whose kitchen interior is displayed at the Philadelphia Museum of Art.)

The five plate stoves are clear material evidence of a heating method transplanted to this country. The early stoves were brought from Germany, in spite of their weight, at the time of the first Germanic settlements in the mid 1600s. Later, when they were manufactured in America, the designs and inscriptions followed the German prototypes, although the stove assembly was simplified.[12]

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Joseph E. Sanford, 1961) is still the most definitive work on these stoves. Franklin calls them German stove in his 1744 promotional pamphlet for his *New Invented Pennsylvanian Fire-place* and the inscriptions, designs and archeological evidence all indicate their use in America was restricted to Pennsylvania Germans. The term five-plate stove also appears in the eighteenth century, particularly in ledger books and journals. They are also called jamb stoves, but this term appears to date only as far back as *Watson's Annals of Philadelphia* (Mercer, 142).

[12] Mercer, *Bible in Iron,* 29.

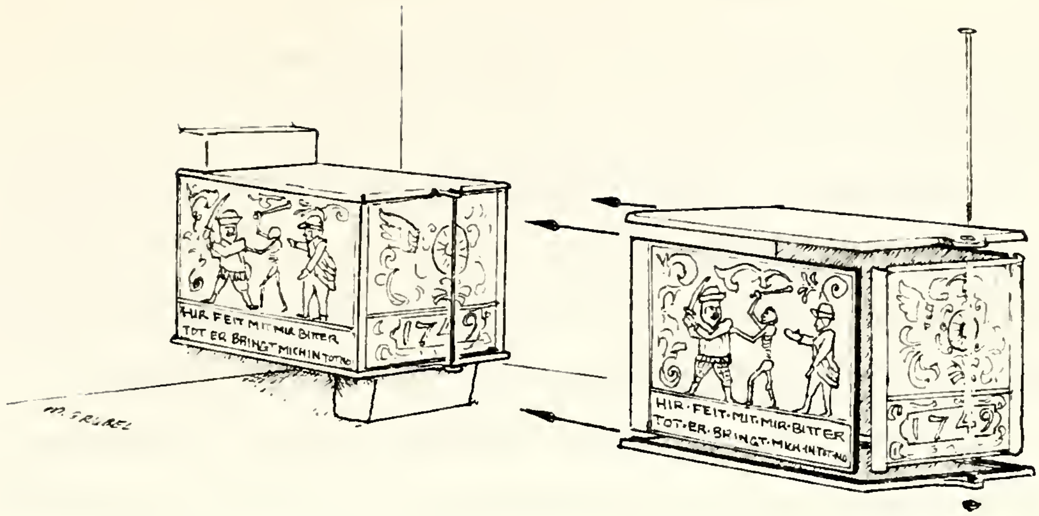


Fig. 3. Assembly of Five-plate, or German, Stove

Showing how the five plates go together and placed in the back wall of the fireplace. Note the large margin left so the decorative scene would not be buried in the wall.
(Based on stoves in Mercer, *Bible in Iron,* fig. 56-7, 110-13)

The use of five-plate stoves in Pennsylvania continued until the 1780s, and possibly into the first decade of the 19th century. But their production stopped at the end of the 1760s. Henry Mercer believed that five-plate stoves were replaced by six-plate stoves, but six-plate stoves are functionally different. Instead, it seems likely that the decline of German stoves corresponds timewise with the adoption of "Quaker" and "four square" house plans, and gable wall chimneys which could not accommodate five-plate stoves.[13]

[13] Mercer, *Bible in Iron,* 47-8; Noble, *Wood, Brick & Stone*, 1:46-7. The manufacture of stove plates in the Mid-Atlantic appears to date from the 1720s.

In and around Philadelphia, the most politically and economically influential group to settle were the Quakers who came from England and Wales. Their architectural influence was reinforced by later British immigrants, although these later immigrants were often non-Quakers.[14]

Unlike the Swedes, a clear antecedent for the fireplace locations is lacking amongst the Quakers. In spite of this, houses that are only one room deep and have end (gable) wall chimneys are generally associated with English-speaking peoples (as opposed to German-speaking peoples) of the Delaware Valley. Whatever the traditional practices may have been in Britain, end wall chimneys quickly became more popular than centralized chimneys throughout the Philadelphia region, and this would eventually effect the German population as well.[15]

Climate may have been another factor in determining chimney was location. Although it may be nearly impossible to prove, it would be logical to conclude that the colder climate of New England reinforced the traditional practice of placing the chimneys centrally. Likewise, the more

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[14] David H. Fischer, *Albion's Seed* (New York: Oxford University Press, 1989), 6, 424-44; Bernard Bailyn, *Voyagers to the West* (London: I.B. Tauris & Co, 1987), 214. Some differences might be found by further research since the Quakers generally came from the northern Midlands and Welsh borderlands, whereas the others generally came from the Midlands and southern England.

[15] Pillsbury, "Patterns in House Forms," 14, 24; Waterman, *Dwellings*, 122, 150.

moderate temperatures in the lower Delaware Valley made the end wall location acceptable, if not convenient.[16]

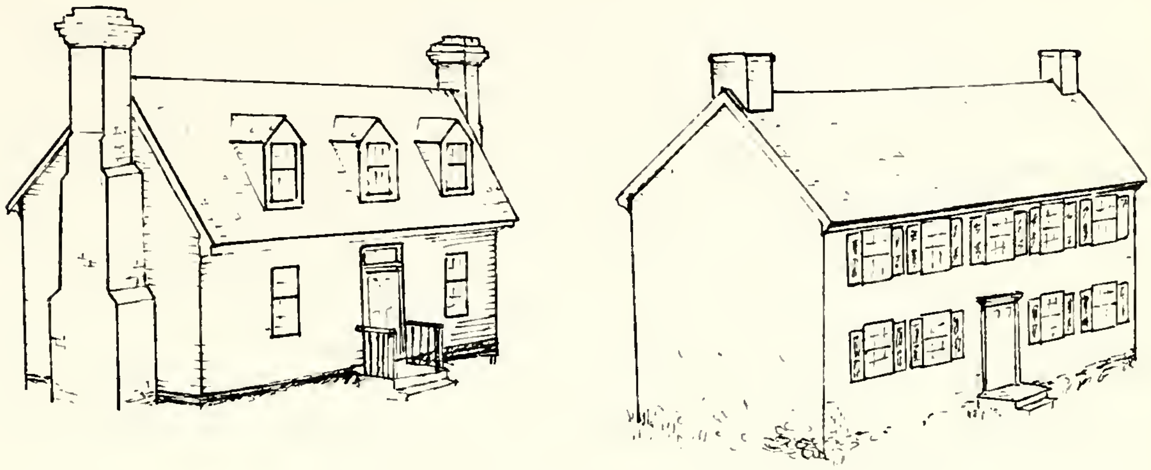

Fig. 4. Contrast in Chimney Placement

Chimneys built outside the gable wall were rare in the lower Delaware valley, but common further south. (Based on Bracken House, Williamsburg, Virg. *fig.* 4.9 in *Building Early America,* Peterson ed.; and house in Middletown, Pa. in Glassie, "Eighteenth-century..," *Winterthur Portfolio* 7: 46)

South of Philadelphia, in the Chesapeake Bay region, most of the chimney mass extended out from the gable wall (see figure 4). In contrast, the chimneys in Delaware Valley were almost always built so the chimney and fireplaces were largely inside the structure. That is, the outside of the chimney was flush or nearly flush with the outside wall.[17]

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[16] Waterman, *Dwellings,* 122.

[17] External Chimneys were common amongst the western British peoples while internal gable wall ones were common among the Scotch-Irish. Noble, *Wood, Brick & Stone*, 47, 49; Waterman, *Dwellings,* 122, 150.

Perhaps the most significant architectural influence of the Quakers was the adoption of the new, neo-classical architecture (a popular, rather than a folk, movement.)[18] The neo-classical influence was (and is) particularly noticeable in the city of Philadelphia proper. While it may be true that neither the concepts or details of the new architecture had been fully absorbed by the bulk of carpenters, joiners and masons, they clearly had the skill and ability to copy and mimic. Starting with William Penn's grid plan for the city, and extending to the Georgian town and row houses; the formal, planned character of the town was unmistakable.[19]

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[18] The difference between "popular" and "folk" architecture is the difference between what is current in mainstream culture, and what is traditional, maintained by an isolated culture. There is some confusion with these definitions, as a "folk" item may represent a formerly popular item, and visa versa. Henry Glassie discusses this at length in *Pattern's in the Material Folk Culture of the Eastern United States,* 1-17.

[19] Noble, *Wood, Brick & Stone*, 40; William Murtaugh, "The Philadelphia Row House," 8-13; and Pillsbury, "Patterns in House Forms," 22,25. All draw comparisons between Philadelphia construction and post fire London practices. Further support for this can be found in Fischer, *Albion's Seed,* 339; who finds there was "a pronounced urban bias" in the institutional leadership of Society of Friends, and also notes a resemblance of urban Philadelphia to London, Dublin & Bristol on page 481. Fiske Kimball argues in *Domestic Architecture of the American Colonies*, 33-4, 56-8; that there was a dearth of Palladian philosophy before 1700, in a form digestible by the tradesman.

## CHAPTER 2

## EVIDENCE OF 18TH-CENTURY METHODS

Wood-burning fireplaces continued as the primary source of heat through the end of the 18th century, but the design of the fireplace was changing. The most widespread changes were in the masonry form and in the increasing number of metal accessories. Although both coal and closed stoves were available, their use in houses remained isolated.

### Coal Grates

Sea coal (also called stone coal) had become the primary fuel in London even before the 18th century. Its primary advantage was that it was usually more available, at reasonable cost, than wood. To burn the coal, it had to be placed in iron baskets, or grates, that allowed air to feed the fire from underneath, similar to the way andirons functioned with wood billets.[20]

To determine whether coal had become an important source of fuel in Philadelphia, a sampling of probate inventories were examined for coal-related equipment. Possession of a grate was considered an extremely good indicator that coal had been used, and evidence of andirons pretty much precluded the use of coal (in favor of wood). It was thought that the presence of pokers or fenders would

[20] Charles E. Peterson, "American Notes: Early House-Warming By Coal-Fires," 21; Lawrence Wright, *Home Fires Burning*, 72, 77.

strongly correlate with coal use, but this was shown not to be the case by comparing inventories with these items to those with coal or coal grates.

Only one house in the sampling had evidence of coal use between the 1730 and 1799. That inventory listed a grate and a "parcel of sea coal," but also listed were andirons, just as in all the other house inventories sampled (a total of 41 in this period). Anecdotal material and illustrative evidence supports the conclusion that coal was rarely used. In fact, only scattered documentary references, such as Benjamin Franklin's purchase of a coal grate in 1763, provide evidence of coal being used for fuel in Philadelphia.[21]

However, the limited sample size, and two other factors must be considered. The first is that since these inventories were taken at death, the results are skewed toward material preferences of older, and possibly more conservative, people. The second is that grates were often set permanently into the fireplaces, especially in the last half of the 18th century. As a permanent part of the house, they would not necessarily be mentioned in the inventory. Identifying these grates with certainty becomes an issue, particularly in the nineteenth century, when many of the inventories fail to mention andirons, stoves, or grates, in

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[21] Benjamin Franklin's Domestic Accounts, Vol. 7, Nov. 5, 1763, MS, American Philosophical Society, cited in Peterson, "American Notes", 22.

primary rooms that were certainly heated.

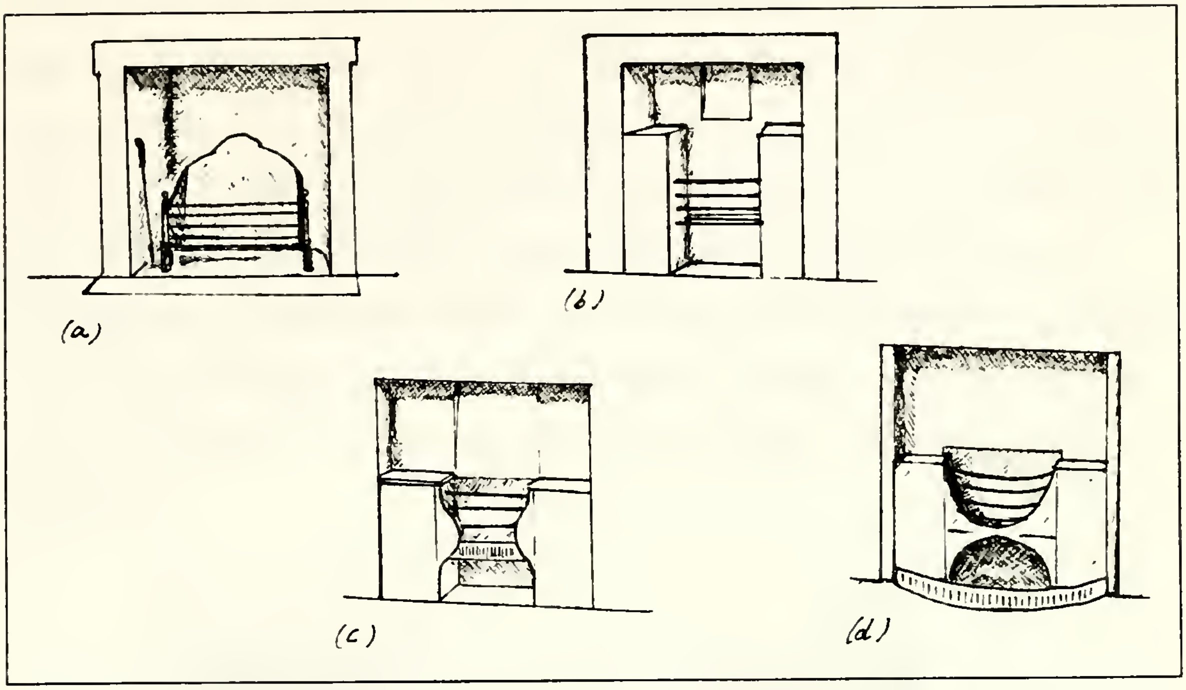


Fig. 5. Coal Grates from the 18th-Century
Grate forms (a) Basket grate, (b) a grate made of bars set into masonry hobs, (c,d) two styles of cast iron hob grates.

## Stoves

To the average 20th-century American, "stove" denotes a closed chamber containing a fire for the purpose of warming a room or for cooking. In 18th-century America and England, stove could denote any sort of portable device for containing fire. Hence, Thomas Chippendale could refer to his designs for basket grates as "Stove-grates", and Franklin's Pennsylvania Fireplace could be called a "stove" even though the front was open.[22]

[22] Thomas Chippendale, *The Gentleman and Cabinet Maker's Director, London*, 1762, plate 190, reprinted by Edgerton,

Closed stoves were also occasionally referred to as draft or wind stoves, particularly by peoples familiar with German five-plate stoves. Draft stoves are designed to contain an active fire, drawing air in, and expelling smoke out a flue pipe. They were often referred to by their form of construction, hence "plate stoves" refers to the iron plates that make the sides of the box, and likewise, "cannon stoves" describe their round tubular shape. Closed stoves were sometimes called "Dutch" or "Holland" stoves by the English.[23]

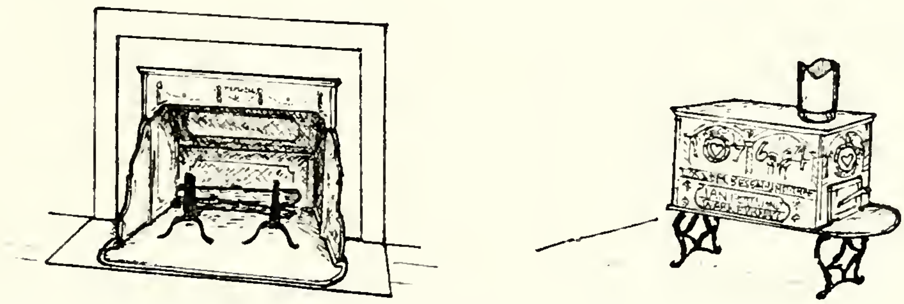

Fig. 6. Example of Open vs. Closed Stove
Open stove shown set into fireplace with andirons, contrasted with a closed draft stove made of six plates.

From the inventories examined, it is apparent that stoves remained a rarity in dwellings through much of the eighteenth century. However, starting in the 1770s there was a gradual increase in the number of stoves appearing in

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"Heating Stoves in Eighteenth Century Philadelphia," 79; Webster & Parkes, *An Encyclopædia of Domestic Economy*, (1849 American edition), 97, item 337.

[23] Edgerton, "Heating Stoves," 16-28, and fig. 10, 13-14; is the best source; Mercer, *Bible in Iron*, 81-6, fig. 256-308, 332; was more interested in decorated examples.

households. Then, after the American Revolution, there appears to have been a jump in the numbers, with about half the inventories having a stove. But this needs to be qualified.[24]

Of those stoves described, it is apparent that about half of them were "open" stoves. In some cases this was stated, in others, it can be deduced. For example, Mr. Neave's "ornamented iron stove" was accompanied by "dogs" and a "bar", which could not have been used in a closed stove.[25]

Another qualification is that the closed stoves appear to have been associated with work spaces (until c. 1790). In these inventories, they are found in an "office", a "shop", and an out-building. The use of closed stoves in work and public spaces had been suspected by other historians, and these probate inventories provide support for their observations.[26]

Finally, it must be noted that one stove (in Paschall's parlor) was worth only a fraction of what other stoves were valued. It must be considered likely that this was a foot stove (foot warmer) rather than an open stove.[27]

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[24] See Table 2 in Chapter 4.

[25] Samuel Neave's Will and Inventory, 1774 No. 38, Philadelphia Register of Wills, Philadelphia, Pa. (see Appendix B: Inventory Study)

[26] Edgerton, "Heating Stoves," 26, 82-3.

[27] Benjamin Paschall's Will and Inventory, 1785 No. 1222, Philadelphia Register of Wills, Philadelphia, Pa. The iron stove in his parlor was worth 4s.6d., while the stove with pipe and

Foot warmers, or stoves, did not appear often in the inventories examined, but they were another method employed to keep warm. Even more so than fireplaces, foot stoves and warming pans provided warmth to a specific point, and any warming of the surrounding air was incidental.

*Warming pans* appear in over half of the 18th-century inventories examined. The numbers give the impression that by the 1770s even people of middling and lower means could afford these conveniences (see table 1). They also give the impression that the Revolutionary War disrupted this trend, which would make sense in light of the harsh conditions in the city during that time (1777-83).

Table 1.
Warming Pan Ownership by Decade

| Decade | Number of Houses with Warming Pans | Total House Inventories | Fraction of Houses with Warming Pans |
|---|---|---|---|
| 1730s | 1 | 2 | 50 % |
| 1740s | - | 0 | na % |
| 1750s | 3 | 10 | 30 % |
| 1760s | 1 | 2 | 50 % |
| 1770s | 12 | 16 | 75 % |
| 1780s | 3 | 6 | 50 % |
| 1790s | 4 | 5 | 80 % |
| 1800s | 6 | 8 | 75 % |
| 1810s | 7 | 17 | 40 % |
| 1820s | 3 | 16 | 19 % |
| 1830s | 4 | 10 | 40 % |
| 1840s | 0 | 10 | 0 % |
| 1850s | 0 | 10 | 0 % |

*Source:* Inventory Study, see Appendix B .

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trivet in his office was valued at £1 10s. (i.e. 30s.) which is in line with what stoves are being valued at in other inventories.

## Refinement of Chimney Technology

It has been observed that by the middle part of the 18th century, the chimney fireplace had been refined. In general, the opening was not as large as it had been, the jambs were often coved, angled or stepped, and a depression inset into the back where it joined the flue.[28]

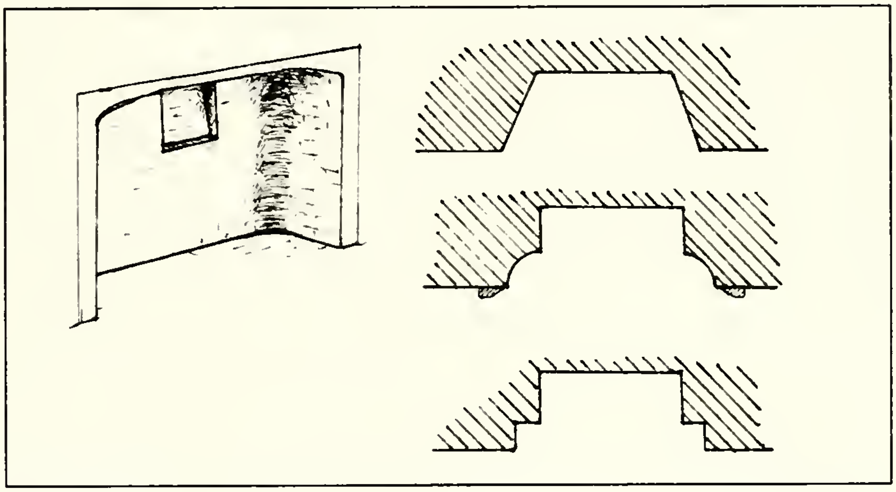

Fig. 7. Fireplace Characteristics

Fireplace with curved corners and sloped and inset back "draft" (*left*). Shaped jambs; angled, coved, and stepped ( *right*).

Two of these changes, the reduced fireplace size, and the inset in the back, can reasonably be explained as a

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[28] Henry J. Kauffman, *The American Fireplace*, 70, 76; Mercer, *Bible in Iron*, 98. Kauffman also remarks that the inset in the chimney back was less common in Pennsylvania than New England. Franklin, *Newly Invented Pennsylvania Fire-place* , 5-7, and again in *Observations on Smokey Chimneys* , 15; states that in the previous generation, fireplaces were built larger. A systematic survey ought to be conducted to support these anecdotal observations.

alterations to improve draft and save fuel. The shaping of the jambs may have been an attempt to put more heat into the room, or may have been only intended as a refinement in appearance.

As reasonable as these explanations appear, there is a dearth of documentary evidence. It might be expected that the leaders of Palladian architecture were the leaders of these improvements as well, but it does not seem to be so. A review of the most popular architectural books known to have been in colonial America reveals that the primary concern was the proportional relationship of the chimney-piece and the room. A few authors were concerned about smokey chimneys, but they do not specifically advocate any of the characteristics evident here.[29]

Finding precedent in British examples was very difficult, because, as noted previously, the British had been rapidly switching over to semi-permanent grates. In addition, the British had used iron fire-place backs, jambs, and hearths since the 17th century, but these appear to have been less common in colonial America. (Iron chimney backs - now generally called fire-backs - have been linked to a number of prominent Philadelphia area houses, but how widespread their use was has not been ascertained.)[30]

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[29] See Appendix A. The Chimney in Architectural Books based on Helen Park, *A List of Architectural Books Available in America Before the Revolution* (Los Angeles: Hennessey & Ingalls, 1973 edition).

[30] Parissien, *Palladian Style* (1994) 106, states that fire-backs

Even so, it seems that the English had also improved their fireplaces by reshaping the back, generally with a slope leading back into the flue, a feature evidenced in many iron hob-grates as well. It also seems that the knowledge and skill required to create a chimney that drew well is evidenced in the existence of the "bath stove grate" and the "tap room grate" in the second half of the 18th-Century.[31]

Whether this increased knowledge came from experience, or from scientific developments, or a combination, is not clear. It also remains unclear how this knowledge was being transmitted: if not by the architects, then perhaps it was through the builder's companies, the guilds and the apprentice system.

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were always used (in England I assume). Edgar Mayhew & Minor Myers, Jr, refer to, but do not cite, a Winterthur study that concluded Pennsylvania German's in Berks County did not use andirons or firebacks in *A Documentary History of American Interiors* page 76. See Mercer, *Bible in Iron,* for description and illustrations of an example of a fireback for Graeme Park and another for James Stenton at Stenton, fig. 385 and 386.

[31] Wright, *Home Fires,* 86; describes the tap-house grate, which Franklin calls a "Staffordshire fire-place" in *Observations on Smokey Chimneys*, 36. Both Wright and Parissien believes "Bath" describes a grate with a tight fitting surround, and this is what I mean here, but I am not convinced this is the correct definition of a "Bath Grate". Wright's citation for figure 87 indicates he got his definition from Bernan. But Webster & Parkes, *Encyclopædia of Domestic Economy* (1848 ed.), who write at the same time or slightly earlier than Bernan, do not show a surround on their "Bath Grate" (page 96).

CHAPTER 3

# THE CHIMNEY "PERFECTED"

Count Rumford[32] was the first natural philosopher to have a widespread impact on the construction of chimneys. He accomplished what his predecessors had not; he was cited in popular architectural guidebooks. However widespread his influence, his design and its principles did not become universal, much to the chagrin of Rumford and his later disciples.

Perhaps Rumford's most important talent was his ability to apply experimental science to practical solutions. In the case of his chimney design, one goal was to minimize the heat conducted away by air above the fire. To do this he determined the minimum throat size and shape by experimentation. Likewise, Rumford tested designs and materials that would maximize the fact that an open fire directly radiates heat into a room.[33]

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[32] The Massachusetts born Benjamin Thompson was knighted by George III in 1784, and made a Count of the Holy Roman Empire in 1793 by Elector Karl Theodor. (Sanborn C. Brown , *Men of Physics: Benjamin Thompson- Count Rumford* , 3-9)

[33] Count Rumford, "Chimney Fireplaces, with Proposals for Improving them..," in *Collected Works of Count Rumford,* edited by Sanborn C. Brown, (Cambridge, Mass.: Belknap Press of Harvard University Press, 1969) Vol. 2, 247, 232, 235-6, 240-2. First published as *Essays Political, Economical and Philosophical [No. 4]* All page numbers are those in *Collected Works.* According to the editors, this version was put together primarily from the 19th-century *Complete Works of Count Rumford* , as a composite from various original editions.

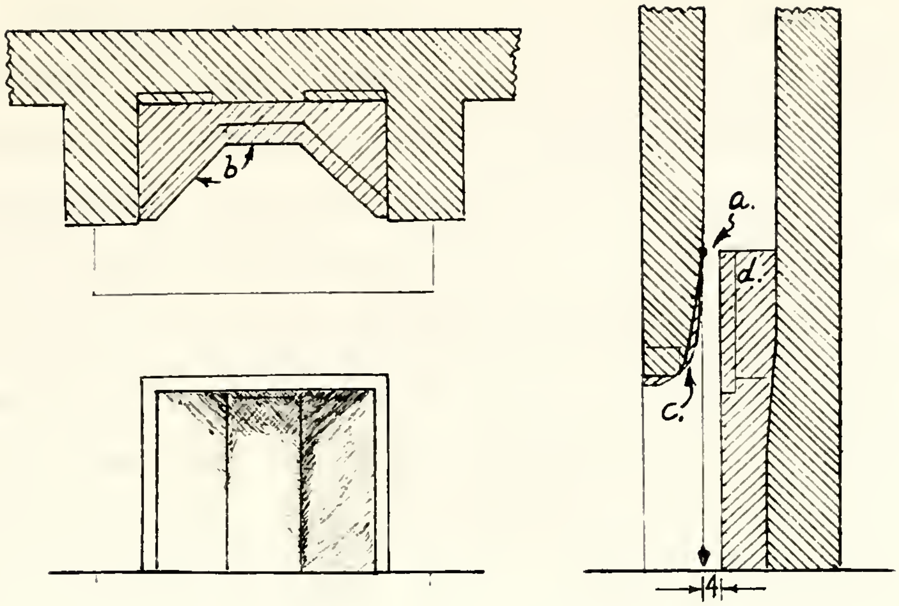


Fig. 8. Characteristics of a Rumford Fireplace

(a) Throat is a four inch slit.
(b) Jambs form a large angle with the back, 130 or 135 degrees if possible.
(c) Breast (behind mantel) is convex.
(d) Smoke shelf is above the mantel (made to be removable for cleaning).

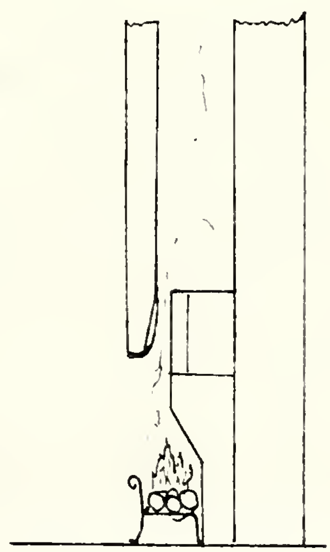

Fig. 9. A Rumford Fireplace with Altered Back

This improvement occurred when Rumford modified a chimney with a thin breast, forcing him to "reverse" his design.

Rumford's guidelines for building chimneys were first printed in 1796.[34] One of the main features was that the throat (a new use for this word) was made into a slit, four inches deep and the same width as the flue. The depth of the fireplace was then reduced to four inches plus the breast (the masonry above the mantle). A related feature was placing a smoke shelf *above* the height of the mantel. The other main characteristic was that the width of the fireplace back was only about one third (1/3) the width of the fireplace opening. As a result, the angle between the back and the jambs could be as wide as 135 degrees, maximizing the heat radiated into the room. Rumford also reported that he had discovered (by accident) that the upper portion of the back could often be sloped forward, directly over the fire. This sloped back then radiated heat into the room that would have otherwise gone entirely up the flue.[35]

One designer apparently impressed by Rumford's design was Asher Benjamin (1773-1845). Benjamin incorporated much of the design into the first edition of his *American Builder's Companion* (1806). Unlike designs in his earlier *Country Builder's Assistant*, all of the floor plans of

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[34] First publication can be inferred (Rumford, *Collected Works*, 296, 516) as the fourth in his series *Essays Political, Economical and Philosophical* (London: T Cadell, Jr. and W. Davies, 1796).

[35] Rumford, *Collected Works*. See pages 221 -307 for the "Chimney Fireplaces, Proposals.." and "Supplementary Observations concerning Chimney Fireplaces." See note on page 265 about sloping the back wall.

houses show fully angled fireplace jambs. Additionally, Benjamin refers to "Count Rumford's experiments," and in subsequent editions he added a section on Rumford roasters and ranges.[36]

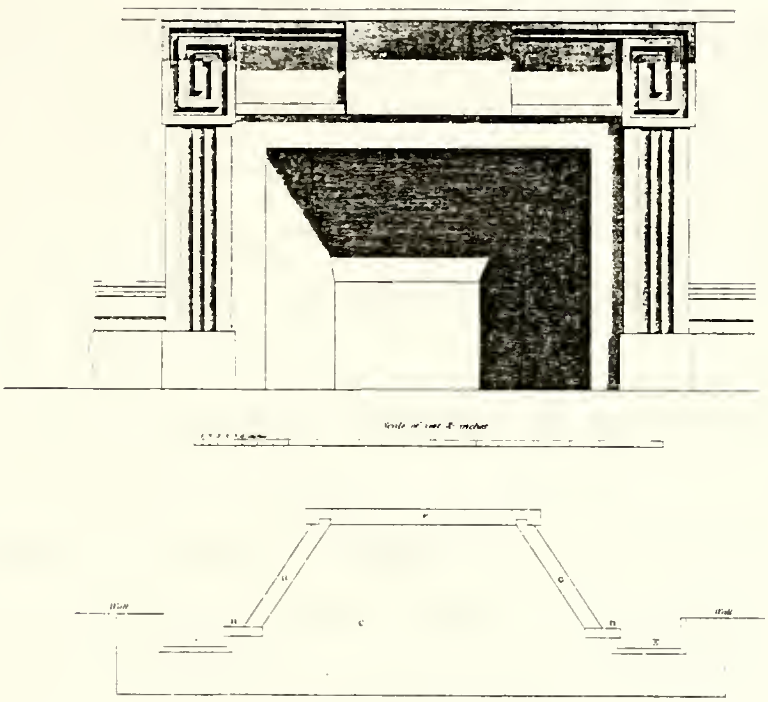

Fig. 10. Rumford in an Asher Benjamin Chimney-piece

Rumford's advice to have the jambs near 130 degrees to the back can be seen in the plan and elevation of an Asher Benjamin chimney-piece, plate 30 from *The Practical House Carpenter* (1830). (Reduction from Da Capo Press reprint, 1972)

Rumford's influence is also apparent in Benjamin's later

[36] Asher Benjamin, *American Builder's Companion*, [First ed.] (Boston: Etheridge & Bliss, 1806), see page 49 for quote, plates 33, 34 for plans. In subsequent editions the quote is on page 77, and plates are 51, 52; Asher Benjamin, *Country Builder's Assistant* (Greenfield, Mass.: Thomas Dickman, 1797), plates 25, and 26. Subsequent editions are the same.

*Practical House Carpenter*, (Boston: R.P.& C. Williams, 1830). In this work are detailed fireplace elevations and plans that accompany the chimney-pieces. They are clearly based on Rumford's guidelines, although he is not mentioned by name in the text.

While Rumford's recommendations were first printed in England, there apparently was enough demand in America to warrant an American printing as well. Nevertheless, Benjamin's two books went through a total of ten editions and would have been the major American source for spreading Rumford's theory.[37]

It is this appearance in popular architectural books that sets Rumford apart. Louis Savot had discussed fireplaces at length in *L'Architecture Francoise*, but this seventeenth-century book was aimed at aiding the "Gentleman of France," and apparently did not make its way to these shores until many years later.[38]

It is also true that some philosophical men of Philadelphia were familiar with the works of Nicholas

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[37] Count Rumford, *Essays Political, Economical, Philosophical [No. 4]*, Vol. 1, 1st American edition from the 3rd London edition (Boston: Loring & Manning, 1798), reprinted in G. Curtis Gillespe, *Rumford Fireplaces & How they Are Made* (NY: William T. Comstock, 1906).

[38] Savot's *L'architecture Francoise Bastimens Particulars* first was published in 1624 and last in 1685. See page iii of Blondel's introduction (1685 ed.) as well as Savot's introductory chapters (1-3)for purpose of the book; pages 140 - 162 for chimneys. For the absence of French architectural books in colonial America, see Park, *List of Architectural Books Available* (1973 edition), page x.

Gauger, who based an improved fireplace partly on what Savot had described. For example, James Logan had a copy of Gauger's book, and he experimented with air passages in one of his fireplaces. Benjamin Franklin specifically credits Gauger and Desaguliers, who translated and enlarged upon Gauger's treatise, in his pamphlets.[39]

But the evidence is that even James Logan did not find air passages worthy enough to incorporate throughout his house. Although, he apparently liked the concept enough to also try one of Franklin's Pennsylvania Fireplaces. So even amongst those who read these treatise on chimneys, the impact on their houses was limited.[40]

Franklin's fireplace, like those designed by his predecessors, was apparently too complicated and too expensive for most people. Like Rumford, Franklin's name would soon become synonymous with fireplace improvement, but "Franklin Stoves" of the nineteenth century only vaguely resembled his Pennsylvanian Fireplace; the appellation

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[39] Edwin Wolf, *The Library of James Logan* (Phila.: Library Company of Philadelphia, 1974), 794, shows Logan had a 1714 printing of Nicolas Gauger's *La Mecanique du Feu*; Reed Lawrence Engle and John M. Dickey, "Stenton Historic Structure Report," TS (Media, Pa.: Nov. 1982), 274-287; Franklin, *New Invented Pennsylvanian Fire-place*, 5, 29; John Theophilus Desaguliers translation into English came out in 1715 as *Fires Improv'd*, although a 1716 version, possibly pirated, *The Mechanism of Fire Made in Chimneys*, is a more direct translation of the original title.

[40] Engle and Dickey, "Stenton," 255, 268, 274-87, 318, 382; and 54-59 for evidence of a Pennsylvanian Fireplace.

"Franklin" was apparently applied rather liberally.[41]

Rumford's impact is hard to ascertain today. In 1798, Rumford wrote that in the two years since his fourth essay, the improvements he recommended were "coming into use" around Britain, but that many installations were flawed. Not long afterwards, Thomas Webster wrote that because of Count Rumford "a great reformation has taken place." But then he noted that although thousands of old chimneys had been altered, and their jambs "Rumfordized", much of Rumford's principles of fireplace construction had since been forgotten.[42]

A similar phenomenon occurred in America. In 1850 Andrew Jackson Downing complained that chimney builders were ignorant of the basic principles laid down by Rumford for building chimneys that did not smoke. An examination of some surviving 19th-century grates and fireplaces lends support to his allegations.[43]

Even in 20th-century America, at least two more books were published with how-to information by people railing

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41 Edgerton, "Heating Stoves," 22-3.

42 Rumford, *Collected Works* (1969), 296; Thomas Webster and Mrs. William Parkes, *An Encyclopædia of Domestic Economy*, (New York: Harper & Brothers, 1848), 93-4, 96. The exact dates Webster refers to are unclear, but the text is from the London edition (1844). When he writes that much has been forgotten since Rumford left Britain, I presume this refers to Rumford's move to France during Napoleon's reign.

43 A. J. Downing, *The Architecture of Country Houses* (1850), 175, and 179 n. for credit to Rumford. The sitting room coal grates in the 1886-7 Regent Square development are examples.

against the ignorance of Rumford's principles. Yet, it must be pointed out that at least some of his principles have survived; having been incorporated into the chimney building traditions of the southern Appalachians. How much should be read into this is, of course, a matter of debate.[44]

Two other technological advances associated with chimneys appear to be gaining popularity around 1800. The first was the use of a register in the chimney. The second was the use of fire-brick in fireplace construction. Like Rumfordization, a large-scale comparative study of surviving, dateable chimneys might provide evidence for what otherwise can only be inferred.

Chimney registers had been around since the seventeenth century; they are now generally called dampers. Late in the eighteenth century they appear to have become popular in England in the form of "register grates". Rumford was initially opposed to registers, and especially register grates. Rumford's first objection was that any excess metal in the fireplace wasted heat; because it absorbed heat faster than masonry and therefore transferring more heat away from the room. He also objected that the registers were attached behind the mantel; this would force smoke into the room when the fire was built toward the front of the

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44 G. Curtis Gillespe, *Rumford Fireplaces and How They Are Made* (NY: William T Comstock, 1906); and Vrest Orton, *The Forgotten Art of Building a Good Fireplace* (Dublin, NH: Yankee Books, 1974). Eliot Wigginton, *The Foxfire Book* (Garden City, NY: Anchor Books, 1972), 111-13.

fireplace, where Rumford wanted it. He had found that bringing the fire forward in the fireplace maximized the heat put into the room.[45]

In 1798 Rumford conceded registers could be beneficial, admitting they could help keep a room warm when the fire was out. His caveat was that the register be at the throat, and that it be removed, or slid, so it was completely out of the way when the fire was burning. (In contrast to registers that only pivoted within the opening.)[46]

Rumford often mentioned fire-stone in his essay and it is not clear if this is the same as fire-brick. He seems to assume that masonry materials that would withstand direct flame were readily available. A study of the use of fire-brick in America is beyond the scope of this inquiry. Yet, it would be interesting to determine if the declining use of fire-backs may have been, in part, due to the new availability of fire-brick.[47]

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[45] Savot, *L'Architecture Francoise* (1685) 158; The *Oxford English Dictionary* first finds the term "damper" used this way in 1788, but I have yet to come across it in an 18th or early 19th century text, so its use was apparently limited; Webster & Parkes, *Encyclopædia*, 95; Rumford, Collected Works, 241-44.

[46] Rumford, *Collected Works*, 302.

[47] Ruford, *Collected Works*, 241-2; From Peter Nicholson's *Encyclopædia of Architecture* (NY: Johnson, Fry & Co., abt. 1858) it can be implied that even in the 1850s that the manufacture of fire-brick was dependent upon "a natural compound of silica and alumina" free of lime, that was available in only a few places.

# CHAPTER 4

## EVIDENCE OF PERVASIVE STOVE USE

While fireplaces remained common, the first decades of the nineteenth century saw a sustained growth of domestic stove use. The data collected here indicates that by the 1830s most Philadelphia houses had at least one closed stove. It also suggests that stoves were still viewed as utilitarian devices; not until the 1840s did they begin to appear in more formal settings.

To determine the extent of both fireplace and stove use, a database was compiled from administrative and probate inventories of Philadelphia County.[48] Every item relating to house-warming was noted, along with its location, and when possible, its value. Advantage was taken of the fact that both technologies use objects that would be recorded in household inventories. These include andirons, to hold burning wood, grates to burn coal, and shovels and brushes to clean the ashes. Stoves were usually listed as a possession of the deceased, even if they were "open" stoves set into the fireplace.[49]

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[48] Old Philadelphia County, including what became Montgomery County.

[49] Most of the inventories were those used, and often transcribed in, the Historic House Interiors Inventory Studies and the Historic House Reports written by graduate students in the University of Pennsylvania's Historic Preservation Program. Both collections are The Athenaeum of Philadelphia. See Appendix B. It is likely that this skewed the results toward households of greater wealth and larger houses.

As this information was being compiled, a judgement was made about the primary and secondary forms of heating present in each space. For example, the presence of andirons, tongs and an hearth brush were considered excellent indicators of a wood burning fireplace. When a decade appeared pivotal, an effort was made to increase the number of inventories examined for that time period.

The survey shows that the number of houses with at least one stove increased about 10% per decade from the 1770s through the 1830s, when ownership appears to level out at near 90%. As noted in Chapter 2, in the eighteenth century a significant portion of these houses actually had open stoves, not closed stoves. The number of closed stoves that appeared in the households studied increased significantly during the 1790s, to about 40%, and then again in the 1820s, to 80%.

While the presence of closed stoves increased, the relative number of open stoves declined. Nevertheless, many houses from the 1800s through the 1820s had both closed and open stoves (1800s-63%, 1810s-35%, 1820s-25% of total).

Table 2.

Stove Ownership by Decade

| Decade | Total Number of Inventory Houses | Number of Houses with Stoves | Number of Houses with Closed Stoves | Percent of Houses with Stoves | Percent of Houses with Closed Stoves |
|---|---|---|---|---|---|
| 1730s | 2 | 0 | 0 | 0 % | 0 % |
| 1740s | 0 | - | 0 | na | na |
| 1750s | 10 | 0 | 0 | 0 | 0 |
| 1760s | 2 | 0 | 0 | 0 | 0 |
| 1770s | 16 | 4 | 3 | 25 | 19 |
| 1780s | 6 | 2 | 1 | 33 | 17 |
| 1790s | 5 | 3 | 2 | 60 | 40 |
| 1800s | 8 | 5 | 4 | 63 | 50 |
| 1810s | 17 | 12 | 8 | 71 | 47 |
| 1820s | 16 | 13 | 13 | 81 | 81 |
| 1830s | 10 | 9 | 9 | 90 | 90 |
| 1840s | 10 | 8 | 8 | 80 | 80 |
| 1850s | 10 | 9 | 9 | 90 | 90 |
| *Total* | *112* | *65* | *57* | *58 %* | *51 %* |

*Source:* Inventory Study, see Appendix B, particularly parts B-1 & B-3.

To provide a comparison with a less urban environment, similar information was extracted from two inventory studies of nearby Bucks County. In the first study, the summary table did not provide the details to compare the number of open stoves versus closed stoves. The second study did include the information and the result could be readily digested. The results suggest that open stoves were not as common in Bucks County as Philadelphia County, and that stoves in general were at least as popular in the nearby countryside as in the city.

Table 3.

Stove Ownership in Buck County

| Time Frame | Total Number of Houses | Number of Houses with Stoves | Number of Houses with Closed Stoves | Houses with Stoves (%) | Houses with Closed Stoves (%) |
|---|---|---|---|---|---|
| 1785-95 | 10 | 6 | na | 60 | na |
| 1800-09 | 18 | 14 | 13 | 78 | 72 |

*Source:* This analysis was derived Susan K. Wallace, "Bucks County Inventories 1785-95," Historic House Interiors Inventory Studies Collection, Item 4, Athenaeum of Philadelphia; and Kathleen K. Cook, "Bucks County, Pa Inventories 1800-1809," No. 5 in the same collection.

Although closed stoves had clearly become a part of the home of the 1820s, until the 1840s their use appears to be limited to informal or work settings. Very few were in a "parlor", and generally these are in back rather than the more formal front parlors. In fact, until 1843, only three inventories indicate a closed stove in any parlor (One in each of the following years: 1790, 1795, and 1834). This suggests that stoves were not initially considered acceptable in the most formal and public spaces of the house. In part this may have been due to the primitive and utilitarian nature of the early closed stoves. Many are described, particularly in the 1820s inventories, as plate stoves.

Plate stoves probably served as much for baking as they did for warming the room and the occupants. Many were found in or near kitchens, and many appear to have been ten-plate stoves or variations. (Ten-plate stoves were essentially six-plate stoves that had an oven compartment added inside.

It is believed that nine plate stoves were a variation on this concept.[50]) Many of the inventories also note "tin plate" stoves. It seems to me that in fact these are ten plate stoves, particularly in light of the fact that "tin" plate stoves are unmentioned in histories of stoves, and their prices appear to be similar. (see page 40n.)

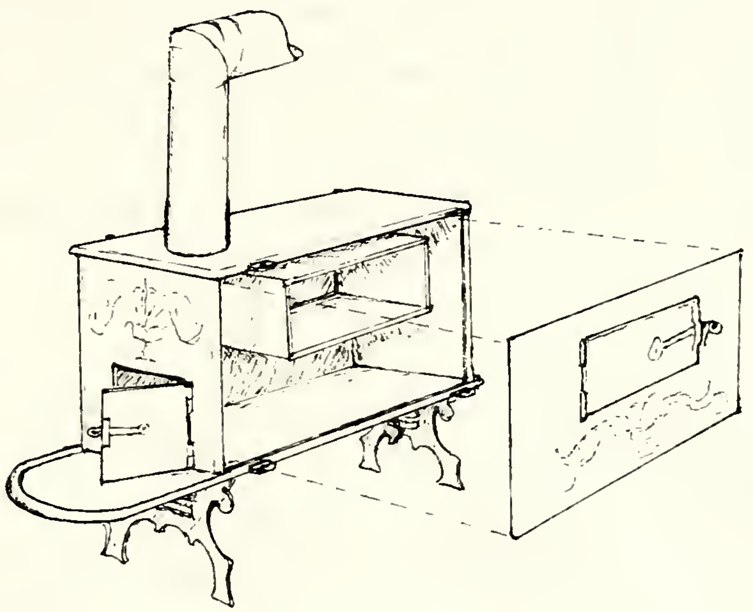

Fig. 11. Schematic View of a Ten Plate Stove

In fact, it is interesting to observe that in the 1840s, when stoves begin to appear in public rooms, it is often in the new "dining" rooms. One is led to speculate that the association of stoves with baking, along with the interior arrangement of such rooms, encouraged the acceptance of

[50] Mercer, *Bible in Iron*, 86-88; Edgerton, "Heating Stoves," 27.

stoves for warming them.

It must be noted that although stoves could be found in most houses, fireplaces had not been entirely displaced, and continued to be used in many rooms. One weakness of this study is that the inventories are primarily of personal possessions. As a result, a combination of diminishing relative value of fireplace equipment compared to other household possessions, and the more permanent nature of coal grates, is believed to be the reason these items may have been omitted from inventories after 1840. Just how common coal grates were is a question that must be left unanswered for now.

Table 4.
Decline in Fireplace References.

| Decade | Inventories with Fireplace Equipment | Total Number of Inventories | Houses with Fireplace Equipment (%) |
|---|---|---|---|
| 1800s | 8 | 8 | 100 |
| 1810s | 17 | 17 | 100 |
| 1820s | 16 | 16 | 100 |
| 1830s | 10 | 10 | 100 |
| 1840s | 1 | 10 | 10 |
| 1850s | 3 | 10 | 30 |

There is significant anecdotal evidence to support the empirical conclusion that stoves had become a common source of domestic warmth in the new Republic. For example, *Johnson's New Universal Cyclopedia* (1878) states that "stoves were generally used in offices and shops prior to

1825."[51] The acceptance of stoves may have been related to the changing population. In particular, the large influx of European immigrants who, unlike the British, preferred heated air in their dwellings. While this is difficult to prove, there is some logic to it. From the 18th century to the 20th, observers have noted the preference throughout Britain and Ireland for open fires over stoves or central heat. Clearly this had little to do with industrial capacity, or technical innovation, for the British Isles were leading producers of iron products during this period and had no lack of successful innovative stoves and heating systems. But, these stoves and heating systems were primarily for public spaces, factories, hospitals and the like.

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[51] *Johnson's New Universal Cyclopedia* (NY: Alvin J. Johnson & Son, 1878), s.v. "Stoves."

## CHAPTER 5

## AFFORDABLE WARMTH

The prevalence of stoves in the 1820s was certainly assisted by the fact that they became more affordable. For at this time, there appears to have been a significant decrease in purchase price, and an increased interest in economizing on fuel.

*Background To the Price Comparisons:*

In examining prices of stoves and fuel, the actual value given in the primary source was always used. However, it is understood that there were fluctuations in the value of currency over time. Instead of addressing this problem by adjusting the prices, comparisons were made with other material possessions, and with income estimates.

The primary reasons for not making adjustments, was that it would be tedious, with little assurance that the comparisons would be any more valid with them than without. For early America, such adjustments would have required significant interpolation from the few representative years for which estimates of the changes in currency value have been made. These estimates are sufficient to indicate general long term stability, except for a period in the early 1800s when the dollar's value became almost 50% greater than when it had been first issued in 1792.[52]

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[52] Alice Hanson Jones, *American Colonial Wealth: Documents and Methods*, 2nd ed., vol. 3 (1977), 1705-1720.

Even when it was necessary to convert money based on the old British system into a decimal form, no attempt has been made to adjust its value to a consumer price index. When comparisons were made with later items priced in US dollars, the conversion rate used was $1.00 equaled 7.45 shillings (decimal), or about 0.7.5½ Pennsylvania currency.[53]

There seems to be general agreement that the disposable income of families in the Philadelphia area increased slowly but steadily through the second half of the 18th century, ignoring the short term fluctuations (particularly during times of war), and also through the early nineteenth century. There also were several periods of decline, the first in 1819, and upheavals in the work place that kept real incomes from rising significantly through 1850. Nevertheless, through most of the period under examination, historians seem to agree that there was a steady increase in most families' material possessions. This may have had as much to do with the declining price of goods, as gains in disposable income.[54]

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[53] Jones, *American Colonial Wealth,* vol. 3, pp. 1705-1720. Jones estimated the conversion rate of £1 sterling to $4.56 for 1792 their respective gold & silver values. Pennsylvania money was traded at £1.14.0 to £1.0.0 sterling (that is 1.7 to 1 in a decimal system).

[54] Edwin J. Perkins, *The Economy of Colonial America*, 159, 163-4; Lance Davis, et. al., *American Economic Growth: An Economist's History of the United States*, 25; Lorena Walsh, "Consumer Behavior, Diet, and Standard of Living in the Late Colonial and Early Antebellum America, 1770-1830" in *American Economic Growth and Standards of Living Before the Civil War*, ed. by Gallman & Wallis, 218, 220-2, and also see table 4-2.

When possible, the prices of goods taken from the probate inventories have been supplemented with known purchase costs on similar items. This serves as a check against the depreciation assigned worn and used stoves, and really helps to provide a more complete picture of fuel costs.

## Price of Stoves

During the first three decades of the nineteenth century, the inventories suggest that the price of stoves dropped in absolute terms. They also dropped in relative terms, compared both to fireplace equipment and to other household possessions. To see the trend in the prices assigned stoves in inventories, the different types of stoves had to be separated. Three types of stoves were identified often enough to suggest trends: open stoves, ten-plate stoves, and kitchen stoves. Even with these divisions, there were sometimes great differences in the given value of a stove depending on its condition and size.

Of these three groups, ten-plate stoves are the most important type related to the adoption of stoves for the purpose of keeping warm. Open stoves still represented a preference for warming the body directly (rather than heating the air), while kitchen stoves were primarily used for food preparation. One could argue that ten-plate stoves also served a cooking function, but baking in a stove is a

far cry from cooking on one.[55]

In preparing the charts, if the stove lacked a description, its room location was used (if known) to assign it a category. Additionally, similar stoves types were grouped under a single heading: Franklin stoves went with open stoves, nine-plate and baking stoves grouped with ten-plate stoves, and all kitchen and cooking stoves grouped together. It was also determined that *tin* plate was probably either a dialect, or transcription "error" for *ten* plate.[56]

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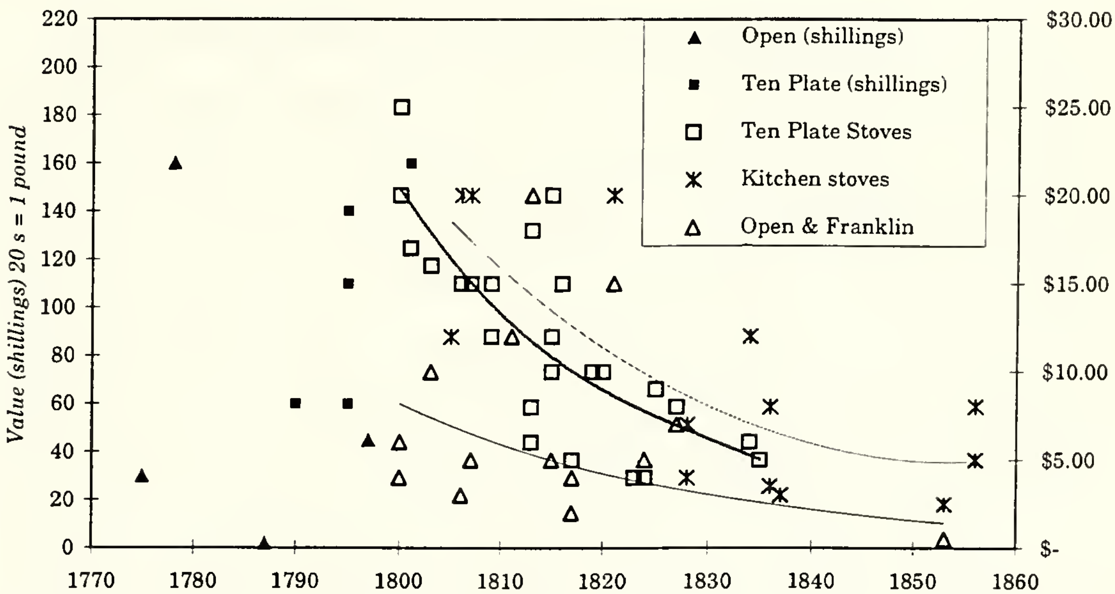
[55] Baking in a plate stove is similar to baking in an iron dutch oven, a familiar and readily learned skill for anyone familiar with cooking in a fireplace. Running a cookstove requires a whole new method of fire management. I can state from experience, it is daunting, even after it has been explained to one skilled in open hearth cooking. In 1830, when the Burnetts send their brother Samuel to the iron merchant Samuel Wright, he is not only to set up the cook stove, but demonstrate how to use it. Barnett to Wright, 16 July 1830, Wright Family Papers, Accession 1665: Box B-1, folder Samuel Barnett, Hagley Museum and Library; A similar conclusion is drawn from an 1839 *Journal of the Franklin Institute* by David Handlin in *The American Home* (Boston: Little Brown & Co. 1979), 478.

[56] A significant proportion of the plate stoves mentioned are "tin plate", but there are several sound reasons why these are probably ten plate stoves made of iron castings. For one, tin-plate, the hot dipped sheet iron, was a thin material assembled by lock folds and solder, a rather unsound choice for containing a hot fire. For another, when sheet iron was used, it appears to have been usually named as such. When sheet iron was used for "stoves", it was for devices like foot warmers that held only embers (or "coals" as they would have said) and were relatively inexpensive. Not one of the sheet iron stoves found in these inventories exceed $1.50, while the prices for tin plate stoves were in line with those for ten plate stoves and never went below $4. Finally, to support the dialect theory, from the records of Colebrookdale Furnace there is a receipt of Sept 27, 1793 for castings of a "Tin plate" stove and on the same are four gallon "kittles" and cooking pots. (Hagley Museum & Library, Item 35 on Microfilm reel M-9, in the Potts-Rutter papers.)

As shown in chart 1, the price trend of closed stoves dropped from 1800 to 1810, with a low price of $12.00. From 1810 until 1820, a wide range of prices appear, although the average continues to fall. Then, after 1820, hardly a stove is priced at more than $10.00 and after 1830 many are priced near $5.00. It should be noted that although open stoves appear much cheaper than closed stoves, they had the additional cost of andirons (or grate) and fenders.

Chart 1. Value of Stoves Given in Sample Inventories




The drop in price has been attributed to a combination of factors. For one, after a period of expansion, the iron business suffered after the War of 1812, and competition and foreign imports kept profits to a minimum and probably pushed prices down. For another, the cost of transportation

and assembly was dropping as transportation improved and immigrants enlarged the labor pool. Finally, it can be speculated that the increased volume of business made production cheaper.[57]

Few records have been found for the actual purchase cost of stoves in this time period. While they are too few to determine if the trends are correct, they do indicate that prices in the inventories are probably reasonable, but less than the cost new. Further research into actual purchase prices ought to prove fruitful.

An understanding of both the iron trade and Colonial/State money is critical in figuring costs and prices charged. In brief, the iron furnace produced stove castings that were sold by weight. The selling merchant had them finished and mounted (i.e. assembled), the cost of which was per stove. The purchaser then still needed to pay for carting it and having it set up, and any pipe required. Therefore, rarely do retail stove prices appear in iron masters' or merchants' account books. Only a store merchant's day books or a buyer's journal might have such an entry.

Still, some very important things were learned from the papers of iron merchant Samuel Wright. For one, the primary cost of stoves was in the iron, at least at the end of the

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[57] Clark, *History of Manufactures*, 1:347, 377, 378.

1820s. For example, the New York price for assembly was $3 or $4 per stove while the plates cost around $8. For another, the sellers found the market seasonal, with most of their sales in the late Fall.[58]

It was also possible to estimate the cost of stove plates from some of the correspondence. We know that Wright was charging around $60 per ton for stove plates, and several letters tell us the quantity of stoves and their weight, which allows us to estimate a price for one stove's castings. It is important to realize that weight was still given in Tons, hundreds, quarters, and pounds. One Ton was 20 hundreds, one hundred-weight was four quarters, and one quarter-hundred-weight was 28 pounds. I suspect unwary researchers have been confused by this system and the fact that into the 1790s money was written in a very similar manner, that is pounds, shillings, pence.

Stove prices earlier than those in the Wright papers were compiled in Table 5, from prices cited by Samuel Edgerton in "Heating Stoves in Eighteenth Century America."

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[58] Letters received by Samuel Wright, Wright Family Papers, Accession 1665, Hagley Museum and Library. See the letter from Richard Manley (New Brunswick, NJ) 30 Aug. 1824 who writes that the cost of finishing stoves in New York is $3 for stoves up to 26 inches and $4 for larger stoves. Until the 1830s when stove making became a separate business, it was common for furnaces in NJ and Pennsylvania to have their stoves assembled in New York City or Philadelphia (Clark, *History of Manufactures in the US*, 1:502). For the selling season see letters from: Daniel Bates (Boston, Mass.) 4 June 1831, Robert Brookhouse (Salem [Mass.?]) 10 Dec 1822, and James Foster (Baltimore, Md.) 27 Dec. 1822 who writes that the season for selling is over and has only sold 3 because the stoves came too late and were not assembled in time.

As with the prices from the Wright papers (shown in Table 6) most are wholesale prices of the plates alone. To that figure might be added the cost of bolts, finishing and assembly - although some of the letters to Wright imply that the iron merchant bore that cost. Occasionally a customer price was found and is listed in Table 6 with an asterisk. In the case of Henry Drinker's 8-plate baking stove, we also know it cost him another £3.15.0 for making doors and assembly, £1.13.9 for 18 lbs of pipe and £0.8.4 for a pan; in all, an additional £5.2.1 for a stove whose castings cost £4.

Table 5.

Sale Value of Stoves in the 18th-Century

| Year | Description | Weight cwt. qr. l. | Cost £.s.d | Cost $ equiv. | Reference‡ |
|---|---|---|---|---|---|
| 1772 | big 10 plate | 5.2.10 | 5.10.0 | $14.77 | Elizabeth Furnace |
| 1772 | small 10 plate | 5.0.0 | 5.0.0 | 13.42 | p. 68 |
| 1772 | big 6 plate | 4.0.0 | 5.0.0 | 13.42 | " |
| 1772 | mid. 6 plate | 2.3.12 | 3.0.0 | 8.05 | " |
| 1772 | small 6 plate | 2.0.25 | 2.5.0 | 6.04 | " |
| 1772 | big 5 plate | 4.0.0 | 5.0.0 | 13.42 | " |
| 1772 | mid. 5 plate | 3.1.9½ | 4.0.0 | 10.73 | " |
| 1772 | small 5 plate | 2.3.12 | 3.0.0 | 8.05 | " |
| 1772 | Moravian | 2.3.12 | 3.0.0 | 8.05 | " |
| 1772 | Open 6 plate | 3.3.21 | 4.19.0 | 13.29 | " |
| 1784 | small 8 plate | | 4.0.0 | 10.73 | Drinker, 33 n. 32 |
| 1784 | same installed | | †8.5.1 | †22.16 | Drinker, 33 n. 29 |
| 1788 | large 6 plate | | 3.3.0 | 8.45 | Drinker, 33 n. 29 |
| 1794 | pipe & 10 plate | | †8.10.0 | †22.82 | City, 34 n. 33 |
| 1794 | 7 plate | 2.2.0 | 17 - - | $5.70? | Reading Furnace, |
| 1794 | small 6 plate | 2.2.0 | 16 - - | $5.37? | p.34 n. 31 |

*Notes*: From Edgerton, "Heating Stoves in Eighteenth-Century Philadelphia", *APT Bulletin*, vol. III, no 2-3 (1971). ‡Reference is to primary source author, page number in article and chapter end note number. On page 94 he cites Drinker's price list for 1784, but the prices seem truly out of line with the smallest six plate stove at £65. The Reading Furnace prices appear to be for the lot of 8, but if it is in dollars then the price each is about two dollars. It seemed more likely the price was in £/s. †Price of installed stoves.

Table 6.

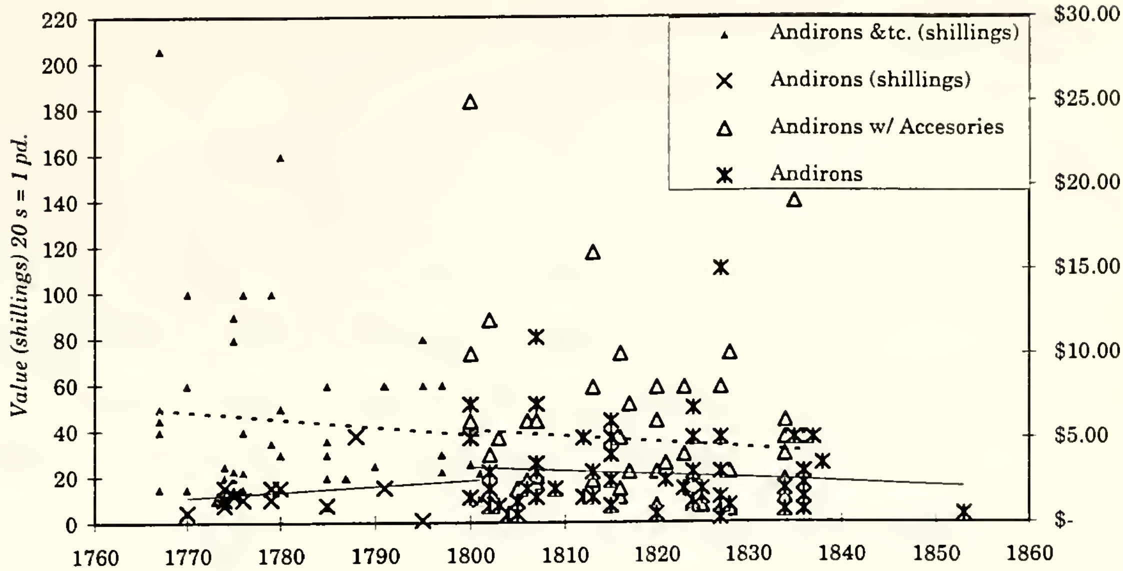
Wholesale Value of Stove Plates (from Wright)

| Year | Description | Weight | Cost‡ | Letter from |
|---|---|---|---|---|
| 1822 | large box | | $ 7.75† | C. Hollinshead |
| 1829 | Franklins ? | 508 lbs | 13.67 | R Buck |
| 1829 | Franklins ? | 300 lbs | 8.00 | R Buck |
| 1831 | *cook stoves* | *1.0.0* | *3.00* | Heermans, Rathbone & Co. |
| 1831 | *cook stoves* | *4.0.0* | *12.00* | Heermans, Rathbone & Co. |
| 1831 | Franklin | 3.0.8 | 8.90 | Sayre & Armstrong |
| 1831 | back & jambs | 1.1.7 | 3.94 | Sayre & Armstrong |

*Source:* Letters received by Samuel Wright, Wright Family Papers, Accession 1665, Hagley Museum and Library.
*Notes:* ‡Costs are figured from the charge of $60 per ton. The cook stove weights represent an inquiry, not an actual sale. A 112 lb. *cook stove* would actually weigh less than the 147 lb. back and jambs furnished to Sayre & Armstrong. It was assumed the charge for back and jambs was the same as that for stoves, but it was probably less. †From a pencil notation on the letter for a sale at cost. This may be the total price including assembly, but does not include portage to the site.

The drop in stove prices in comparison to both fireplace costs and other household possessions only reinforces the impression that stoves had become more affordable. For example, the value given for fireplace equipment, ignoring the high prices for fancy brass, was on average just under $5.00. While at the turn of the century, it is evident a stove would have required an investment several times that of a fireplace, by the 1830s it would have cost only a little more. In addition, not included in these fireplace estimates was the expense of a fire-back, and if coal was to burned, a grate. But in fact, as we have seen in previous chapter, Philadelphians were buying stoves even before the prices became comparable.

Chart 2. Value of Fireplace Equipment in Inventories




The value of stoves, and fireplace items, also dropped in comparison to other household goods. In the nineteenth century, there are an increasing number of references to mantle ornaments worth only a few dollars, as well as clocks and mirrors worth $10 and $20 or more. For example, Nathaniel Holland, a Hatter, had mantle glass worth $10, mantle ornaments worth $4, and his stove was worth $8.00 when he died in 1836. His poker, shovel and tongs were only worth $1.00, and brush worth just $0.50, almost not worth mentioning in comparison to the other goods.[59]

[59] Further study into both disposable wealth, and value of material possessions on probate inventories may lend support to this. For 1774, the average value of consumer durables listed in probate inventories in the mid-Atlantic colonies has been figured at £21.81 sterling or £37 Pennsylvania, but I have not found a similar study for the late 18th or early 19th century. Jones, *American Colonial Wealth*, 3:2011.

## Prices of Fuel; Coal & Wood:

The increased interest in fuel economy does not appear to be a direct result of a dramatic rise in fuel costs. Rather, it appears to have been a combination of perceptive citizens observing the decreasing size of wood lots, a slow rise in wood prices, and occasional short term, but severe, shortages of both wood and coal.[60]

In retrospect, long term fire-wood prices appear to have been stable for the eighteenth and early nineteenth centuries (ignoring the severe shortages and controls imposed during the Revolution). On the other hand, the rise in the price of wood (in Philadelphia) from about $2.50 a cord in the mid-1780s to about $5.00 by 1810, could have hardly gone unnoticed. In 1815, an observer in Baltimore commented about a similar price rise there.[61]

While it is possible that the rising price of wood at the end of the 18th century prompted an increased interest in stoves, it must be noted that the price appears to have been remarkably stable once it reached $5.00 per cord. In fact, according to a report in *Nile's Weekly Register*, the

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[60] Friends of Hall and Sellers, "The Following Observations on Improving the Navigation on the Schulykill..", *The Pennsylvania Gazette* (Philadelphia) Nov. 30, 1769. Included in these "Observations" is the need for access to the reputed coal fields above Reading. This coal will be needed because the Citizens "may apprehend Scarcity of Fire-wood in Time, for we know the Farmers do not sufficiently attend to the Increase or Preservation of Timber..."

[61] *Nile's Weekly Register* 9 (Oct. 7, 1815):95 . The writer states that in Baltimore, oak is hard to come by at $6.00 a cord but 30 years before it could be had for $1.75 to $2.00.

price of wood dropped by $1.50 in 1823. This drop may have been short lived; the values for fire-wood in the inventory study indicate that a few years later the retail price was back to $5.00 per cord.[62]

This same article attributed this drop in price (in May of 1823) to three factors. First, the improvements in the Lehigh and Schuylkill Rivers for navigation cut transportation costs; second, the use of fuel more economically; and third, the introduction of coal.[63]

We may infer that by "introduced" it was meant that a regular market for the use of coal in domestic heating was established. As noted in the discussion of coal grates (in chapter 2), coal appears to have seen only scattered use in colonial Philadelphia. As we shall see, prices for coal in Philadelphia suggest that by the 1820s it was becoming cheaper to use; but sudden shortages, combined with speculation, could still make the price swing wildly.

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[62] "Balance of Trade", *Nile's Weekly Register* 24(May 24, 1823):178. The prices given here are $4.50 and $3.00, but it must be noted that these are Spring prices and it is not clear if this is the price at the wharf or what end users were paying.

[63] "Balance of Trade", *Nile's Weekly Register* 24(May 24, 1823):178.

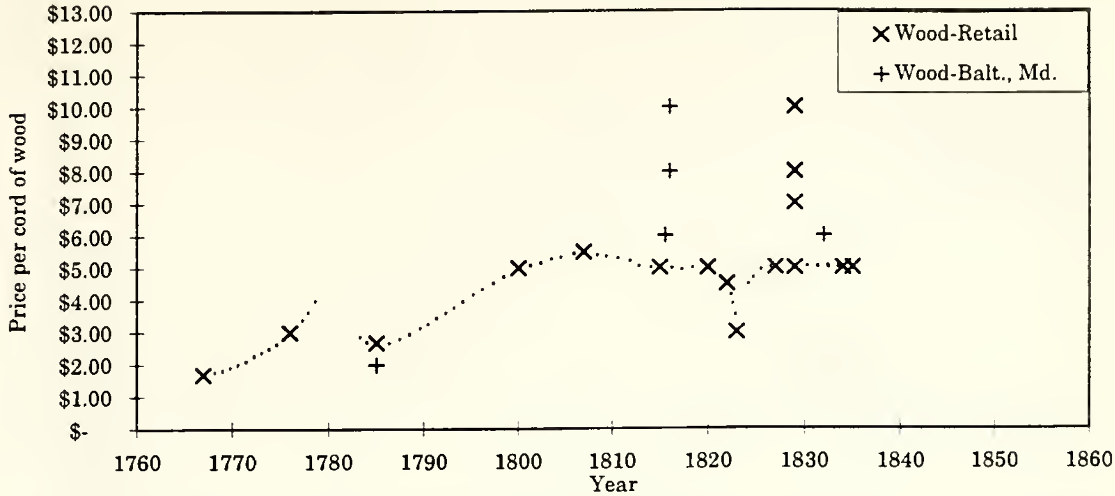
Table 7.

Fuel References In Probate Inventories Sampled

| Year | Decedent | Description | Quantity | Value | Value per qty | |
|---|---|---|---|---|---|---|
| 1767 | Shoemaker | Wood | 12 cords | £ 7.16.0 | £ 0.13.0 | cord |
| 1770 | Elfreth | Wood | | 0.10.0 | | |
| 1775 | Robinson | Wood & Lumber | | 0.15.0 | | |
| 1776 | Neave | hickory sawed | 3 cords | 3.7.6 | 1.2.6 | cord |
| 1785 | Paschall | Wood, oak | 11 cords | 11.0.0 | 1.0.0 | cord |
| 1797 | Leaming | Wood | 25 cords | 202.2.0* | 8.1.8* | cord |
| 1800 | Browne | Wood | 9 cords | $ 45.00 | $ 5.00 | |
| 1812 | Griffith | Wood | | $ 50.00 | | |
| 1813 | Truman | Wood, cedar | lot | $ 6.00 | | |
| 1813 | Truman | Wood, fire | lot | $ 30.00 | | |
| 1815 | du Plessis | Wood, fire | 2 cords | $ 10.00 | $ 5.00 | cord |
| 1820 | Shoemaker | Wood | 6 cords | $ 30.00 | $ 5.00 | cord |
| 1821 | Engle | Coal & Wood | | $ 32.00 | | |
| 1827 | Crawly | Wood | 8 cords | $ 40.00 | $ 5.00 | cord |
| 1828 | Sink | Coal & Wood | lot | $ 20.00 | | |
| 1834 | Price | Wood | | $ 30.00 | | |
| 1834 | Price | Coal | | $ 20.00 | | |
| 1834 | Steel | Coal | 3 tons | $ 15.00 | $ 5.00 | ton |
| 1834 | Steel | Wood | 5 cords | $ 25.00 | $ 5.00 | cord |
| 1835 | Twamley | Coal, Lehigh | 4.5 tons | $ 24.00 | $ 5.33 | ton |
| 1835 | Twamley | Wood | 6 cords | $ 30.00 | $ 5.00 | cord |
| 1835 | Pritchett | Coal & Wood | lot | $ 12.00 | | |
| 1838 | Sheepshank | Wood | lot | $ 1.00 | | |
| 1852 | Cooper | Coal & Wood | | $ 100.00 | | |
| 1853 | Pierce | Coal & Wood | | $ 20.00 | | |

*This price appears to be unreasonably high, and may well have been in dollars. This would then work out to $8.09 per cord, which was still much higher than any other reference except during the extreme late winter shortages in 1829 (see note for Chart 3). (One pound, £1.0.0 Pennsylvania was worth about $2.68 US, and almost the same in Spanish dollars).

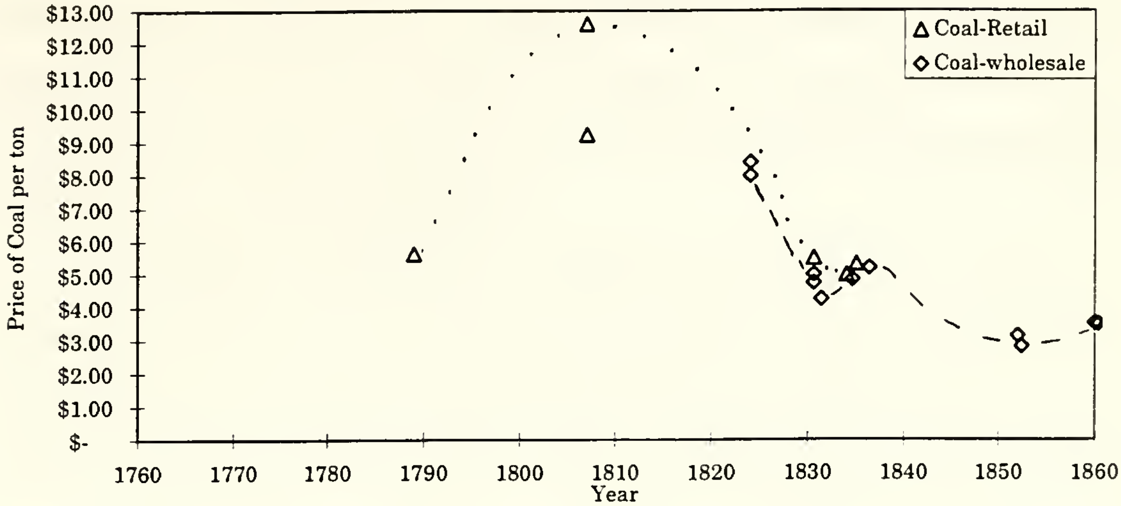
Chart 3. Price of Wood in Philadelphia (per cord)




*Sources*: Probate inventories sampled describing quantity and price of wood (see Table 3); *Recollections of Samuel Breck* (London: 1877) 295; Nile's Weekly Register (Oct. 7, 1815) 9: 95, (Jan. 20, 1816) 9:364, (May 24, 1823) 24:178, (March 14, 1829) 36:37. This last article is of particular interest because it notes the merits of Mr. Girard selling his wood stock at $5.00 a cord whilst others asked $7-8.00 per cord (and the *Aurora* says Oak was going for $10.00 per cord). Some question whether his actions may cause harm, because he is selling at the old price, not the demand price, and the transportation cost alone (to bring wood into the City) had risen to $5.00 per cord. The cause of the fuel crisis appears to have been the extended length of that winter. Temperature measurements in New Haven, Conn. indicate that people might have been caught off guard by the extreme cold of February and March 1829 particularly because since 1824 those months had been extremely mild. (David Ludlum, *Early American Winters 1604-1820* [Lancaster, Pa.: Lancaster Press Inc., 1966], 274-5.)

To get a more complete picture of the changing price of coal, prices from the inventory study were augmented with those from diaries and newspaper extracts. The results suggest that in the last decade of the 18th century, coal became very expensive in Philadelphia, and then fell steadily and dramatically in the first three decades of the 19th century.

Chart 4. Price of Coal in Philadelphia (per ton)
*Dotted line* suggests general change in retail price.
*Dashed Line* suggests course of wholesale prices.




*Source*: Probate inventories sampled describing quantity and price of coal (see Table 3); J. Leander Bishop, *A History of American Manufactures from 1608 to 1860* (Philadelphia: E. Young & Co., 1866), 605, gives the retail price of Virginia coal in Philadelphia at 1s 6d per bushel in 1789; *Recollections of Samuel Breck* (London: 1877) 295; *Nile's Weekly Register* (July 24, 1824) 26:344, (Oct 2, 1830) 39:89, (Jan 14, 1832) 41:374-5. *Delaware County Republican* gives prices at Darby and Chester on Aug. 15, 1834 and May 13, 1836 and gives the difference with Philadelphia prices (not including warfage and other charges). (Included in the CD-ROM *Delaware County Newspapers II*.); Anne Benazon, et. al., *Wholesale Prices in Philadelphia: 1852-96*, (Philadelphia: University of Pennsylvania Press, 1937) 58, 427.

It is likely that the skyrocketing price of coal at the end of 18th century was caused by an increased demand and a restricted supply. In colonial Philadelphia, it can be inferred that demand was so low that it was reasonably filled by this limited supply. One way that made coal economical to import was by shipping it as ballast. The American supply of coal was chiefly from Virginia, but was apparently insufficient in quantity and quality to meet

demand in Philadelphia when imported coal was threatened by the French and British in the 1790s and 1800s. By 1807 there must have been a strong demand for coal to be used for heating (relative to supply) as Samuel Breck stated the summer price was usually $9.24 per ton although he had paid $12.60 per ton in December.[64]

It appears the primary reason for the drop in coal prices in the early decades of the 19th century was that Pennsylvania coal was being mined and brought down to Philadelphia via the Schuylkill. Yet, this did not always mean a steady supply of cheap fuel. A combination of speculation and unusual winter weather occasionally drove the price very high. While no figures were found for Philadelphia, in December of 1831 for example, a writer noted that the stoppage of navigation three weeks earlier than normal (caused by an early winter) had "enormously advanced" the price of wood and coal in Boston, New York and Philadelphia. He then boasted that because of the railroad line into Baltimore, oak there did not exceed $6.00 per cord. The same winter, a group of New Yorkers petitioned the U.S. Congress to lift the foreign duty on coal. They claimed that the price of Schuylkill coal in their city was $16.00 per ton, double what it had been the previous winter, and it was causing great suffering amongst the poor. On the

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64 J. Leander Bishop, *A History of American Manufactures from 1608-1860*, 185, 382. Peterson, "American Notes," 21-2.

other hand, "a subscriber" in *Nile's Weekly Register* chides that those complainers should have been buying the previous Spring, when an excess supply brought the price down to $4.00-$4.50 per ton, with at least one sale at $2.50 per ton - just sufficient to cover the shipping costs. Clearly, many people did not have the means, or foresight, to lay away enough fuel for an entire winter.[65]

High winter prices were not limited to coal, or to periods of acute shortages: a seasonal variation in firewood prices must have been quite apparent to Philadelphians by 1821. In this year, a benevolent association called the Philadelphia Fuel Savings Society was formed to help people purchase their winter wood supply at summer prices. The officers were not allowed profit or accept compensation. The Society was only for those "who are disposed to make exertions to help themselves" by contributing "small sums as can be spared" in the summer months that the Society would use to buy and store wood at the cheapest price possible. Then in the winter, they could have all that they contributed toward. In May of 1832 they claimed this had saved depositors a hundred and fifty percent.[66]

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[65] "Chronicle," *Nile's Weekly Register* 36 (July 24, 1824):344 for importance of the waterways. For comments on speculators see vol. 39, page 89 (Oct 2, 1830) and vol. 41, pages 374-5 (Jan 14, 1832), and page 325 of the same volume for "The Winter" and the boast about the price of oak in Baltimore.

[66] "Plan, &c. of the Philadelphia Fuel Savings Society" (May, 1832), Broadside, original copy at the Hagley Library. They said that a dollar in the fund bought the same amount of wood

Even before the price of coal settled in around $5.00 a ton in the 1830s, it had already become cheaper to burn than wood. When Samuel Breck bought a grate for his house in December of 1807, he compared the amount of coal he burned to the amount of wood he normally burned. As a result he determined that the coal was costing him more than the wood (not counting the cost of the grates), but he would be ahead if bought coal at the usual summer price.

Breck estimated that a fireplace used 6 cords of wood a winter, and his grate would use about 75 bushels of coal (2.68 tons). This estimate was used in this study as a basis for comparing the cost of heating with wood versus coal. The results, shown in chart 5, indicate that in Philadelphia, coal was becoming far more economical to burn by 1830.[67]

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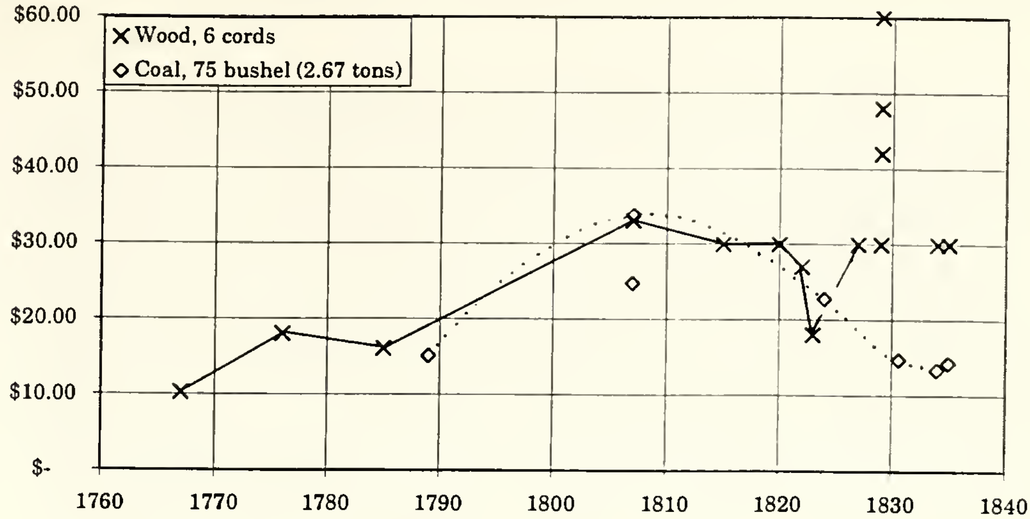
that cost $2.50 in the winter.

[67] Breck, *Recollections of Samuel Breck* (London: 1877), 295. I converted bushels into tons at the rate of 28 to 1, because most of the other references were in tons.

Chart 5. Cost Comparison between Wood and Coal Heating




*Notes*: This is the cost of fuel used in a single fireplace over the entire heating season. It is for a parlor fireplace, not a kitchen fireplace, but the relative expense ought to be similar for any situation, including stoves.
*Source*: Retail price data same as used in Charts 3 and 4. Quantities of fuel used and length of heating season from *Recollections of Samuel Breck*, 295.

Not everyone could take immediate advantage of the economy afforded by coal because of the initial expense of the grate. Additionally, because Pennsylvania's coal was chiefly anthracite[68], regular grates would not work, especially when confined in an ordinary stove.[69] As a result, the Philadelphia Fuel Savings Society offered its

[68] *Anthracite* is also known as hard coal because it is physically denser and harder than bituminous, or soft coal. It has a higher ignition temperature than soft coal and tends to burn cleaner.

[69] Bishop, *A History of American Manufactures from 1608 to 1860* , 1:561-2, 2:185, 203, 312, 316; Pierce, *Fire on the Hearth,* 126-8 for Eliphalet Nott's development of his anthracite burning stove at the instigation of the Lehigh Coal Company.

depositors a stove for anthracite in May of 1832. In their own words:

> The Board of Managers having taken great pains to ascertain the most economical kind of Fuel, and also the best method for *using it, are convinced* that great advantages would result to the poorer classes of our citizens, if *Anthracite Coal* could be introduced as a common Fuel, instead of Wood,-and having succeeded in obtaining a *convenient Cooking Stove*, which they have ascertained from *actual experiment* , will with about one peck of *small* coal , at a cost not exceeding FOUR CENTS PER Day, perform the various operations of warming the room, boiling (if required,) a wash kettle of 10 to 12 gallons of water, and accomplish all the necessary *baking*, and other cooking, required in a family of five or six persons.
>
> The district receivers are authorized to deliver these stoves to such "DEPOSITORS" as incline to purchase them, at the low price of $4 50 each, including the necessary pipe, pans, poker, &c., this being the cost to the Society, by the hundred.[70]

If this stove only warmed a room for but 4¢ a day, that alone would have been a substantial savings over wood. From chart 5 it can be seen that a fireplace consumed about $30 worth of wood (and about $15.00 worth of coal) a season in 1831, where this stove would use but $7.00 worth of coal. Four cents a peck works out to $4.48 a ton, probably the summer price of coal the Society was obtaining.

So it seems that in the Philadelphia area, the popularity of stoves preceded the general use of coal; and the widespread use of coal as an economical alternative was dependent on the development of stoves with grates that could burn anthracite. Although there are some indications that open (fire-place) grates were in common use, it is not

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[70] "Plan, &c. of the Philadelphia Fuel Savings Society" (May, 1832) Broadside, original copy at the Hagley Library.

clear if they were for use with anthracite. Therefore, it is likely that it was stoves that permitted anthracite to become a practical, and popular, fuel for domestic use.

CHAPTER 6

# INTRODUCTION OF CENTRAL HEAT

The introduction of central heat can be identified in Philadelphia houses as far back as the late 1830s. Even at that time, the idea of distributing heat to rooms away from the source of combustion was not new, but its application to dwelling-houses was rare. Its primary application had been in large factories spawned by the industrial revolution.[71]

In factories and other large work spaces, central heat was adopted when fireplaces and stoves proved ineffective and troublesome. But few individuals had interest in introducing potentially risky, complex, and expensive machinery into their houses. In Britain, James Watt and Matthew Boulton had done so in the 1780s and 90s, but they were already heavily interested in similar industrial applications. Sir John Soane was another notable exception, but only in the portion of his house associated with his professional life, in which he so extensively opened the spaces that only a central system could heat it. In fact, Soane was forced to try several systems before finding one that worked as he required in 1832.[72]

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[71] Constance Greiff, *John Notman, Architect*, 43, 61-2; found that the John Notman was using furnaces in his house designs from 1839 on, and as early as 1837; Benjamin L. Walbert III, "The Infancy of Central Heating in the United States: 1803 to 1845" *APT Bulletin*, Vol. III, no. 4 (1971), 76.

[72] [English Heritage] "HSR for Matthew Boulton's Soho House" 103; Todd Willmert, "Heating Methods and Their Impact on Soane's Work: Lincoln's Inn Fields and Dulwich Picture Gallery,"

## Hot Water Systems

Although Sir John Soane had success with Perkins's high pressure hot water system in England, it appears to have seen very limited domestic use in the United States in general, and Philadelphia in particular. On the other hand, low pressure hot water systems had many advocates in the U.S.: although the number of actual installations appears to have been rather limited (until perhaps the first decade of the twentieth century).[73]

The difference between a low pressure, or open, system, and a high pressure, or closed, system like Perkins's is whether it is open to the atmosphere, or sealed up (like most automobile radiators). Both systems used pipes to bring water to the place being heated and then return the water to the bottom of the boiler to be reheated. Although, water is an excellent fluid to transfer heat, there were problems getting it to circulate through the system. While in theory the hot water would rise, and the cold water descend, the difference in temperatures had to be sufficient

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27, 34-49.

[73] A Perkins system was installed in part of the White House, a partially residential building, around 1840, according to Eugene S. Ferguson, "An Historical Sketch of Central Heating," in *Building Early America*, ed. by Charles Peterson, 166; Downing, *The Architecture of Country Houses* (1850), 479n. says that Perkins's system has "met with little approbation" in the US. For low pressure systems, see following paragraphs.

to overcome the friction inside the pipes (and the inertia of stationary water).[74]

In open systems, the water temperature had to be kept below 212 degrees or it would turn to steam, and even at 180 degrees it might start to boil. Since this limited the maximum temperature difference, friction had to be reduced by using large pipes (about 3" in diameter) to insure the water would flow without a forcing pump. For some applications, like greenhouses, this worked satisfactorily. But because the high temperature was limited, and the pipes were large, only a limited amount of heat could be transferred to the rooms, and the system's response to firing was slow.[75]

Closed systems prevent the water from boiling by keeping it under pressure, limiting its ability to expand into vapor. While water normally vaporizes at 212 degrees, if it is held to 15 psi (above atmospheric pressure) the boiling point is nearly 250 degrees, and at 60 psi, 307 degrees Fahrenheit.[76] Perkins's systems were claimed to have been run at these temperatures and pressures and even higher. By

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[74] John S. Billings, *The Principles of Heating and Ventilating and their Practical Application*, 2nd ed.[1886] (New York: The Engineering and Building Record, 1889) 49-52.

[75] Billings, *The Principles of Heating and Ventilating and their Practical Application*, 44,52; Ferguson, "Historical Sketch of Central Heating",168.

[76] Kenneth Wark, *Thermodynamics*, 4rth ed. (New York: McGraw-Hill Book Co., 1983), 847-8. Note: any text with a properties of saturated water table, or "steam tables" will have the same.

doing so, he could use much smaller pipes in spite of their increased friction. The smaller pipes allowed more flexible installations and transferred more heat to the places desired.[77]

Although it was installed in the White House, 19th-century texts indicate use of the Perkins system in the United States was rare. I suspect that it suffered in part because air systems generally sufficed for even larger dwellings in America, because it was risky, and because its main advocates and components had to come from Britain. While I have not come across any specific examples of failures in Perkins systems, the pressures and temperatures they ran at clearly made many fearful. At least one system had a safety valve put on by the person in charge, although Perkins apparently felt it was unnecessary.[78]

While Perkins's closed systems disappear from the scene after 1850, a low pressure system had caught the attention

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[77] Ferguson, "Historical Sketch of Central Heating," 169-70. Wilmert, "Heating Methods and their Impact on Soane's Work," 46-8 for an example of installation described in detail.

[78] See footnote number 66; Also Billings, *Principles of Heating and Ventilating,* (1886) mentions Perkins only in passing (p. 44) and on page 51 describes by implication only open systems because he states the temperature of the pipes is between 160 and 180°F; Even the 1875 London publication by J.W.C. *Our Dwellings Warmed: As They Are and as they Might Be* , states hot water heating can not heat the pipes over 212° (p. 31) although the book was printed for Robert R. Gibbs who advertises in the front and back for his "Perkins Patent" Hot Water Aparattus, suggesting that the high pressure was no longer a feature of the system in spite of the name Perkins. For the dangers of the Perkins system see Ferguson, "Historical Sketch," 171-2.

of Philadelphia architect Samuel Sloan (1815-1884). In *City and Suburban Architecture* (1859), Sloan recommended Tasker's Patented Hot Water Aparattus to those who could afford it. Low pressure hot water was the only system that insured the air would not become unhealthy by over-heating. Sloan believed that Tasker had overcome the difficulty in regulating the fire (and hence the water temperature) with an automatic regulator that controlled the dampers. It also had the advantage that it could be adjusted from the upper floors by mechanical connections. The bulky pipes were still present, but Sloan explained how they were to be run into "pipe" rooms, or air chambers, where they would warm fresh air from outside that would then ascend within brick flues and enter the rooms through a register in each. Such combination systems, using air passing over pipes, are often referred to as "indirect" heating systems.[79]

In spite of its advantages, these systems seem to have enjoyed only limited popularity. This was probably not due to any failure in performance, but because it was a bulky, and expensive installation, and its complexity may have been difficult to maintain. In addition to Sloan's

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[79] Samuel Sloan, *City and Suburban Architecture* (1859), 85, *pl. 109*, 87-88, 94, *pl. 118*; At the time of publication, the patent was only about five years old - Dec. 5, 1854 according to an 1868 Morris, Tasker and Company promotional pamphlet in the Hagley Museum and Library Trade Catalog Collection. This was not the first such regulator, others had been invented both before and after, including one by Angier Perkins in 1840 (Donaldson and Nagengast, *Heat and Cold*, 193-6).

recommendation, there was a positive report from the Franklin Institute Committee on Science and the Arts, which Morris, Tasker & Company reprinted as part of their 1868 promotional pamphlet. That pamphlet also included a long list of testimonials indicating the system had a number of well satisfied customers in addition to Sloan.[80]

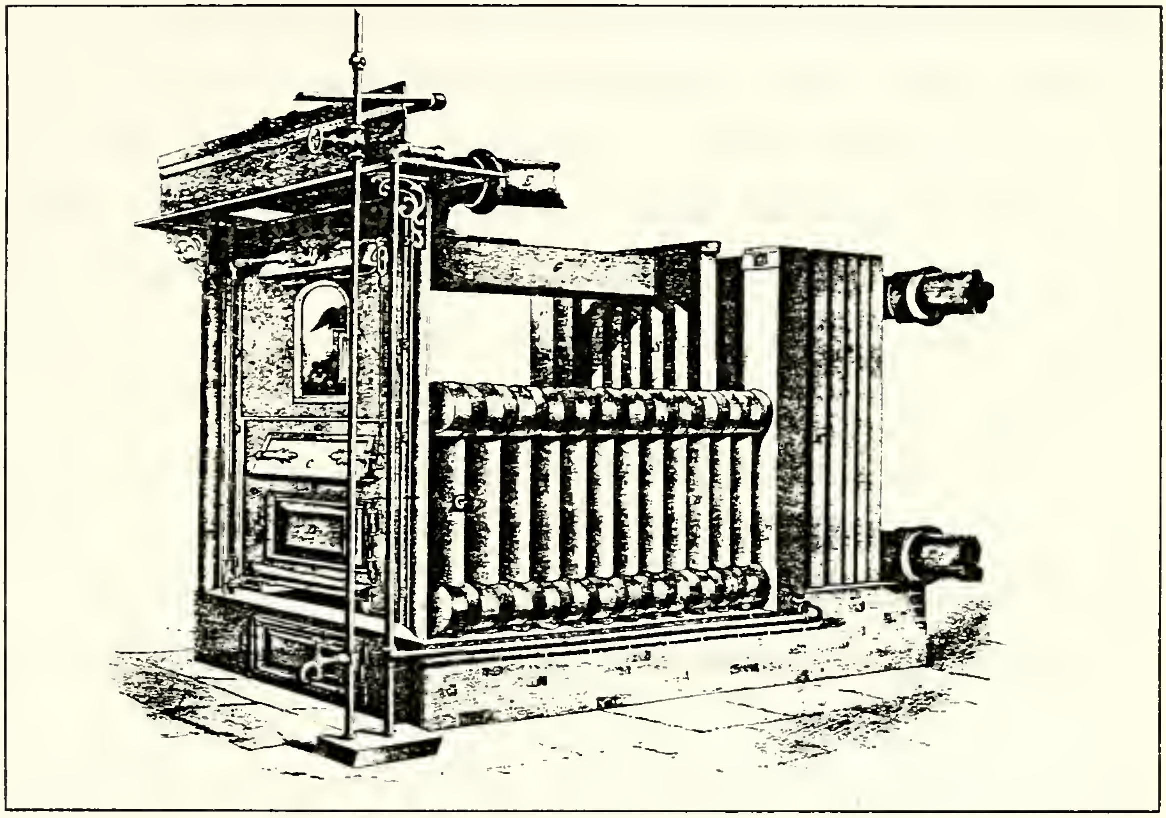

Fig. 12. Tasker's Hot Water Apparatus
(From Samuel Sloan, *Suburban and City Architecture* (1859) pl. 118.)

Another advocate of indirect hot-water systems was Andrew Jackson Downing. Even so, he stated they cost "about

[80] Morris, Tasker & Company, *Tasker's Patent Self Regulating Hot Water Furnace: Adapted to Warm Private Residences...* , (Philadelphia: 1868).

five times as much as heating by hot air" and because of this it was "confined to town house of the first class, in our cities."[81] It does not appear that the cost had come down significantly in the decade following 1850. Both Sloan and the Franklin Institute Report concur that Tasker's Apparatus was more expensive than hot air furnaces. In fact, the smallest house for which Sloan expressly suggested the hot water system was still fairly large, with a plan of 36 by 78 feet. Ten years later, in 1868, the situation apparently remained unchanged. George Woodward wrote that for heating "a whole house...the hot-air furnace will do the work better" than stoves or grates. As for warming by steam or hot-water, "these methods are too expensive for general adoption, and do not entirely satisfy where they are used."[82]

There seems to be some agreement that between the 1870s and 1900 there were significant improvements in hot-water

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[81] Downing, *Architecture of Country Houses* (1850), 478-9. It is not clear whether Downing was referring to the expense in installation, or in operation, or both. In 1864, it cost James Roosevelt $1500 to install a steam system with two Gold Boilers, not including the brick (Stifler, *A Century of Steam & Water Heating*, 73-4). From table 8, it can be seen that this was roughly 5 to 10 times more expensive than an hot-air system in 1850s.

[82] Sloan, *City and Suburban Architecture* (1859), 89, 94; for Design 27 "A Three-Quarter House"; Report of the Franklin Institute Committee on Arts reprinted in Morris, Tasker & Company, *Tasker's Patent Self Regulating Hot Water Furnace: Adapted to Warm Private Residences...* , (Philadelphia: 1868); George Woodward, *Architecture and Rural Art*, vol. II (NYC: 1868), 70.

systems that eventually made them a reasonable alternative to both warm-air and steam systems. One can surmise from early-twentieth-century texts on heating that air, water, and steam systems are all common. Although both open and closed hot-water systems are described, by this time they used similar components and layouts. Closed systems were now a far cry from the Perkins system in that they normally ran at 10 psi or less. The evolution of these water systems from the earlier ones has not been well documented and should be. Certainly the steps to reduce manufacturing costs and improve the heat given off by radiators was important. Probably even more important was the development of boilers that could be installed in modest homes at reasonable cost. The H. B. Smith Company produced one such boiler around 1890, but it still cost $90, making it slightly more expensive than a 36-inch air furnace with galvanized case. Like many components developed for hot-water, this boiler was soon adapted to work in steam systems as well.[83]

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[83] Dan Holohan, who works with old systems, writes that gravity hot water systems came to the U.S. from Canada between 1875 and 1885 ("Gravity Hot-Water Heat," 46. Susan Stifler in her history of the H.B. Smith Company ( *The Beginnings of a Century of Steam and Water Heating*, (1960) 87, 101) state there was a new interest in hot-water heating in that same time frame, and the Baker Smith & Co. Catalog of 1885 shows they already were selling a "portable boiler". Not one hot-water system was identified in the sampling of 177 insurance policies that concentrated on the years 1840-90; E. S. Keene, *Mechanics of the Household* (1918), 37-50 for example. Stifler, 107-8 for the first Reed patent "Cottage" boiler, made with separate fire pot with 16" grate, base and dome, for the purpose of competing with

In nineteenth-century America, steam became an important means of distributing heat in large buildings, including some larger residences. Although first applied successfully to factories just after 1800, it took until the latter half of the century to make steam practical for use in moderately sized houses.[84]

In principle, steam works in a very different manner than hot water, although in practice many of the parts (pipes, boilers) are similar or the same, making them hard to tell apart at first glance. When steam is generated, it expands rapidly and races through the system of pipes which contains it. If it is designed correctly, most of the heat

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furnaces in smaller houses.

The secondary sources that touch on the subject, cite various innovations as important and make some sweeping generalizations. Some of these are contradictory and none of them are supported. A review of some of the late nineteenth-century trade catalogs indicates that many parts, such as radiators and boilers, were useable for either hot water or steam systems; so while engineers might have argued the merits of one or the other, I suspect the manufactures benefited if people bought either. I believe that the most important developments were those that did at least one of the following: reduced manufacturing and assembly costs, reduced operating costs. But in any event it must be shown that the improvement made a significant difference in the number of systems being installed. This could be shown by an increase in sales, decreases in cost, and so forth. I also suspect the introduction of engineering of the systems, and the need for such systems in large buildings, might have assisted in paving the way for scaled down systems of moderate cost.

[84] Ferguson, "Historical Sketch," 166-7; Walbert, "Infancy of Central Heating in the U.S.," 76-80. Sloan can not recommend it as late as 1859, and only in the 1880s are they mentioned in the insurance surveys sampled. See discussion in text.

will be lost when the steam condenses on the inside surfaces of the radiator. In theory, this condensed steam (now water) will drip back to the boiler. Two pipe systems have return lines (for water) leading from the radiators (like a hot water system); single pipe systems do not, so the water drips back in the same pipe the steam moves up in.[85]

Because steam is a vapor, not fluid, state, it is less effected by piping resistances and carries further and more quickly. It also takes less time to get the system going because less water needed to be heated. For these reasons, it appears that steam became the method of choice in large buildings, at least in America. Factories already using steam for power could use the excess for heating; the first examples of this are believed to be about 1812.[86]

Before steam systems could be used in ordinary houses, they had to overcome a number of obstacles. First was the issue of safety. Without a skilled and attentive steam engineer and/or fireman to run a steam boiler an explosion was likely. Most of the historical development of steam for heating used relatively low pressures in the pipes and radiators themselves, although Nason and Walsworth developed a high pressure (60 psi) system in the 1840s. Starting about 1919 the Hartford Steam Insurance and Inspection

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[85] Keene, *Mechanics of the Household* (1918), 1-36.

[86] Ferguson, "Historical Sketch," 166-8; Walbert, "Infancy of Central Heating," 83n. 20, 22.

Company has recommended a piped safety loop be added to all systems, even if safety valves were present, implying that even at that late date there was a serious concern about the dangers of explosion in residential steam use.[87]

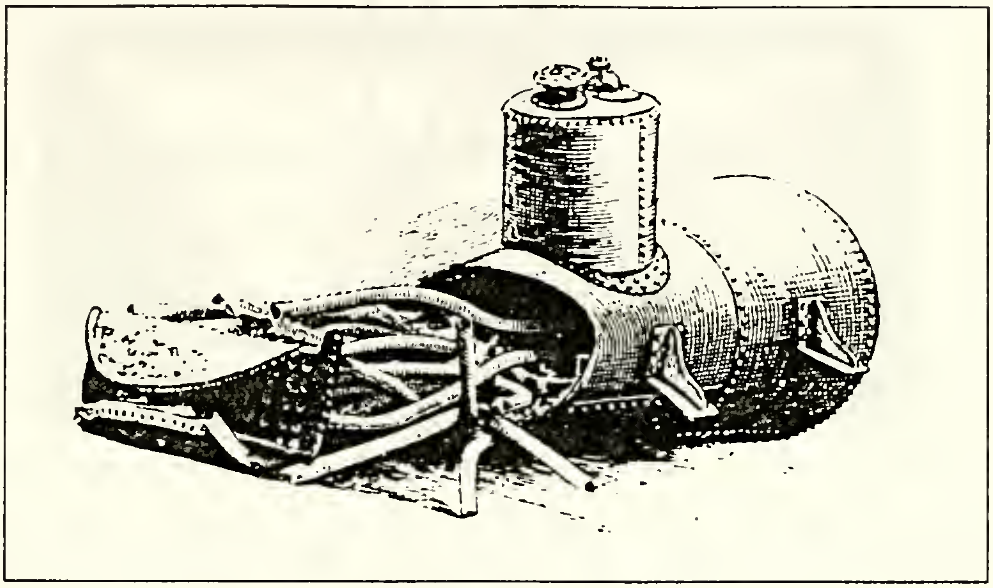

Fig. 13. Remains of an Exploded Boiler, 1887

"Return Tubular Boiler at the Edison Electric Light Co.'s Works, West Chester, Pa. Exploded December 17, 1887, killing seven and wounding eight People." (Babcock & Wilcox Co., *Steam, Its Generation and Use* [New York, 1894], 13)

Second, like hot water systems, steam systems were more expensive than furnaces. The boiler, firebox and such had to be installed into a masonry housing and then fitted up with all the pipes, radiators and valves. Steam's widespread industrial use, coupled with developments in both

[87] Boiler explosions were a hazard throughout the 19th century for all applications of steam, although railroad and steam boat accidents probably got the most public attention.

boilers and radiators may account for the inroads it made into home heating in the second half of the century.[88]

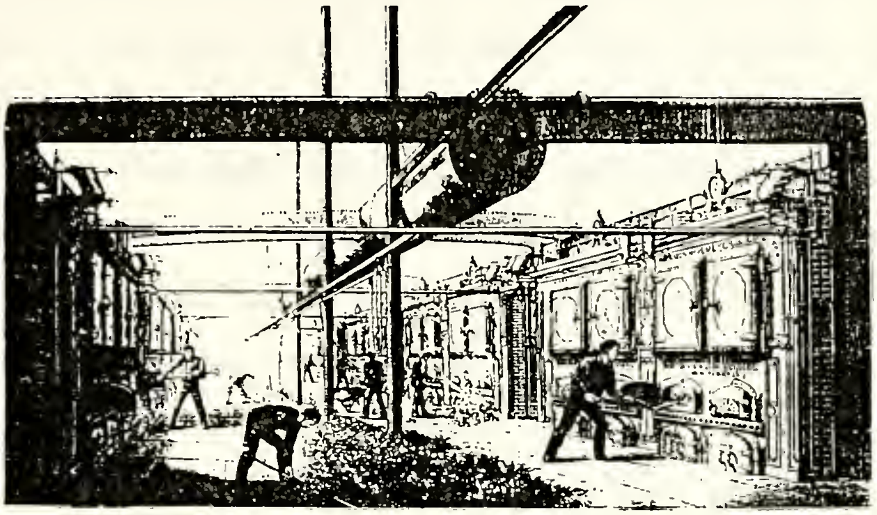

Fig. 14. Fire Room of Harrison, Frazer & Co. Philadelphia
Steam saw widespread use industrial use and also was used for heating large buildings in the United States. (Babcock & Wilcox Co., *Steam, Its Generation and Use* [New York: 1894], 8)

Improvements in boiler manufacturing, efficiency, and smaller "portable" units (which could be readily brought to and assembled on the site) finally made steam a practical residential alternative. Likewise, improvements in radiators that dropped costs and improved efficiency helped small steam systems compete against warm-air systems.[89]

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[88] Billings, *Heating and Ventilating* (1886), 44, 48 says steam is generally used in large buildings. On page 49 he says a steam system installation was about the same cost as one for hot water heating.

[89] Donaldson and Nagengast, *Heat and Cold*, 83-6, 254.

Another objection to residential steam use was posed by health advocates, who believed steam overheated the metal and damaged the air in the room, and the aesthetics of the early radiators may have discouraged their use in many instances. One way around this was to use indirect steam heat. Like indirect hot water, fresh air was warmed by passing over the pipes or radiators and then ascended by ducts. In 1888 a radiator manufacturer argued that indirect radiators provided safer heat than furnaces, because there was no danger of poisonous gases getting in the warm air. For their direct radiators (which included decorated Bundy and sectional cast models) they cited their superiority over stoves, noting that radiators "will not produce coal gas, dirt or dust."[90]

One thing steam could certainly overheat was wood, and flammable particulates inside the walls and floors. Observers had noted that over time, with enough heat, steam pipes in contact with wood could cause it to char. (The same had been observed with Perkins hot water systems.) By 1867, Ætna Insurance Company was advising its agents that pipes laid under flooring would cause it to dry out, creating gaps between the boards that dust would fall into and eventually ignite.[91]

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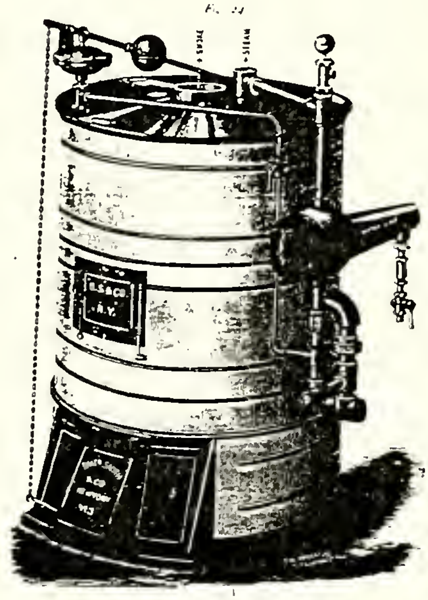
[90] A.A. Griffing Iron Co., *1888-9 [Catalog]* (Jersey City, NJ & Chicago, Ill., 1888) 1.

[91] Ferguson, "Historical Sketch," 171. J.B. Bennett. *Ætna Guide to Fire Insurance* (1867), 14.

In 1859, Samuel Sloan wrote that he could not yet recommend steam for residential use, although he noted that it was being improved at such a rate that it would soon be worthy of consideration. The last three and a half decades of the century saw a number of improvements in the radiators, venting and boilers that apparently did help bring steam into a number of Philadelphia-area residences. Of the insurance surveys sampled, only four specific references to steam heat were found. The first, in 1881, appears to be a retrofit in an older (1850s) house, as do the two references from around the turn of the century. All four appear to be in substantial houses, at least two of which were architect designed.[92]



PORTABLE BOILER.

Fig. 15. A Portable Boiler

A boiler, like this one, that did not need to be set in brick, helped make steam and hot-water competitive in the residential market. (Baker, Smith & Co., *Warming & Ventilating by Steam* [NYC, 1885] 4)

[92] Sloan, *City and Suburban Architecture*, 94. Donaldson and Nagengast, *Heat and Cold*, 83-6, 254; Dan Holohan, *The Lost Art of Steam Heating* (1992), 4, 16, 103. Both houses happen to be Wilson Bros. designs.

## Warm-Air Systems

By far the most common form of domestic central heating in and around 19th-century Philadelphia was the distribution of air heated by a furnace. In theory it was simple; a furnace (in essence a closed stove) heated the air surrounding it, and that air was conducted to the rooms by ducts while a smoke pipe carried off the smoke (and a minimal amount of heat).[93] In practice, exhaust gases could leak out of the fire box, and dust and odors from the cellar could be conducted up to the rooms with the warm air. Furthermore, because air is both a poor conductor and easily stopped by resistances in the ducts, it was difficult to get it to carry heat great distances. In spite of this last weakness, the early development of warm-air central heating, like steam and hot water, appears to have been in institutional buildings just at the beginning of the 19th century.

At this early date, a furnace system could be far cheaper than one of the alternatives. An example of the savings to be had by using a furnace instead of steam was reported in an 1815 *Nile's Weekly Register* regarding the Patapsco Cotton Factory near Baltimore. The furnace (designed by Robert Mills) was built on one side of the building, of soapstone and brick, along with brick flues.

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[93] In 19th-century writing, the terms flue or pipe are generally used for the warm-air ducts.

The cost to build it was figured to be $700, where the estimate for a steam apparatus to do the same had been $3000. It was capable of bringing the 100′ by 40′ (and 60 foot high!) room to 70 degrees (although the outside temperature was not stated) and consumed a cord of wood a week, for which they were paying $4 per cord. This too was far better than the estimate for the steam apparatus, which they were told would have probably consumed six and a half cords a week, or $26.[94]

When warm-air systems did start appearing in houses, they cost far less than $700 (see table 8), but cost and size still limited them to larger and more expensive houses (as will be shown in the next chapter). In matters of cost, no turning point could be identified as crucial in making these systems more affordable and practical. Clearly the construction of a brick housing and flue system made it difficult to retrofit a house, even if enough cellar space was available. Therefore, the successful substitution of metal for the brick-work must have been a significant advance.

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[94] "Furnace Costs," *Niles Weekly Register*, vol. 9, Supplement p. 183, (taken from the *Federal Gazette*).

Table 8.

Prices of Furnaces From Estimates in Pattern Books.

| Price | Furnace | Reference | Year | Location |
|---|---|---|---|---|
| 180.00 | Walker's Patent | Ranlett, *The Architect*, II p.81, 85 | 1851 | NYC |
| 125.00 | Chilson's No. 3 | Sloan, *The Model Architect*. p. 25 | 1852 | Philadelphia |
| 140.00 | Chilson's No. 4 | Sloan, *The Model Architect*. p. 44 | 1852 | Philadelphia |
| 175.00 | Chilson's No. ? | Sloan, *The Model Architect*. p. 33 | 1852 | Philadelphia |

*Note*: Prices include setting of the furnace in the brickwork.

Exactly when furnaces with metal casings became available is uncertain, but they appear to have become popular in the 1870s and 80s. Even though "portable" furnaces have been found in a catalog as far back as 1851, they do not seemed to have gained any standing until after the Civil War. Pre-Civil War architectural books describe only brick casings, and the first mention of a portable heater in the fire insurance surveys sampled was not until 1871.[95]

[95] Chilson Gardner, *[Catalog]* (Boston, 1851); the next found was in Perry & Co., *The Oriental Improved Base-burning Stoves and Furnaces* (Albany, NY: 1868) 34. The books looked at were Ranlett's *The Architect* (1849, 51); and *The City Architect* (1859); Downing's *Cottage Residences* (1842); and *Architecture of Country Houses* (1850); and Sloan's *The Model Architect* (1852); and *City and Suburban Architecture* (1859). Insurance Co. of North America Perpetual Policy 3086, Ferdinand Hurxthal, Feb 9, 1871, for 509 S. 42nd St. (CIGNA Archives, Philadelphia, Pa.). Portable Hot-air furnaces must be at least 2 feet from any wood according to F.C. Moore in the Insurance Company of North America's *Fires: Their Causes, Prevention & Extinction, Combining also a Guide to Agents* (1876, printed 1881), 43.

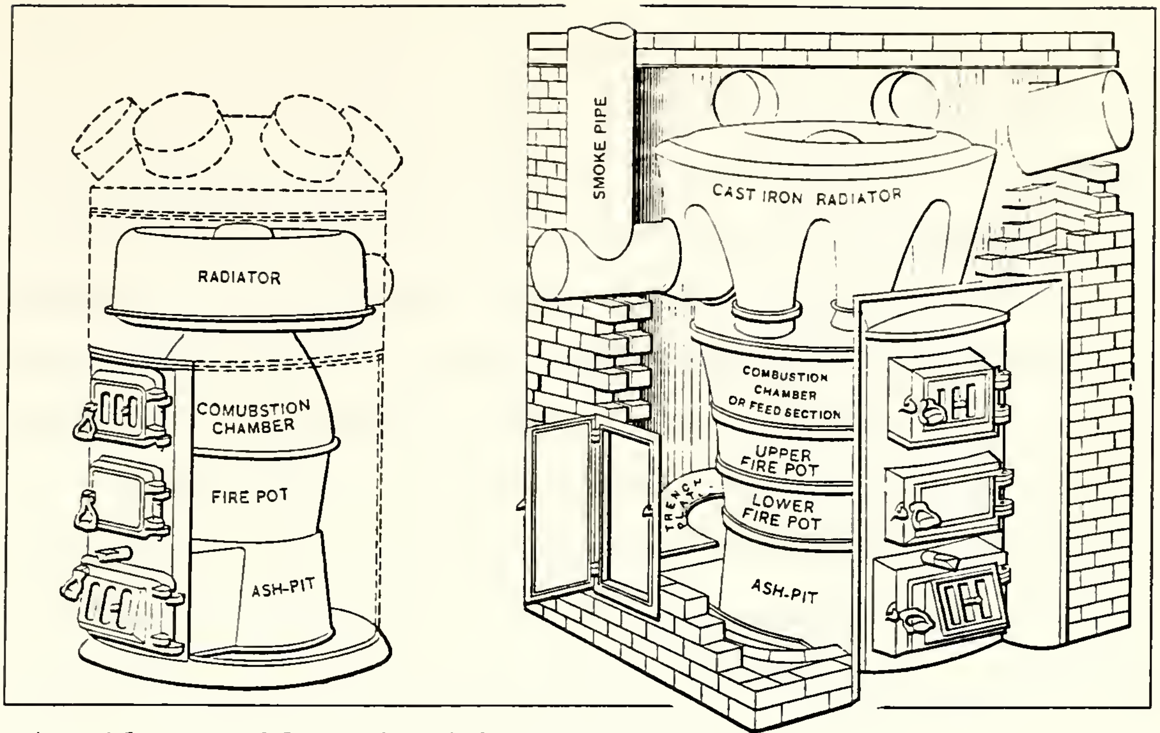


Fig. 16. Portable and Brick-Set Furnace

These drawings show a double wall brick-set furnace, and a steel cased portable furnace with slightly different radiators. Although taken from the 1919 Snow's *Furnace Heating* the essential forms had changed little in a half century.

Research for this paper uncovered less information regarding the chronology of duct-work. It is probably safe to say that at least until the Civil War, the warm-air flues were primarily brick, with metal pipes only used to make connections where brick was impractical. In one instance, Samuel Sloan specifies that "all hot air flues must be lined with two cross tin." Exactly what this means still needs to be determined, but may have been a double casing of the tinned sheet iron. While there was nothing new about sheet-iron stove pipe, it was considered unsafe to run through

woodwork. Warm air flues of sheet metal were also considered unsafe to run into or next to wood, as they sometimes got much hotter than they should have. In spite of this, it is apparent that at least in some indirect systems, air boxes and ducts were made of wood. The Insurance Company of North America advised their agents in 1870 that the cold air chamber or feed should never be made of wood because of the possibility that the currents could reverse. It also recommended that if hot air pipes did pass through partition walls, the face of the studs should be tinned and the lath made of sheet iron {I assume this was to diffuse the heat so nothing would ignite). In 1876, they advised that tin hot air pipes be encased in brick 4 inches thick, or if in horizontal runs, to make the tin casing double (one around the other).[96]

Further advice on the matters of preventing fires also lends credence to the belief that even after the Civil War, such apparatus was primarily for people who could afford at least one servant. In 1867 J. B. Bennett wrote, "Furnaces-When one is used-should not be in charge of a careless or ignorant servant." He also advised that the pipes should be examined, "especially where they pass through closets, and

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[96] C.C. Hine, *Fire Insurance: A Book of Instructions for Agents* (1870 revision), 11. Extant examples of wood ductwork could be seen in the basement of the Krueger Mansion on High St. in Newark NJ in 1993, and in Rockwood (now a museum) in Wilmington, Del. F.C. Moore, *Fires: Their Causes, Prevention & Extinction* (1876, printed 1881) 44.

one register be *fastened open*" to prevent accidental overheating.[97]

Other improvements in both furnace manufacturing and design may have also helped make them more economical and desirable. These improvements included things like shaker grates, self feeding magazines and secondary combustion (reburning the smoke), although cheaper models without these advances were also available. Some of the touted advances were a more a matter of opinion than of science; such as doing away with or adding firebrick linings, or various methods of making the joints leak proof. It should also be noted that many furnace manufactures were also stove and cooking range manufactures, and they incorporated improvements across all of their lines when possible. For example, Perry & Co. offered their Oriental base burner as a stove, a "parlor furnace", a brick-set hot-air furnace, and a portable hot air furnace.[98]

[97] J.B. Bennett, *Ætna Guide to Fire Insurance* (1867), 19, 14.

[98] Examples in the collections of The Athenaeum of Philadelphia include Isaac A. Sheppard's "Excelsior Home Journal"; J.L. Mott Iron Works, *Illustrated Catalog of Kitchen Ranges, Fireplace Heaters & Hot Air Furnaces* (NYC: 1882); and Perry & Co., *The Oriental: Improved Base-Burning Stoves & Furnaces* (Albany, NY: 1868).

Table 9.

Furnace Prices from Catalogs 1851-1890. .

| 1851 | Chilson's | Chilson Gardner & Co | Boston & New York. |
|---|---|---|---|
| $ 65.00 | No. 3 Cone Furnace | to be brick-set | for house 20' x 30' |
| 80.00 | No. 4 Cone Furnace | to be brick-set | for house 24' x 38' |
| 100.00 | No. 5 Cone Furnace | to be brick-set | for house 28' x 45' |
| 125.00 | No. 6 Cone Furnace | to be brick-set | for house 36' x 60' |
| 175.00 | No. 7 Cone Furnace | to be brick-set | for church 50' x 75' |
| 48.00 | No. 3 Trio Furnace | Portable | |
| 60.00 | No. 4 Trio Furnace | Portable | |
| 75.00 | No. 5 Trio Furnace | Portable | |
| 100.00 | No. 6 Trio Furnace | Portable | |
| **1868** | **Oriental: Base-burner** | **Perry & Co.** | **Albany** |
| $ 75.00 | #14 Furnace | Portable | |
| 215.00 | #24 Furnace | Portable | |
| **1888** | **Novelty** | **Abraham Cox** | **Philadelphia** |
| $ 35.00 | small B-series | stove | heats room above |
| 45.00 | large B-series | stove | heats room above |
| 27.00 | No. 25 castings alone | to be set in brick | |
| 32.00 | No. 28 castings alone | to be set in brick | |
| 55.00 | No. 36 castings alone | to be set in brick | |
| 47.00 | No. 25 finished w/ galv. case | Portable | |
| 55.00 | No. 28 finished w/ galv.case | Portable | |
| 85.00 | No. 36 finished w/ galv. case | Portable | |

## CHAPTER 7

## DECADES OF TRANSITION, 1840-1890

Although central heating had entered the scene, from the 1840s through the 1890s it would live side by side, and often in conjunction with, stoves and open grates. There was clearly a growing tendency in the 1840s and particularly in the 1850s, for better houses to be built with furnaces, both in Philadelphia City and in surrounding towns. These houses, along with most modest houses, also had fireplaces, although they may not have been used much. As early as the 1860s, and certainly by the 1880s, most middle-class houses in the city used furnaces as their primary heat source. In these decades, functional fireplaces nearly disappeared except in wealthy homes and in rural areas. Stoves had also started to disappear, but remained in rural areas and probably in the smallest city houses, where no space nor money could be spared.

*Identifying the Trends:*

While heating methods become hard to identify in probate inventories of the mid-nineteenth century, they can often be identified from fire insurance surveys. A sampling of these surveys, primarily of Philadelphia County, has helped identify some of the trends in domestic heating. The surveys were taken from those in the collections of the Historical Society of Pennsylvania and the archives of CIGNA Corporation. Surveys were selected primarily from the 1830s

through the 1880s, concentrating on the periods when central heat might have been making popular gains.

An unexpected problem was encountered with the surveys. Many did not specify the form of heating, particularly those for houses in the city. This may be surprising, since the policies were insurance against house fires, but there are several explanations. One is that the survey was more concerned with determining the value of the property than its degree of risk. Risk rates appear to have been governed by the construction, and ignition hazards such as stove pipes run through woodwork often made them an unacceptable risk to policy writers. It also appears, at least for the Insurance Company of North America, that the form of heating was stated on the applications. Many of these survive for the outlying areas, but virtually none for Philadelphia itself. For this reason, surveys from outlying towns, such as West Chester, were occasionally included in the sampling.

Another reason heating methods may have been neglected in a survey was that none had yet been installed. Many of the surveys are for blocks or series of houses, and they very well may have been built on speculation. Even if they were not, it is likely that things such as the choice of stoves, grates, or furnace could have been left to the buyer to furnish. For example, Lewis Leeds described the difficulties he had with the flues in his *new* house (in

Philadelphia) when *he had* the heating apparatus installed.[99]

If the survey did not explicitly describe the method of heating, it could sometimes be inferred, either from the plan or from the description. For example, a mantle with register insert was considered a good indication of a hot air furnace in the cellar.

Once the surveys had been analyzed for the forms of heating, the clearest way to see the trends was by grouping the results by decade. For this purpose, only the primary form of heating was used. Each house was categorized as using either an open fireplace (including grates), stoves, central heat, or that the primary heating method was unknown. From this, it became apparent that there was a long period where all three forms of heating were prevalent. It was also apparent that the number of houses with "heat source unknown" were significant during the same period. Because of this, it became even more important to use other approaches to corroborate these findings.

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[99] Lewis W. Leeds, *A Treatise on Ventilation*, 3rd ed. (1882), 196-8. The time frame can be assumed to be 1867-8, when he delivered his second set of lectures.

Chart 6. Primary Form of Heating by Decade.

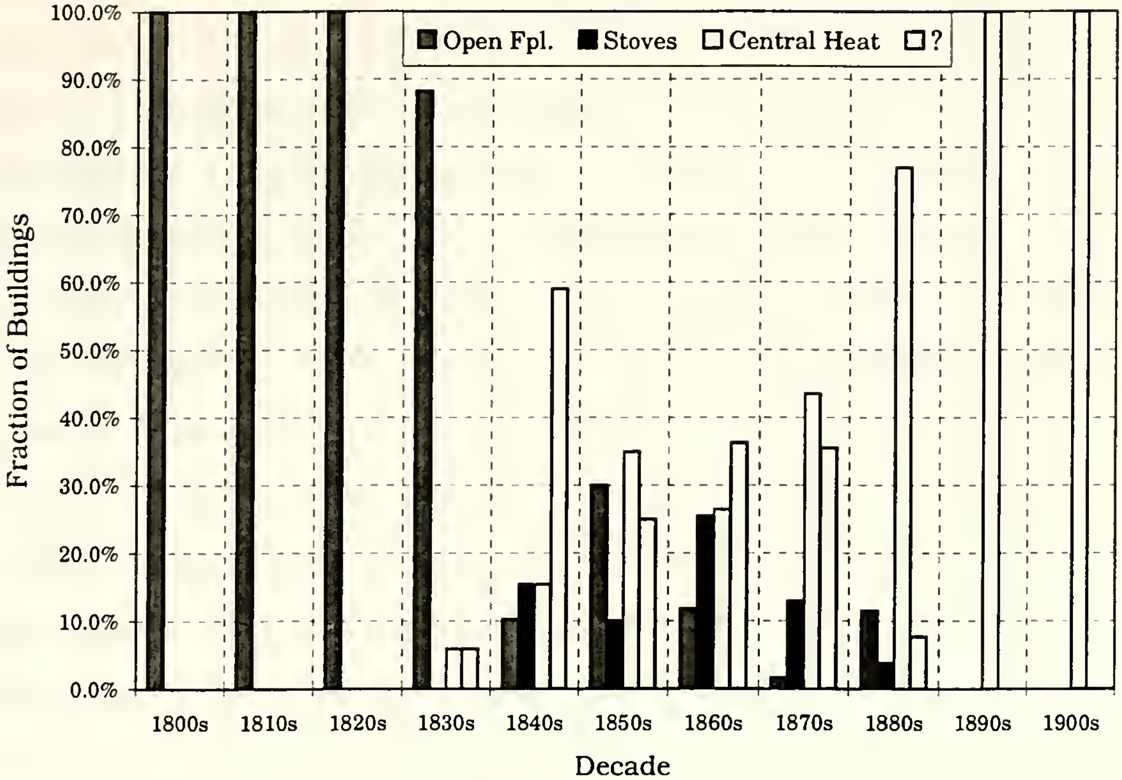



Table 10.

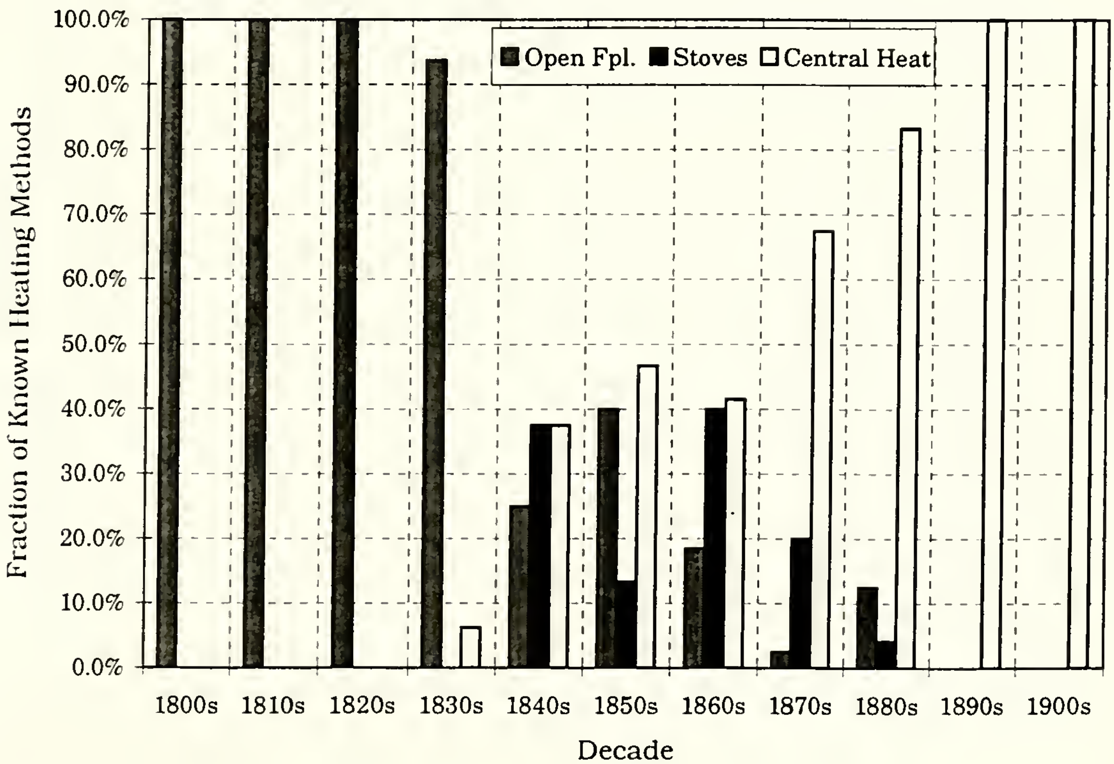
Primary Form of Heating By Decade.

| Decade | Number of Policies | Number of Buildings | Primary Heat: Open Fpl. | | Stoves | | Central Heat | | Unknown | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1800s | 2 | 11 | 11 | 100.0 % | 0 | 0.0 % | 0 | 0.0 % | 0 | 0.0 % |
| 1810s | 2 | 10 | 10 | 100.0 % | 0 | 0.0 % | 0 | 0.0 % | 0 | 0.0 % |
| 1820s | 2 | 2 | 2 | 100.0 % | 0 | 0.0 % | 0 | 0.0 % | 0 | 0.0 % |
| 1830s | 16 | 17 | 15 | 88.2 % | 0 | 0.0 % | 1 | 5.9 % | 1 | 5.9 % |
| 1840s | 24 | 39 | 4 | 10.3 % | 6 | 15.4 % | 6 | 15.4 % | 23 | 59.0 % |
| 1850s | 17 | 20 | 6 | 30.0 % | 2 | 10.0 % | 7 | 35.0 % | 5 | 25.0 % |
| 1860s | 65 | 102 | 12 | 11.8 % | 26 | 25.5 % | 27 | 26.5 % | 37 | 36.3 % |
| 1870s | 34 | 62 | 1 | 1.6 % | 8 | 12.9 % | 27 | 43.5 % | 22 | 35.5 % |
| 1880s | 13 | 26 | 3 | 11.5 % | 1 | 3.8 % | 20 | 76.9 % | 2 | 7.7 % |
| 1890s | 1 | 1 | 0 | 0.0 % | 0 | 0.0 % | 1 | 100.0 % | 0 | 0.0 % |
| 1900s | 1 | 1 | 0 | 0.0 % | 0 | 0.0 % | 1 | 100.0 % | 0 | 0.0 % |
| *total* | 177 | 291 | 64 | 31.8 % | 43 | 21.4 % | 90 | 44.8 % | 90 | 30.9 % |

*Note*: This is the fraction of the total number of buildings using a given type of heating.

The preference for stoves and then central heat can be seen more clearly in chart 7. In this chart, buildings for which a primary form of heating could not be determined were excluded. This probably does not reflect the actual fraction of buildings with a particular type of heat (e.g. stoves). For one, we do not know the true reason why the form of heating is not stated. But, it is probably safe to assume it was not random chance, but one of the reasons stated in the previous section. For another, the sampling itself is probably skewed, and as can be seen on table 10, the number of policies for some decades is rather small. That said, the general trends are probably accurate.

Chart 7. Heating Trends Suggested by Insurance Surveys



In the 1830s most houses were still using fireplaces as a primary form of heating, but toward the end of the decade a few people installed furnace heating. This use of fireplaces and grates corroborates pretty well with what was discovered about the adoption of stove heating in the early decades of the century. The limited presence of central systems is in line with what is known about early furnace heating.

In chapter 4 it was shown that stoves had become prevalent by the 1830s, but it was also suggested that many rooms in the houses did not have stoves. This was either because there was little need, such as in bed chambers, or because there was a reluctance to admit them, particularly in parlors. One could argue that if the stove(s) were in the most used spaces, they ought to be considered the primary source of heat. On the other hand, it could be just as easily argued that if the majority of heated rooms used fireplaces (or grates), then that should be considered the primary source of heat. In this case the latter argument has been chosen, primarily because it works better with the type of data available from the insurance surveys, and does not require any assumption about room usage.[100]

The earliest houses with central heat in the sampling of

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100 Jack Larkin, *The Reshaping of Everyday Life 1790-1840,* 124-6; for discussion on room use. Following pages discuss stoves and warmth, apparently drawn mostly from New England sources, but with unmistakable parallels to the findings here.

insurance surveys happen to be in Portico Row, attributed to Thomas Ustick Walter (c. 1832). But since furnaces are only mentioned in surveys from 1839 onward, it appears that the houses were not built with furnaces, but that they were added later by many of the owners. It is probably safe to assume that this prominent, architect-designed, and well situated row, represented some of the best housing in the city. Therefore, it is likely the owners could afford central heat even if it involved considerable construction inside a pre-existing house. There could have been extra interest generated once some of the neighbors had systems installed, and if they had been pleased with the results.[101]

It is possible that Walter had included provisions, or even the option for, furnaces in the initial designs for Portico Row, but there is no proof. If he had, it would have been the earliest provisions for residential furnaces identified in this area, and perhaps in the U.S. But in the late 1830s, another prominent local architect, John Notman (1810-1865), did begin to include central heat in his residential designs.[102]

In the two decades preceding the American Civil War,

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[101] Alix Jacobs, Craig Kolfach, Margaret Welch, "Portico Row", Historic House Report Collection, 84.5, Athenaeum of Philadelphia.

[102] Greiff, *John Notman, Architect,* 43, 61-2; found that the John Notman was using furnaces in his house designs from 1839 on, and at as early as 1837. Bishop, *A History of Manufactures,* vol. 2, 302 notes a claim by Mr. William Wheeler to have been the first in 1835 with a house warming, hot-air furnace in New England.

both stoves and furnace systems became common heating methods, and the use of fireplaces as a primary heat source dropped dramatically. During this period, there is considerable evidence that the differentiation fell along lines of class and location. Urban and suburban houses of the well-to-do were often constructed with furnace heating in mind, particularly in the 1850s. They also retained fireplaces, particularly in the primary rooms. One is led to believe that stove heating was to be the preference in most of the other houses, even if working fireplaces were present. Outside of Philadelphia, fireplaces apparently continue as a major source of heating, although one suspects that stoves were also present in many houses.

The first indication that furnaces were found primarily in first-class houses comes from comparing the insurance values on houses which definitely had furnace heat to those that appear to have had another form. For the 1840s the average policy value with furnaces was $4,050 versus $1,193 for those with another form of heating. The lowest policy for a house with central heat was $2,200 while the price range for those using others form of heating started at $2,000 and went down to $600. In the 1850s the values begin to overlap, but the general pattern is the same.

This analysis is crude because the insured value is never more than, and often less than, the rebuilding cost. It also does not take into account the number of buildings,

as opposed to the number of policies. Finally, it is muddled by the large number of houses whose heating system was not identified. In the 1840s these ranged from $7,000 down to $250.

Nonetheless, it does seem that furnaces were primarily found in the larger and more expensive houses. A comparison of construction estimates given in several architectural advice books reveals a similar pattern (see table 11). It is interesting to note that William Ranlett, a New York-based architect, only included a furnace in his most expensive estimate; whereas Sloan, a Philadelphia based architect, included furnaces in all of his estimates from $3,800 on up. Additionally, he recommended a furnace for a cottage estimated to cost $3575 to build (without a furnace).

Although not included in the table, A. J. Downing's *Cottage Residences* (1842) does include furnaces in the two designs from other architects. The first, is a "Tuscan Cottage" (Design 9) by John Notman, previously mentioned for his early inclusion of furnace heating in residential designs. The estimate for this house is given at $3000, although it is not clear what this includes. The other design with a furnace, is a house for J. Rathbone (the stove manufacturer?) by A. J. Davis, estimated between $12,000 and $ 15,000 to build (Design 10). Only a few other estimates are given this book; design one would cost about $1,800 in

brick, design 5 from $5500 to $6000, and number 7 about $7500. So although Downing was interested in conserving heat in northern climates (by placing the chimney in the center), he was not yet advocating furnace heating.[103]

Table 11.

Construction Estimates from Pattern Books.

| Author | Source | Date | Design No. | Description | Total Cost | Furnace | Cost | Mantels # & cost |
|---|---|---|---|---|---|---|---|---|
| Ranlett, W. | *The Architect* | 1851 | 39 | | $ 160 | | | |
| Ranlett, W. | *The Architect* | 1851 | 40 | | $ 474 | | | |
| Ranlett, W. | *The Architect* | 1851 | 41 | | $ 827 | | | |
| Ranlett, W. | *The Architect* | 1851 | 30 | Cottage | $ 860 | | | 2, $ 5 |
| Ranlett, W. | *The Architect* | 1851 | 38 | | $ 1,482 | | | 1, $ 20 |
| Ranlett, W. | *The Architect* | 1851 | 32 | | $ 1,946 | no, 2 grates 3 fpl | | 3, $ 11 |
| Ranlett, W. | *The Architect* | 1851 | 33 | | $ 2,401 | no, 1 grate 3 fpl | | 3, $ 17 |
| Ranlett, W. | *The Architect* | 1851 | 43 | Italianate [twin] | $ 2,416 | | | 8, $ 106 |
| Ranlett, W. | *The Architect* | 1851 | 48-9? | American Villa | $ 2,451 | no, 2 grates 6 stoves | | 4, $ 18 |
| Ranlett, W. | *The Architect* | 1851 | 27 | | $ 4,451 | | | 6, $ 113 |
| Ranlett, W. | *The Architect* | 1851 | 51 | | $ 8,201 | Walker's | $ 180 | 6, $ 138 |
| Sloan, S. | *The Model..* | 1852 | 15 | Small Villa-brick | $ 1,200 | | | |
| Sloan, S. | *The Model..* | 1852 | 11 | Plain Villa | $ 2,500 | | | |
| Sloan, S. | *The Model..* | 1852 | 12 | [Cheap] Cottage | $ 3,575 | not incl. | | not incl. |
| Sloan, S. | *The Model..* | 1852 | 47 | Castellated Style | $ 3,870 | yes | $ 175 | |
| Sloan, S. | *The Model..* | 1852 | 1 | Italian Villa, stone | $ 4,800 | yes | | |
| Sloan, S. | *The Model..* | 1852 | 3 | | $ 6,092 | Chilson's no. 3 | $ 125 | 5, $ 130 |
| Sloan, S. | *The Model..* | 1852 | 6 | Italian Villa | $ 6,220 | yes | $ 175 | 8, $ 200 |
| Sloan, S. | *The Model..* | 1852 | 9 | | $ 9,632 | Chilson's no. 4 | $ 140 | 4, $ 130 |
| Ranlett, W. | *The City Arch.* | 1856 | 4 | [Cheap Twins] | $ 624 | no | | |
| Ranlett, W. | *The City Arch.* | 1856 | 3 | | $ 2,143 | no | | 2, $ 55 |
| Ranlett, W. | *The City Arch.* | 1856 | 5 | Block of Stores & Dwls | $ 2,899 | no | | 4, $ 72 |

*Note:* A blank under Furnace indicates a furnace was not included in the design. If grates or stoves were mentioned in the estimate instead of a furnace, that is noted there as well. In one case Sloan gave an estimate, but did not include the furnace, but recommending provisions be made for one to be installed if desired.
*Sources:* William Ranlett, *The Architect*, vol. 2 (NYC: 1851); Samuel Sloan, *The Model Architect*, 2 vol. (Phila.: 1852); William Ranlett, *The City Architect*, (NYC: 1856).

[103] Andrew Jackson Downing, *Cottage Residences* (1842), 40, 108, 144, 171-2, 164-6.

By 1850, things had changed a little. As noted in the previous chapter, Downing thought indirect hot-water heating the healthiest, but too expensive for most people. Instead, for central heat, he was recommending one of Chilson's hot-air furnaces, which he had tested for five months. It is important to note that Downing found most hot-air furnaces to be as bad as stoves because the metal was too easily heated red hot, releasing poisonous gases and overheating the air. With any sort of heating, Downing insisted on ventilating flues and chimney valves to carry off the vitiated air.[104]

Even with central heat, architects retained the fireplace, in part because it was an important feature of the rooms, and in part because they like the way it heated and ventilated. When Ranlett wrote "the old fashion is a cheerful wood fire in an open fireplace, which is still in extensive use in many parts of the United States" he revealed a bias toward fireplaces, which he liked because they heated the room, not the air. The importance of the fireplace as an object in the room can be inferred from the considerable expense set aside for mantles, even in houses with furnaces (see table 11).[105]

In spite of this, from these same authors, one can infer

[104] A. J. Downing, *The Architecture of Country Houses* (1850), 475-8.

[105] Ranlett, *The Architect,* vol. 1 (1849), 27.

that stoves were the primary source of domestic heat for many Americans. Ranlett specifically includes stoves, and provisions for stove pipes, in several of his less expensive designs. Downing is less accommodating, "The open fireplace is the most agreeable and healthful mode of warming an apartment, and next to this, the grate with air-chamber.... Whoever can afford these means of warming and ventilating an apartment (in connection with a chimney-valve) should never be persuaded to introduce a stove, of any kind, into his room." But in the note at the bottom of the page, we can see that he is aware that most people do differently. "We know that there are few "notions" of which our people are fonder than *stoves*-of all descriptions-but we protest against them.... Close stoves are not agreeable...and not economical, for though they save fuel they make large doctor's bills." Of course, even when fireplaces were present, it was an easy matter to brick or board over the opening and install a stove in front.[106]

At this juncture, it is important to note that *stoves* had improved mechanically and ornamentally, although simple plate stoves were still available. Many coal stoves took

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[106] Ranlett, *The Architect,* vol 2. (1851), 72, 76; It is surprising to see that even in his 1856 *The City Architect,* the only place that appears to call for stoves is the store in design 5. Additionally, at least until 1851, he assumes cooking will require a fireplace with crane and hooks. A. J. Downing, *The Architecture of Country Houses,* (1850), 472; also note at the bottom of 480-1; On page 467 is one of many references found about boarded up chimneys and stoves. See Ranlett, *The Architect,* vol. 1 (1849) 29, for another.

advantage of coal's characteristics: base-burners and pyramid stoves required less attention because coal worked its way down into the burning fire from a magazine. Moreover, "shaker" grates made it easier to prevent the ashes from choking the fire, and virtually eliminated poking. These features may have had added appeal as more people worked away from the house and the family, and as a result fewer hands were available to maintain the fire. Fewer people laboring in a room would, of course, also make it feel cooler, and require more artificial heat. Where only a room or two needed heating, there seems to have been agreement that point-source heating was more economical than a central furnace.[107]

The 1860s and 70s show evidence that furnace heat was entering middle class houses. Progress in this respect seems to have been interrupted by the Civil War, and then the depression in the mid-1870s. So even in Philadelphia City, there is evidence that not until the 1880s was central heat becoming as universal as some contemporary accounts might lead us to believe.

When Sloan published *City and Suburban Architecture* in 1859, he wrote, "Heating by furnaces in the cellar has become quite common, and in view of its many advantages it

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[107] Pierce, *Fire on the Hearth,* all but 105, 126, 146 have examples of improvements; Larkin, *The Reshaping of Everyday Life*, 48-61,113-41 ; Even Downing admits so much, *The Architecture of Country Houses* (1850), 474-5.

is probable that a few more years will make it almost universal in city residences." Sloan was clearly an advocate for central heating. In this book, nearly all of his designs indicate central heat will be used.[108]

Sloan was not alone. John Riddle in his *Architectural Designs for Model Country Residences* (1864) includes a furnace in every design, although it must be noted that these were not cheap houses to build, the lowest estimated at $3,600. Then there was George Woodward, who clearly liked fireplaces, stating in 1868 "for a whole house [as opposed to a room or two]...the hot-air furnace will do the work better" than a grate or close stove. "Fireplaces are seldom seen, or are made for ornament and closed up with fireboards."[109]

By the Centennial Exhibition (1876), James McCabe observed that that the working class was better housed in Philadelphia than in any other city. Typical houses were described as three stories, with pressed brick fronts, and a hall, parlor, dining room, kitchen, and often a summer kitchen on the first floor. "They are lighted by gas,

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[108] Sloan, *City and Suburban Architecture* (1859), 57 for quote, see also 87 regarding fireplace disuse.

[109] George E. Woodward, *Architecture and Rural Art,* 2 vol. (1867,1868). For preference of fireplaces see 1:124 and 2:71,78-9. Quotes from 2:70 and 2:68 respectively. He also includes furnaces in many designs. On page 185 of *Woodward's Country Homes* (1870) he specifically states the design is for stoves, but flues should be constructed so a furnace can be added at any time.

heated by furnaces in the cellar, and supplied with hot and cold water."[110]

While this makes a good case that furnaces had replaced stoves and fireplaces by the 1870s, the insurance surveys suggest a more complicated situation. In that furnace heating could be found in most of the better houses, they agree. Furthermore, unlike the pre-Civil War era, it seemed to matter little where they were located. Nevertheless, there clearly were many houses without furnaces. Most of these households relied on stoves, although a few preferred grates.

By the 1860s, the insurance surveys support the notion that furnace heat was preferred by most of those who could afford a better than average house. They also indicate that furnaces could be had in many of the outlying towns as well as the city. Examples can be found in Gloucester, Mt. Holly and Camden, N.J.; Norristown, Wilkes-Barre, Franklin, Harrisburg, and West Chester, Pa.; as well as Philadelphia.

Perhaps because of what James McCabe wrote at the Centennial, it ought not be surprising that the poor could not afford a "typical" Philadelphia house and its furnace, but lived in something smaller. Quite a few of the insurance surveys from the 1860s, and a few from the 1870s, are for 2-story houses insured for no more than $1000, and

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[110] James M. McCabe, *The Illustrated History of the Centennial Exhibition: A Collector's Reprint* (1876, reprint 1975), 10-11.

as little as $400. None of them had furnaces, and although most of those surveys do not say so explicitly, they were probably using stoves. Lewis Leeds described these two-story row houses (cottages he called them) in his fourth lecture on ventilation. Most, he said, had their fireplaces boarded up and the room heated by "the American Stove - a little air-tight stove - a stove too small for the room," but they compensate "by heating it *white hot* instead of only red." But he also did not believe that stoves were evil if properly sized, and the room ventilated, because they kept the poor from freezing. For him, the question was not "Shall the laboring classes use stoves, or...open fires? It is, Shall they have stoves, or shall they go without artificial heat altogether?"[111]

What was surprising, in light of the earlier comments, is that for modest (middling) houses, it is only around the Centennial that the shift toward central heat can be detected. While this can be guessed at from looking at Chart 7, it can most clearly seen in the surveys representing new housing developments (or, real estate "operations" as they were then termed).

These operations indicate that at least as early as 1869, three-story brick houses were being built in West Philadelphia with furnaces, "cylinder furnaces"

[111] Leeds, *A Treatise on Ventilation* (1882 [c1871]), 164-7, 189-91.

specifically. Yet, in 1872, a slightly more modest, three-story row of houses was put up in North Philadelphia equipped with stoves. In fact, all the developments that have furnace heat in their houses have policy values of at least $2,500 (including one in Camden, NJ). Finally, in the 1880s, furnaces are indicated in a housing operation with policy values as low as $1,300. As the editors of Philadelphia's *Real Estate Record and Builder's Guide* replied to an opponent of furnaces, "we can not do without." Yet to be fair, many rural houses were still using stoves. The subsequent surveys to the one just before mentioned, although not included in the sampling, were for rural houses, and every one of them had stove heat.[112]

An in-between solution was to use a ventilating stove that had a warm air flue that could be connected to the room above. Although not central heat, it did heat more than one room simultaneously. Perhaps the best known of these was the "Baltimore heater," or "Latrobe stove," which was set part way into the fireplace opening and had clear mica windows in the front.[113] These stoves are mentioned in

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[112] Insurance Company of North America Perpetual Policy 9201 [for 3901-15 Baltimore Avenue], INA 5: INA Perpetual Surveys, CIGNA Archives. *[Philadelphia] Real Estate Record and Builder's Guide*, (Feb. 14, 1887), vol 2, no. 6, page 27 bottom of third column.

[113] Baltimore heaters were a type of stove created by one John H. B. Latrobe of Baltimore around 1845. Ron Pilling, "Restoring the Baltimore Heater", *Old-House Journal*, vol.12, no. 9, 191,206. He states that it predated the whole house furnace, which we know is not true.

several of the insurance surveys, including one in an early 1860s West Philadelphia house, designed by none other than Samuel Sloan.[114]

This house is a particularly interesting because if the insurance survey had not stated it was heated by grates (and one Baltimore heater), several factors might have led one to assume it was heated by furnaces. It was a large suburban house, constructed about 1864 as a part of a development, and designed by Samuel Sloan, whom we have learned was including furnace heat in his published designs. The slightly smaller twins constructed across the street, for which there is also a representative insurance survey in 1871, have portable heaters. But in 1879, this house is described with grates in most rooms, and the Baltimore stove in one. We may ask why?[115]

Grates and fireplaces were clearly a matter of choice, at least for urban dwellers. As we have learned, the very poor could not afford to run them. It is likely that Sloan was either accommodating the developer, or the buyers. Further, although certainly not typical, this was not the

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[114] James P. Colgate, "John F. Busch House in 1880", Historic Interiors Studies Collection, 91.14, Athenaeum of Philadelphia.

[115] Colgate, "John F. Busch House in 1880," discusses the development and includes the survey for George Crawford's house (Franklin Fire Insurance policy 10824) 504 S. 42nd Street. The survey for the Insurance Company of North America policy 3086 mentions only 509 & 527 S. 42nd St., but the upon viewing the extant buildings, one can see the whole block was obviously the same. These houses had "portable heaters".

only post-Civil War insurance survey that turned up grates. William Sellers had them in 1882 in what appears to be a new house. In another policy, because a furnace or stove is not mentioned in the resurvey of 1883, it is possible that the owners were still using the grates noted in the initial survey of their old, 1832 house.[116]

Far more typical, was to have a fireplace or grate in just one or two rooms. Particularly after 1870, the insurance surveys show many more grates, and far fewer stoves, as secondary sources of heat. This probably represents the physical manifestation of what advocates of healthy houses had been arguing: fireplaces could provide the best ventilation, and, perhaps more importantly, they were a source of cheer and warmth. By the 1880s even the builders seem to agree that any first class house ought to have at least one working fireplace for the family to gather around.[117]

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[116] Franklin Fire Insurance Survey 12778 [1819 Vine St.] in Mark V. Rambusch, "William Sellers Residence", Historic House Reports, 89.1, Athenaeum of Philadelphia; Franklin Fire Insurance Survey 0 480, Historical Society of Pennsylvania.

[117] Some of those who liked fireplaces for healthy ventilation include Lewis Leed, *Lectures on Ventilation*, 70, 164; those who also liked the cheer and warmth they brought include most of the architects already mentioned, Ranlett, Downing, and Woodward. Even Sloan prefers "low-down grates" to stoves. These were grates set in the hearth floor; with the air supplied from below, and a well for the ashes to drop into the cellar. The attitude of builders can be seen in the *[Philadelphia] Real Estate Record and Builder's Guide*, such as the article previously noted from Feb 14, 1887, vol 2, no. 6, page 27 and William S. Kimball's announcement March 14, 1887, page 66. Examples of sitting room fireplaces can be found in even the


Fig. 18. A Cheerful Fire

From the trade catalog of Charles Williams, Office and Ware rooms 1132-34 Market St., *Heating & Ventilating.* Philadelphia: Longacre [1873]) in the collection of the Hagley Museum and Library.

Although central heat had entered the scene, it took many years to become widespread, even in Philadelphia. Its cost and bulk restricted its use to larger houses, and its advantages were not necessarily manifest or universally

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smaller houses put up by Kimball, such as those on Regent Square, which sold for $3,600, *[Philadelphia] Public Ledger*, Feb 12, 1887.

The intertwining of these ideas, along with the movement toward greater "truth" in architecture can be seen in "Beds and Tables, Stools and Candlesticks II" from *Scribner's Monthly* vol. 11, no. 3 (June 1876) 347-50. To quote just a little: "We are putting behind our backs the time when furnaces were all the rage [and kept doctors rich]. It seemed the hearth-stone was a dead institution..." yet people kept their chimneys and make-believe fire-places, and mantelpieces, some even with asbestos logs and gas flues.

agreed upon. Stoves, and to a lesser extent grates, were being improved at the same time and still provided a reasonable alternative for many people. They provided warmth when and where needed; and this could be far more economical if only a room or two was being used. For the more rural population, they were cheaper to transport to their house, and offered more flexibility in burning wood or coal. Grates and fireplaces were also advocated by many authorities as warm, and cheerful, as well as a healthy source of ventilation. Stoves on the other hand, had no such advocates, although many ventilating models were promoted.

# APPENDIX A

## THE CHIMNEY IN ARCHITECTURAL GUIDEBOOKS

In 1779 Robert Clavering, a builder, noted there was an astonishing lack of knowledge on constructing chimneys so they will not smoke. Just six years later, Benjamin Franklin writes similarly: "Architects in general have no other ideas of proportion in the opening of a chimney, than what relate to symmetry and beauty, respecting the dimensions of the room." Franklin later expounds on this, stating that even in the latest book of architecture he had seen, the chimney funnel was not made proportional to the fireplace opening.[118]

An examination of architectural books available in America before the War for Independence fully supports these assertions. Although Franklin wished there was more scientific (experimental) study of this problem, both Clavering and Franklin recite the works of philosophers who had studied the subject (see Chapter 3) and would have been available to any architect.

Some of the architectural handbooks do make suggestions such as narrowing the throat to prevent smoking chimneys.

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[118] Robert Clavering, *An Essay on the Construction and Building of Chimneys*, 3rd ed. (London: I.J. Taylor, 1793), ii, 18; Benjamin Franklin, *Observations on Smokey Chimneys* (London, I.J. Taylor, 1793), 12, 39. See also Edgerton, "Heating Stoves," 95-97; In note the gives the full citation of the book Franklin referred to as *Nutshells*.

Most of the books say nothing, probably because they are more design guides, primarily to show examples of decoration and proportion. Of the three more sophisticated authors who cover theory, one ignores the subject (Gibbs), one is consumed with the notion of proportion as mathematical harmony (Morris), and only the third attempts to cover the subject in depth (Ware).[119]

Ware is most concerned that the chimney functions. He writes, "observing not to make their funnels too wide, nor too narrow" and explains why. He also writes that the inside should be very smooth, "because rustick work is not proper..." But as far as the design (shape and dimensions)of the fireplace he provides no guidance, only that flue should be at least 6 inches wide, and no greater than 9 by 2'6".[120]

In contrast, Morris is concerned that the fireplaces were the correct size for the room, something Ware appears to ignore. But Morris is either unconcerned if the size is proper to heat the room, or more likely, believes that if they are built in natural proportion to the room, they will

[119] Helen Park, *A List of Architectural Books Available in America Before the Revolution* (Los Angeles: Hennessey & Ingalls, 1973 edition) x-xi; James Gibbs, *A Book of Architecture Containing Designs of Buildings and Comments* (London, 1733); Both Gibbs's and Ware's books appear to be have been relatively popular in the colonies, 7th and 8th most references found by Ms. Park; Edgerton, "Heating Stoves, " 95-97 made similar observations to these.

[120] Isaac Ware, *The Four Books of Andrea Palladio's Architecture* vol. 1 (London, 1737-8), 33-4.

naturally function. *viz.*

> A room should be 3:2:1 (L:B:Ht) and
> the fireplace breadth = ½*û(L+B),
> the fireplace height = ½*û(L+B+Ht). He also suggests
> the depth = (b+h)/4, and each
> side of the funnel = d*3/4.[121]

Some of the handbooks give dimensions based on room size, others give proportions, a very few make suggestions. There seems to have been little agreement, as seen from the following:

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[121] Robert Morris, *Lectures on Architecture* (London, 1734-6), 94-7.

Advice on Chimneys in Architectural Books

In Order of Popularity (as found in the Park *List* ff.29)

1. Salmon, *Palladio Londinensis or The London Art and Method of Building*, 2nd ed. 1738, 129-30.

Gives general proportions for projecting fireplaces based on the type of room.

Gives size of funnels to be 10-15", and directions on instructing workmen how to build them. That is, they be of "sufficient height above the ridge", that they "be not wide...or too narrow", that they "be truly perpendicular", and that there is no wood in them, or 1' from the jambs or 6" from the back.

2. Price, *British Carpenter* (1733)

A hands-on carpenter's guide, but nothing on chimneys or masonry.

3&4. Langley, *Builder's Jewel* & *The City and Workman's Treasury of Designs* (London:1750)

In the plates of chimney pieces he affixes the measures of the openings that seem to go from 4 2/3:6; to 5:6 (ht:w) and shows some in plan. The depths appear relatively shallow (less than 1/2 the width or 3:6) and some have curved back corners while others are square. see *Treasury*.

4. Swan, *British Architect*, (1745)

Pictures of chimney-pieces.

5. Edward Hoppus, *The Gentleman's and Builder's Repository or Architecture Displayed*, 2nd ed. (London, 1738), 75.

"Of Chimney-Pieces Plate XLVII"

They must be made larger or smaller, in proportion to the size of the rooms they are intended. On this plate are four different Sorts; the Opening of the all is a **perfect Square,** and the Architrave is one sixth of the opening, the pilistars half thereof.

6. Halfpenny, *New & Complete*, (1749)

Framing and construction of big houses. Shows fireplaces squared.

7. Gibbs, *A Book of Architecture*, (London, 1733)

Does not cover fireplace design. In plans, shows them with squared corners.

8. Ware, *The Four Books of Andrea Palladio* (1737)

Discusses the ancients, and describes how workman should make the funnel. It should be over 6 inches, and less than 9 by two and half feet. Not too wide or narrow, and taller than the roof. They must be a little narrower where they join the pyramid, and may be made a little crooked (very similar to what Savot wrote.) The top of the chimney "ought to be wide" and the whole smooth and neat, especially the mantle tree and away from any combustible materials.

9. Pain, *Builder's Companion*, (1758)

Of particular note because it is reprinted in America after the war, along with Swan's British Architect. His proportions result in fireplaces that are taller than wide, and shallower than most others. For example, a 10 x 10 foot room would have a fireplace 2'6 w, 2'11 ht and 1'4 deep. His funnel would by 12"x12".

Neve's *Dictionary* (1726) should be mentioned, although it was not nearly as common(15th), because he does mention that the back should have an "apt falling back"; otherwise his proportions are very similar to Salmon's. He also discuss a number of devices to cure smokey chimneys, most which had been dismissed by Savot a century earlier.

By way of Comparison, consider the following:
Natural Philosophers Recommendations (chronological order)

Gauger, *The Mechanism of Fire Made in Chimneys*, [Desaguliers trans]. (London, 1716)

Specifically recommends rounded back corners, but prefers the whole interior to be made of bright metal in a parabolic shape. Suggests a fireplace be 4'w, and only 3'9 high and 1'9 deep. In the glossary, a "Draught" is defined as "the falling in above the Back" of the chimney. The following definition (for hotte *fr.*) makes clear that this is not the breast, but opposite it, on the back. Also that "Wings" are the sides of the funnel above the jambs.

*Encyclopædia Britannica*, vol. 3. s.v."Smoke," (Edinburgh, 1771)

Clavering writes that he found this article particularly informative. It gives no dimensions or proportions, but does explain the problems, especially in older chimneys that have mantels too high, and wide, and backs too deep.

The correction they show (in plate 156) differs from all the other chimney sections I have seen for this time period. In particular, they show the back wall rising perpendicular to the ground until it is equal in height to the bottom of the mantle. Then it juts forward a little before sloping back. The others have a straight back (Gauger), or slope more gently and start much lower.

Clavering, *the Building ..of Chimneys* (1779/1793 3rd pub)

Describes how to slope the wings, the back and the breast. His proportions are to make the chimney function best and are more concerned with the total opening size, rather than height or width specifically. The recommended opening is a bit smaller than most of the architects and a bit shallower. For a 10 by 10 room, it could be 2'3 by 2'11 and 1'6 deep with funnel 11"x11". Also says fireplaces are usually built with square back corners but occasionally with angled or curved jambs.

Franklin, *Observations on Smokey Chimneys* (1785/1793 pub.)

Writes that fireplace openings are still too large, and suggests even smaller openings than Clavering. such as 2'6 by 2'6 with a depth of 1'6. Gives no specifics on the flue sizes. Suggests that the right size can be found by experimenting with the existing chimney. Using boards the opening sizes can be adjusted and the results observed.

# APPENDIX B
# PROBATE INVENTORY ANALYSIS

## 1. List of House Inventories Examined

| ID | Will # | Date of Death | Address | Town | first name | last name | Age | profession |
|---|---|---|---|---|---|---|---|---|
| 1 | 1834:102 | Nov 11 1834 | 209 Pine | Phila. City | Thomas | Badaraque | 65 | accountant |
| 2 | 1835:28 | Feb 16 1835 | NW crnr Spruce & 8th | Phila. City | William | Pritchett | 47 | Master Tanner |
| 3 | 1835:155 | Oct 4 1835 | 14 Palmayra Row Vine blw 11th | Phila. City | Elizabeth | Twamley | 72 | gentlewoman |
| 4 | 1836:73 | Apr 18 1836 | 68 1/2 S. 2nd Street | Phila. City | Nathaniel | Holland | 61 | Hatter |
| 5 | 1836:200 | Dec 21 1836 | SE crnr Lombard & 9th | Phila. City | Thomas | Brown | | Grocer |
| 6 | 1850:84 | Mar 26 1850 | 307 Walnut Street | Phila. City | Aquila A | Browne | 81 | attorney |
| 7 | 1852:339 | Jun 1 1852 | 11XX Spruce St abv 11th | Phila. City | John | Cooper | | Merchant |
| 8 | 1853: | Oct 26 1853 | 370 S. Front | Phila. City | Caleb | Pierce | 60 | Agent |
| 9 | 1856:499 | Jan 15 1856 | | Roxborough, | Jacob | Rittenhouse | 68 | Farmer |
| 10 | | Dec 13 1754 | | Phila. City | Michael | Lightfoot | | |
| 11 | | Oct 21 1754 | | Phila. City | Samuel | Pennock | | House Carpenter |
| 12 | | May 22 1754 | | Phila. City | James | Terry | | |
| 13 | | Oct 10 1754 | tenament Chestnut Street | Phila. City | Andrew | Bartholamew | | Cordwainer? |
| 14 | | Apr 17 1754 | Cherry or Hill St | Phila. City | George | Spofford | | Merchant |
| 15 | | Jun 16 1755 | | Phila. City | John | Pole | | Merchant |
| 16 | | Nov 25 1757 | | Phila. City | William | Fitzsimmons | | |
| 17 | | Sep 15 1758 | | Moyamonsing | Joseph | Huddle | | Cooper |
| 18 | | Jul 10 1755 | | Phila. City | Joshua | Crosby | | |
| 19 | | Feb 25 1772 | | Phila. City | John | Kearsley | | Physician & Surgeon |
| 20 | | Jan 1 1773 | | Phila. City | George | Plim | | |
| 21 | | Jul 23 1773 | | Phila. City | Cadwallader | Evans | | Physician |
| 22 | | Apr 23 1775 | | Pasyunk, | John Nicholas | Kleyn | | Farmer, Yeoman |
| 23 | 1800:53 | Jan 1 1800 | Southwark Ward | Phila. City | John | McCulloh | | Merchant |
| 24 | 1802:31 | Jan 1 1802 | | Phila. City | Gunning | Bedford | | Lawyer |
| 25 | | Apr 1 1780 | NE crnr 2nd & Lombard | Phila. City | Carpenter | Wharton | | Merchant |
| 26 | 1812:85 | Jan 1 1812 | Dickson's Court | Phila. City | Elizabeth | Griffiths | | Haymaker |
| 27 | 1815:133 | Nov 12 1815 | 25 S. 3rd Street | Phila. City | Peter | du Plessis | | Interpreter & Conveyancer |

1. List of House Inventories *continued.*

| ID | Will # | Date of Death | Address | | Town | first name | last name | Age | profession |
|---|---|---|---|---|---|---|---|---|---|
| 28 | 1816:126 | Jan 1 1816 | 143 | Pine Street | Phila. City | William | Hamon | | Merchant |
| 29 | 1820:2 | Jan 6 1820 | 134 | S. 3rd Street | Phila. City | Rebecca | Shoemaker | | gentlewoman |
| 30 | 1820:9 | Mar 23 1820 | 77 | N. 7th Street | Phila. City | Jacob | Rush | | Gentleman |
| 31 | 1821:5 | Jan 5 1821 | 96 | S. 5th (by Delancy) | Phila. City | James | Engle | | Customs Inspector |
| 32 | 1821:104 | Aug 20 1821 | 13xx | Chestnut & 13th | Phila. City | James | Ashman | | Boot Maker |
| 33 | 1823:111 | Oct 2 1823 | 53 | S. 5th | Phila. City | John | Lake | | Tanner |
| 34 | 1823:111 | Oct 2 1823 | | | Dela. County | John | Lake | | Tanner |
| 35 | 1824:38 | Jan 1 1824 | 77 | S. 4th Street | Phila. City | Margaret | McCall | | gentlewoman |
| 36 | 1824:124 | Oct 29 1824 | 208 | Spruce Street | Phila. City | Lewis D. | Carpenter | | Confectioner & Merchant |
| 37 | 1825:25 | Jul 7 1825 | | | Northern Liberties | John | Brown | | Physician |
| 38 | 1827:110 | Aug 19 1827 | 197 | Race or Sassafras | Phila. City | Benjamin | Cresson | 53 | China Merchant |
| 39 | 1828:36 | Mar 20 1828 | 395 | S. 2nd Street | Phila. City | Lewis | Dreamer | | Grocer |
| 40 | 1833:177 | Nov 8 1834 | 16 | N 11 Street | Phila. City | Thomas C. | Price | 33 | Hardware Merchant |
| 41 | 1834:176 | Nov 4 1834 | 247 | Spruce Street | Phila. City | Robert | Steel | 73 | Gentleman |
| 42 | 1797:435 | Nov 15 1797 | 910 | [S] Front Street | Phila. City | Thomas | Leaming | | Wealthy Gentleman |
| 43 | 1797:372 | Apr 18 1797 | 129 | Market Street | Phila. City | Josiah | Twamley | | Iron & Hardware Merchant |
| 44 | 1795:152 | Apr 8 1795 | 5219 | Germantown Ave. | Germantown, | John | Bringhurst | | Master Coachmaker |
| 45 | 1791:32 | Feb 7 1791 | | | Phila. City | Richard | Farmer | | Physician |
| 46 | 1790:6 | Nov 29 1790 | | | Phila. City | Philip | Boehm | | Liquor Merchant |
| 47 | 1788?:79 | Dec 12 1788 | | | Phila. City | Hannah | Morton | | |
| 48 | 1787:280 | May 5 1787 | 371 | Arch Street | Phila. City | William | Fischer | | Merchant |
| 49 | 1785:1222 | Dec 15 1785 | 965 | [S ?] 2nd Street | Phila. City | Benjamin | Paschalt | | Esq. , Merchant |
| 50 | 1785:59 | May 19 1785 | 3rd | Walnut Streets | Phila. City | Andrew | Hamilton | | |
| 51 | 1778:91 | Sep 3 1778 | | | Northern Liberties | Henry | Woodrow | | Lumber Merchant |
| 52 | 1776:274 | Sep 18 1776 | | | Phila. City | Peter | Turner, Jr. | | gentleman |

1. List of House Inventories *continued.*

| ID | Will # | Date of Death | Address | Town | first name | last name | Age | profession |
|---|---|---|---|---|---|---|---|---|
| 53 | 1775:163 | Sep 13 1775 | | Phila. City | Samuel | Bryan | | Shipwright [Master ?] |
| 54 | 1775:113 | Apr 28 1775 | | Phila. City | Henry | Robinson | | Liquor & Spice Merchant [Carpenter ?] |
| 55 | 1776:240 | May 14 1776 | | Phila. City | Allen | McKlean | | Skinner & breeches maker |
| 56 | 1776:214 | May 12 1773 | | Phila. City | John | Baynton | | Merchant |
| 57 | 1774:38 | Sep 14 1774 | | Phila. City | Samuel | Neave | | Merchant |
| 58 | 1773:259 | Feb 24 1773 | Front St. | Phila. City | Samuel | Morton | | Merchant |
| 59 | 1774:52 | Oct 18 1774 | W side along Moravian Alley S. 2nd Street | Phila. City | Lynford | Lardner | | Esq. Iron Master (of Andover Forge) |
| 60 | 1772:231 | Jan 8 1772 | N. 2nd St E side Gilbert's [Elfreth's] Alley | Phila. City | Jeremiah | Elfreth | | Blacksmith |
| 61 | 1770:516 | Oct 12 1770 | | Phila. City | Robert | Montgomery | | Merchant |
| 62 | 1767:98 | Jul 2 1767 | | Phila. City | Benjamin | Shoemaker | | |
| 63 | 1767:90 | Aug 5 1767 | | Germantown, | Benjamin | Shoemaker | | |
| 64 | 1848:114 | May 5 1848 | 273 N. 6th St. | Northern Liberties, | John | Heyl | 73 | Brushmaker |
| 65 | 1847:125 | Jun 17 1847 | 413 Vine Street | Phila. City | Robert | Barret | 66 | [master] brick layer [& real estate man] |
| 66 | 1837:219 | Jan 24 1838 | 15 Palmayra Row | Phila. City | William | Sheepshank | 61 | gentleman |
| 67 | 1837:108 | May 18 1837 | 216 S. Front Street | Phila. City | Lewis | Clapier | 73 | Merchant |
| 68 | 1837:104 | May 16 1837 | Nr Masters Cadwallader Street | Kensington, | James | Rihl | 40 | Pumpmaker |
| 69 | 1828:1 | Jan 8 1828 | 111 Lombard Street | Phila. City | Lawrence | Sink | 63 | Cabinet Maker |
| 70 | 1827:137 | Nov 30 1827 | 132 S. Front Street | Phila. City | John | Crowley | 47 | Watchmaker |
| 71 | 1827:84 | Aug 27 1827 | 31 Chestnut Street | Phila. City | Jane G. | Keen | 22 | widow of Currier |
| 72 | 1842:149 | Jul 14 1842 | 93 S. 4rth Street | Phila. City | Richard | Alsop | | Merchant |
| 73 | 1843:11 | Feb 9 1843 | 59 N. 11th Street | Phila. City | Charles | Schreiner | | Tax Collector |
| 74 | 1843:250 | Jan 24 1844 | 107 Pine Street | Phila. City | William W. | Hendry | | Leather Dealer |
| 75 | 1846:163 | Jul 29 1846 | 102 Chestnut Street | Phila. City | William | Swain | | Newspaper Editor |

1. List of House Inventories *continued.*

| ID | Will # | Date of Death | Address | | Town | first name | last name | Age | profession |
|---|---|---|---|---|---|---|---|---|---|
| 76 | 1848:7 | Feb 11 1848 | 30 | N. 3rd Stree | Phila. City | John, Jr | Angue | | Merchant |
| 77 | 1848:70 | Apr 20 1848 | 5279 | Germantown Ave | Germantown, | Samuel | Harvey | | Banker |
| 78 | 1849:337 | Jan 24 1850 | 9 | Brown Street | Northern Liberties, | Peter | Gabel | | gentleman |
| 79 | 1849:283 | Dec 3 1849 | 249 | Mulberry Street | Phila. City | Esther | Fischer | | gentlewoman |
| 80 | 1849:82 | Apr 9 1849 | 107 | S. 4rth Street | Phila. City | David J. | Ruddach | | Merchant |
| 81 | 1813:67 | Sep 15 1813 | 75 | N. 5th Street | Phila. City | Richard | Truman | 68 | Tax Collector |
| 82 | 1804:24 | Feb 29 1804 | 70 | Walnut Street | Phila. City | Edward | Stiles | | gentleman |
| 83 | 1800:51 | Apr 14 1800 | 7 | Pine Street | Phila. City | John | Ross | 67 | Esq. Merchant |
| 84 | 1804:8 | Jan 30 1804 | 7 | Union Street | Phila. City | John | Bordley | 77 | Esq. |
| 85 | 1806:63 | Sep 18 1806 | N. side | Kays Alley | Phila. City | Nicholas | Hicks | | |
| 86 | 1816:93 | Aug 17 1816 | 81 | S. 5th St. | Phila. City | Alexander | Carlyle | 82 | [Master] Tanner, gentleman [builder ?] |
| 87 | 1813:55 | May 13 1813 | 212 | Pine Street | Phila. City | John T. | Cox | | Carpenter |
| 88 | 1815:69 | May 15 1815 | 22 | Sassafras [Vine] St | Phila. City | Sarah | Falconer | 81 | Gentlewoman (widow) |
| 89 | 1811:80 | Aug 16 1811 | 72 | Mulberry [Arch] St. | Phila. City | Martha | Hall | 68 | Gentlewoman |
| 90 | 1811:44 | May 17 1811 | 57 | Almond [Kenilworth] St | Southwark, | John | MacDougal | 40 ? | Sea Captain |
| 91 | 1817:65 | May 23 1817 | 152 | S. 4th Street | Phila. City | William | Stevenson | 69 | House Carpenter |
| 92 | 1815:68 | Jun 3 1815 | 411 | Front Street | Northern Liberties | John | Stiles | 50 ? | Lumber Merchant |
| 93 | 1813:57 | May 11 1813 | 5 & 9 | Union [Delancy] Street | Phila. City | John | Mifflin | 50 | Attorney |
| 94 | 1815:129 | Nov 1 1815 | 54 | S. 6th Street | Phila. City | Edward | Tilghman | 65 | attorney |
| 95 | 1817:90 | Jun 24 1817 | 3rd | Pine Street | Phila. City | Thomas | McKean | | ex Gov. Pa. |
| 96 | 1819:16 | Dec 1 1819 | | Union Street | Phila. City | Nicholous | Arnous | | Broker |
| 97 | 1820:19 | Mar 1 1820 | 278 | Race Street | Phila. City | John | Rush | 73 | Judge |
| 98 | 1809:67 | Jan 1 1809 | | | Phila. City | Henry | Drinker | | |
| 99 | 1810:101 | Jan 1 1810 | | | Phila. City | John | Rossiter | | Sea Captain |

1. List of House Inventories *continued.*

| ID | Will # | Date of Death | Address | | Town | first name | last name | Age | profession |
|---|---|---|---|---|---|---|---|---|---|
| 100 | 1770:65 | Nov 18 1770 | na | A Great Road | White Marsh Twp. | Samuel | Morris | 56 | Merchant, Miller, Yeoman Farmer |
| 101 | 1730:146 | Apr 3 1730 | ? | Front Street | Phila. City | Austin | Paris | | Chandler |
| 102 | 1780:334 | Jan 1 1780 | S. side | Elm [New] Street | Phila. City | Caspar | Hasenclever | | Merchant |
| 103 | 1828:104 | Sep 9 1828 | 10 | Carter's Alley | Phila. City | Thomas | Rimer | | |
| 104 | | Sep 6 1751 | sw corner | 5th and Walnut Streets | Phila. City | James | Benbridge | | |
| 105 | 1800:88 | Sep 5 1800 | 24 | Sassafras [Race] Street | Northern Liberties, | Nathaniel | Browne | | |
| 106 | 1813:199 Admin | Sep 21 1813 | | E. bank of the Schuylkill River | Pasyunk, | Josiah | Harmar | | Gen'l. ret., gentleman |
| 107 | | Oct 20 1730 | 2xx | Front Street | Phila. City | Thomas | Nevell | | Merchant |
| 108 | | Jan 15 1856 | 130 | Spruce Street | Phila. City | William | Wharton | 66 | [wealthy] gentleman |
| 109 | | Feb 28 1856 | | N 2nd Street | Phila. City | Thomas | Sutcliffe | 40 | Plumber/hydrant maker |
| 110 | 1856:499 | Apr 16 1856 | | | Germantown, | Samuel | Hildeburn | 69 | Watchmaker Merchant |
| 111 | | Apr 23 1856 | 132 | Spruce Street | Phila. City | Joseph | Roberts | 84 | Banker gentleman |
| 112 | | Apr 24 1859 | 920 | South Street | Phila. City | Emlen | Physick | | gentleman |

## 2. List of House Inventories with Warming Pans

| Date of Death | ID | Last Name | Location | Heat source | 2nd Heat Source |
|---|---|---|---|---|---|
| Apr 3 1730 | 101 | Paris | Front Street Philadelphia City | fireplace; iron dogs | old warming pan 0.8.0 |
| Apr 17 1754 | 14 | Spofford | Cherry or Hill Street Philadelphia City | fireplace, andirons(3) | warming pan |
| Oct 10 1754 | 13 | Bartholamew | Chestnut Street Philadelphia City | fireplace, doggs | warming pan |
| Jun 16 1755 | 15 | Pole | Philadelphia City | fireplace, andirons | warming pan |
| Jul 2 1767 | 62 | Shoemaker | Philadelphia City | fireplace;hand irons-3 pr, iron fender | 2 brass warming pans 0.12.0 |
| Oct 12 1770 | 61 | Montgomery | Philadelphia City | fireplace; andirons-brass | japanned plate warmer 2.0.0 |
| Oct 12 1770 | 61 | Montgomery | Philadelphia City | fireplace; andirons-iron; 6 pr A & 5 pr A | warming pan |
| Nov 18 1770 | 100 | Morris | White Marsh Twp. Phila. County | fireplace; andirons | warming pan |
| Jan 8 1772 | 60 | Elfreth | N. 2nd St E side Gilbert's [Elfreth's] Alley Philadelphia City | fireplace; andirons-pr | warming pan 0.5.0 |
| Feb 25 1772 | 19 | Kearsley | Philadelphia City | fireplace, doggs | warming pan |
| Feb 24 1773 | 58 | Morton | Front Street Philadelphia City | fireplace; andirons | warming pan-brass |
| May 12 1773 | 56 | Baynton | Philadelphia City | fireplace;dogs- pr iron | warming pan |
| Sep 14 1774 | 57 | Neave | Philadelphia City | fireplace;dogs-2pr, lg wood fender lined with tin | warming pan-brass 0.5.0, plate warmer 1.10.0 |
| Oct 18 1774 | 59 | Lardner | W side along Moravian Alley S. 2nd Street Philadelphia City | fireplace;dogs-2 pr iron | warming pan 0.10.0 |
| Apr 28 1775 | 54 | Robinson | Philadelphia City | iron franklin stove;hand irons | copper warming pan |
| Sep 13 1775 | 53 | Bryan | Philadelphia City | fireplace; andirons, iron bar | warming pan 0.14.0 |
| May 14 1776 | 55 | McKlean | Philadelphia City | fireplace; andirons-pr | warming pan 1.0.0 |
| Sep 3 1778 | 51 | Woodrow | Northern Liberties, Phila. County | open iron stove | warming pan 1.5 |
| Apr 1 1780 | 25 | Wharton | NE Corner 2nd & Lombard Philadelphia City | Fireplace, andirons | warming pans(2) |
| Dec 15 1785 | 49 | Paschall | 965 [S ?] 2nd Street Philadelphia City | warming pan | |
| Dec 12 1788 | 47 | Morton | Philadelphia City | fireplace;andirons, fender | warming pan 0.11.3 |
| Nov 29 1790 | 46 | Boehm | Philadelphia City | warming pan | |

2. Inventories with Warming Pans *continued.*

| Date of Death | ID | Last Name | Location | Heat source | 2nd Heat Source |
|---|---|---|---|---|---|
| Feb 7 1791 | 45 | Farmer | Philadelphia City | fireplace andirons | warming pan 0.10.0 |
| Apr 18 1797 | 43 | Twamley | 129 Market Street Philadelphia City | fireplace, andirons | warming pan |
| Nov 15 1797 | 42 | Leaming | 910 [S] Front Street Philadelphia City | fireplace; kitchen &old chamber andirons | warming pan |
| Jan 1 1800 | 23 | McCulloh | Southwark Ward Philadelphia City | fireplace, andirons-brass | warming pan-brass |
| Apr 14 1800 | 83 | Ross | 7 Pine Street Philadelphia City | fireplace ?; andirons, fender | warming pan 0.75 |
| Jan 1 1802 | 24 | Bedford | Philadelphia City | fireplace, andirons | warming pan |
| Feb 29 1804 | 82 | Stiles | 70 Walnut Street Philadelphia City | fireplace; kitchen dogs | warming pan 1.00 |
| Sep 18 1806 | 85 | Hicks | N. side Kays Alley Philadelphia City | fireplace; andirons and spit | warming pan $2/3 |
| Jan 1 1809 | 98 | Drinker | Philadelphia City | tin fender | warming pans-2 3.00 |
| Aug 16 1811 | 89 | Hall | 72 Mulberry [Arch] St. Philadelphia City | small sheet iron stove & pipe | warming pan 1.50; plate warmer 0.50 |
| Jan 1 1812 | 26 | Griffiths | Dickson's Court Philadelphia City | none? | warming pan |
| May 11 1813 | 93 | Mifflin | 5 & 9 Union [Delancy] St. Philadelphia City | small Grate | warming pan |
| May 13 1813 | 87 | Cox | 212 Pine Street Philadelphia City | fireplaces; andirons | warming pan 1.50 |
| Sep 15 1813 | 81 | Truman | 75 N. 5th Street Philadelphia City | fireplace; andirs-2pr. | ten plate stove 6.xx, warming pan |
| Jan 1 1816 | 28 | Hamon | 143 Pine Street Philadelphia City | ? | warming pan 1.50 |
| Aug 17 1816 | 86 | Carlyle | 81 S. 5th St. Philadelphia City | fireplaces; andirons-brass | 10 plate stove, warming pans |
| Jan 6 1820 | 29 | Shoemaker | 134 S. 3rd Street Philadelphia City | | warming pan |
| Jan 5 1821 | 31 | Engle | 96 S. 5th (by Delancy) Philadelphia City | fireplace, andirons | warming pan |
| Aug 27 1827 | 71 | Keen | 31 Chestnut Street Philadelphia City | fireplace; andirons-iron | warming pan |
| Nov 8 1834 | 40 | Price | 16 N 11 Street Philadelphia City | fireplace? | warming pan |
| Oct 4 1835 | 3 | Twamley | 14 Palmayra Row Vine blw 11th Philadelphia City | fireplace?, wire fender | warming pan 0.50 |
| Apr 18 1836 | 4 | Holland | 68 1/2 S. 2nd Street Philadelphia City | stove | warming pan |
| May 16 1837 | 68 | Rihl | Cadwallader Street nr Masters Kensington | Stove | warming pan |

3. List of Rooms with Stoves from Inventories.

| Date of Death | Heat source | 2nd Heat Source | Flr | Room Location | Room Name | ID |
|---|---|---|---|---|---|---|
| Sep 14 1774 | Iron Stove ornamented, [open ?] | [fireplace?] dogs, bar | 1 | back | Parlour | 57 |
| Sep 14 1774 | large cannon Stove w/ pipes | | 1 | outside | [?] house | 57 |
| Apr 28 1775 | iron franklin stove;hand irons pr | copper warming pan | 1 | na | Kitchen | 54 |
| Apr 28 1775 | small iron plate stove | | g | na | [storage ?] | 54 |
| May 14 1776 | iron plate stove, much worn | | g | na | na | 55 |
| May 14 1776 | Iron Stove.. | | 1 | na | Shop | 55 |
| Sep 3 1778 | open iron stove | warming pan 1.5 | ? | out buildings ? | ? | 51 |
| Dec 15 1785 | stove; stove trivit & pipe | | ? | na | Office | 49 |
| Dec 15 1785 | fireplace; andirons | iron stove 0.4.6 [poss. foot warmer] | 1 | na | Parlor | 49 |
| May 5 1787 | an open stove | | ? | of his house | ? | 48 |
| Nov 29 1790 | Ten plate Stove and pipes | | 1 | na | Parlor | 46 |
| Apr 8 1795 | tin plate Stove | | 1 | NE back | Parlour | 44 |
| Apr 8 1795 | tine plate stove | | 2 | na | over Kitchen | 44 |
| Apr 8 1795 | Open Stove; andirons | | 1 | SE Front | Parlour | 44 |
| Apr 8 1795 | tin plate stove & pipe | | 1 | na | kitchen | 44 |
| Nov 15 1797 | fireplace; andirons,open stove | | 1 | back | Parlor | 42 |
| Jan 1 1800 | Stove, open, andirons-brass | | 1 | back | Parlor | 23 |
| Jan 1 1800 | Stove, ten plate | fireplace, andirons-brass | 1 | na | Kitchen | 23 |
| Jan 1 1800 | Stove, plate | | 1 | outside | Storage | 23 |
| Sep 5 1800 | small open stove | open stove 6.00 | 2 | [off kitchen ?] | ? storage] | 105 |
| Sep 5 1800 | ten plate stove & pipe | | 1 | [off kitchen ?] | ? storage] | 105 |
| Jan 30 1804 | open stove | | 1 | na | kitchen | 84 |
| Jan 30 1804 | | bake stove [?] | C | for pantry | na | 84 |
| Sep 18 1806 | Open stoves (2) & fireplace; a(3) | 10 plate stove & pipe 15.00 | na | House | not avail. | 85 |
| Jan 1 1809 | large open stove | | 1 | back | Parlor | 98 |
| Jan 1 1810 | open stove | | 3 | back | room | 99 |

Flr = Floor level: G=Garret, a = attic, c = cellar

3. List of Rooms with Stoves *continued.*

| Date of Death | Heat source | 2nd Heat Source | Flr | Room Location | Room Name | ID |
|---|---|---|---|---|---|---|
| Aug 16 1811 | Open stove | | 1 | back | Parlour | 89 |
| Aug 16 1811 | small sheet iron stove & pipe | warming pan 1.50; plate warmer 0.50 | G | front | na | 89 |
| Aug 16 1811 | Open stove-small | | 2 | back | Chamber | 89 |
| Aug 16 1811 | fireplace:andirons | bake stove & ... 1.25 | 1 | na | Kitchen | 89 |
| May 11 1813 | large cast iron stove | | 1 | na | entry | 93 |
| May 11 1813 | open stove and fire fender | | 3 | front | Chamber | 93 |
| May 11 1813 | open stove; andirons, tin fender | | 2 | back building | all | 93 |
| May 13 1813 | ten plate stove | fireplace; andirons 1.50 | 1 | na | Kitchen | 87 |
| May 13 1813 | 6 plate stove | | 1 | na | [shop] | 87 |
| Sep 15 1813 | fireplace; andirs-2pr. | ten plate stove 6.xx, warming pan | 1 | na | kitchen | 81 |
| Sep 21 1813 | fireplace; iron and irons | ten plate stove & pipe $18 | 1 | na | Kitchen | 106 |
| May 15 1815 | fireplaces(2) & open stove (1) | plate warmer | na | House | not avail. | 88 |
| Jun 3 1815 | Open Stove | | 1 | na | kitchen | 92 |
| Jun 3 1815 | stove | | C | na | [shop ??] | 92 |
| Aug 17 1816 | fireplaces; andirons-brass (2) | 10 plate stove, warming pans | na | house | not applicable | 86 |
| May 23 1817 | fireplace; andirons | ten plate stove 5.00 | 1 | na | Kitchen | 91 |
| Jun 24 1817 | open stove | | 3 | N. | Chamber | 95 |
| Jun 24 1817 | Open stove | | 2 | centre | Chamber | 95 |
| Dec 1 1819 | stove-ten plate | fireplace; andirons | 1? | na | kitchen | 96 |
| Mar 1 1820 | ten plate stove | fireplace; andirons-iron | 1 | na | Kitchen | 97 |
| Mar 23 1820 | Stove, tin plate | fireplace?, andirons-iron | 1 | na | Kitchen | 30 |
| Jan 5 1821 | Stove, grate, fender | | 1 | front | parlor] | 31 |
| Jan 5 1821 | Stove, patent Kitchen | Wood & Coal 32.00 | 1 | na | Pantry | 31 |
| Oct 2 1823 | Stove, 9 plate | | 1 | 8 | Breakfast?] | 34 |
| Oct 2 1823 | Stove, Tin Plate | | 1 | outside | Shop finishing | 34 |
| Oct 2 1823 | Stove, 9 plate | | 1 | 9 | Kitchen] | 34 |
| Oct 2 1823 | Stove, nine plate & pipe | | C | na | storage | 33 |
| Oct 2 1823 | Stove | | 1 | Barn | Storage | 34 |
| Oct 29 1824 | Stove, tin plate | fireplace, fenders-tin (2) 0.50 | 1 | na | Kitchen | 36 |
| Oct 29 1824 | Stove, close | | 3 | front | room, large | 36 |
| Oct 29 1824 | Stove-close | | 2 | front | bed] room | 36 |
| Oct 29 1824 | Stove- Franklin, andirons-small | | 2 | na | Breakfast room | 36 |
| Jul 7 1825 | Stove-tin plate & pipe | Fireplace, andirons & Small Tin plate Stove | 1 | na | Kitchen | 37 |

Flr = Floor level: G=Garret, a = attic, c = cellar

3. Rooms with Stoves *continued.*

| Date of Death | Heat source | 2nd Heat Source | Flr | Room Location | Room Name | ID |
|---|---|---|---|---|---|---|
| Aug 19 1827 | stove-box | | G | na | storage | 38 |
| Aug 19 1827 | Stove-large 10 plate and pipe | | 1? | na | Kitchen | 38 |
| Aug 19 1827 | Fireplace, andirons | Stove-sheet iron 1.00 | 1 | front | Parlor | 38 |
| Aug 27 1827 | tin plate stove & pipe | | C | na | na | 71 |
| Nov 30 1827 | Franklin Stove; andirons | | 1 | back | Parlour | 70 |
| Nov 30 1827 | Stove | fireplace; andirons 0.25 | 1 | na | Kitchen | 70 |
| Jan 8 1828 | stove | | 2 | 2] | [bed room] | 69 |
| Jan 8 1828 | Stove | | 1 | na | Kitchen | 69 |
| Jan 8 1828 | fireplace or open stove; andirons | [poss.tin stove or open stove] | 1 | ft] | Parlors | 69 |
| Mar 20 1828 | Stove | | 1 | na | Kitchen | 39 |
| Sep 9 1828 | stove & pipe | ? | 1 | na | kitchen | 103 |
| Nov 4 1834 | Stove-small | | 2 | front | room | 41 |
| Nov 4 1834 | Stove-sheet iron | | 1? | ? | Breakfast room | 41 |
| Nov 4 1834 | Stove-tin plate | | 1 | na | Kitchen | 41 |
| Nov 8 1834 | Stove-sheet iron | fireplace, andirons | 3 | back | Chamber | 40 |
| Nov 8 1834 | Stove | fireplace, andirons | 1 | na | Breakfast Room | 40 |
| Nov 8 1834 | Stove-sheet iron | fireplace, andirons 2.00 | 3 | front | Chamber | 40 |
| Nov 8 1834 | fireplace, andirons | Stove-cooking 12.00 | 1 | na | Kitchen | 40 |
| Nov 11 1834 | stove, iron parlor | none | 1 | back | Parlor | 1 |
| Feb 16 1835 | stove, coal | | 2 | front ? | Chamber, best | 2 |
| Feb 16 1835 | stove, cooking | | 1 | rear? | Kitchen | 2 |
| Oct 4 1835 | Stove, Tin Plate | fireplace, andirons | 2 | front | Bed room] | 3 |
| Apr 18 1836 | stove | warming pan | 2 | back | kitchen chamber | 4 |
| Apr 18 1836 | stove | | 1 | back | Kitchen | 4 |
| Dec 21 1836 | stove, small | | 2 | East back | room | 5 |
| Dec 21 1836 | stove, small | | G | East front | room | 5 |
| May 16 1837 | Stove | warming pan | 1 | na | Kitchen | 68 |
| Jan 24 1838 | coal stove, 2 fenders | | G | na | [storage] | 66 |
| Jul 14 1842 | stove | | ? | ? | Bath room | 72 |
| Feb 9 1843 | Stove | | 1 | na | Kitchen | 73 |
| Feb 9 1843 | Radiator Stove | | 1 | back | Parlor | 73 |
| Jan 24 1844 | stove | | 2 | back | Chamber | 74 |
| Jan 24 1844 | stove | | 2 | ft | Chamber | 74 |
| Jan 24 1844 | stove | | ? | ? | Bath room | 74 |
| Jan 24 1844 | stove | | A | ? | ? | 74 |
| Jan 24 1844 | Good Stove | | 1 | na | Dining room | 74 |

Flr = Floor level: G=Garret, a = attic, c = cellar

3. Rooms with Stoves *continued.*

| Date of Death | Heat source | 2nd Heat Source | Flr | Room Location | Room Name | ID |
|---|---|---|---|---|---|---|
| Jun 17 1847 | lot of old iron stove plates | | 1 | outside | kitchen yard | 65 |
| Jun 17 1847 | Stove | iron furness 1.00 | 1 | na | Dining room | 65 |
| Jun 17 1847 | ..stove coal.. | | c | na | na | 65 |
| Jun 17 1847 | case iron stove | | 3 | back | room | 65 |
| Feb 11 1848 | stove | | 1 | ft | Parlor | 76 |
| Feb 11 1848 | Franklin Stove | | 1 | na | Dining | 76 |
| Apr 20 1848 | stove | | A | na | na | 77 |
| May 5 1848 | Stove; Stove table | | 1 | na | Kitchen | 64 |
| May 5 1848 | Stove & Line | | 1 | na | Dining room | 64 |
| May 5 1848 | Stove | | 1 | na | Nursery | 64 |
| Apr 9 1849 | stove | | 2 | ft | Chamber | 80 |
| Apr 9 1849 | stove | | 3 | back | Chamber | 80 |
| Apr 9 1849 | stove | | 3 | front | Chamber | 80 |
| Jan 24 1850 | Coal Stove | | 1 | na | Dining room | 78 |
| Jan 24 1850 | stove | | 2 | front | Chamber | 78 |
| Mar 26 1850 | stove, radiator | fireplace?, | 1 | ? | Parlor | 6 |
| Oct 26 1853 | fireplace, andirons | Stove, Franklin 0.75 | 2 | front | room | 8 |
| Oct 26 1853 | Stove | Stove, sheet iron 0.50 | 1? | front] | Office | 8 |
| Oct 26 1853 | Stove | | 1 | back | Kitchen | 8 |
| Jan 15 1856 | Stove, Air tight | | 2 | 2 | chamber | 9 |
| Jan 15 1856 | Stove, Air tight | stove, parlor 4.00 | 1 | ? | Sitting Room | 9 |
| Jan 15 1856 | Stove, coal | | 2 | ? | Sitting room | 9 |
| Jan 15 1856 | ..stove.. | | 1 | na | Dining room | 108 |
| Jan 15 1856 | stove | | 1 | na | Kitchen | 108 |
| Jan 15 1856 | Stove, cook | | 1 | ? | kitchen] | 9 |
| Feb 28 1856 | Air-tight stove | | 1 | na | Dining room | 109 |
| Apr 16 1856 | Stoves | | 1 | na | Kitchen | 110 |
| Apr 16 1856 | stove | | 2 | above kitchen | chmaber | 110 |
| Apr 23 1856 | 2 Radiating Stoves.. | | 1 | N | Parlors | 111 |
| Apr 23 1856 | Fire King Stove | | 1 | na | Dining room | 111 |
| Apr 23 1856 | 2 cooking stoves | | 1 | na | Kitchen | 111 |
| Apr 24 1859 | ..stove.. | | 1 | na | Kitchen | 112 |
| Apr 24 1859 | Parlour Stove | | 1 | na | Parlour | 112 |

4. Stove Prices Extracted from Inventories.

| Year | Description | Value | | Owner/Decedent |
|---|---|---|---|---|
| 1775 | iron Franklin | 1.10.0 | | Robinson |
| 1778 | open iron | 7.10.0 | | Woodrow |
| 1787 | open | 0.2.0 | | Fischer |
| 1797 | open | 2.5.0 | | Leaming |
| 1800 | open | $ 6.00 | | McCulloh |
| 1800 | small open | $ 4.00 | | Browne |
| 1800 | open | $ 6.00 | | Browne |
| 1803 | Open | $ 10.00 | | Hambleton-Bucks |
| 1806 | small open | $ 3.00 | | Hicks |
| 1807 | open | $ 5.00 | | Bessonett-Bucks |
| 1807 | open | $ 5.00 | | Bessonett-Bucks |
| 1811 | open | $ 12.00 | | Hall |
| 1813 | open | $ 20.00 | w/ fender | Mifflin |
| 1815 | open | $ 5.00 | | Stiles |
| 1817 | open | $ 2.00 | | McKean |
| 1817 | open | $ 4.00 | | McKean |
| 1821 | *open* | $ 15.00 | w/grate & fender | Engle |
| 1824 | Franklin | $ 5.00 | | carpenter |
| 1827 | Franklin | $ 7.00 | | Crowley |
| 1853 | Franklin | $ 0.50 | | Pierce |

| Year | Description | Value | | Owner/Decedent |
|---|---|---|---|---|
| 1776 | large Cannon | 3.10.0 | w/ pipes | Neave |
| 1779 | Cannon | 6.0.0 | w/acces | Luken |

| Year | Description | Value | | Owner/Decedent |
|---|---|---|---|---|
| 1775 | plate, small | 1.2.6 | w/ pipes | Robinson |
| 1776 | worn iron plate | 2.0.0 | | McKleane |
| 1800 | plate | $ 5.00 | w/ tongs | McCulloh |
| 1813 | six plate | $ 3.00 | | Cox |
| 1827 | box | $ 15.00 | | Cresson |

4. Stove Prices *continued.*

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1790 | ten plate | 3.0.0 | Boehm |
| 1795 | ten plate | 3.0.0 | Binghurst |
| 1795 | ten plate | 5.10.0 | Binghurst |
| 1795 | ten plate | 7.0.0 | Binghurst |
| 1801 | ten plate | 8.0.0 | McCulloh |
| 1800 | ten plate | $ 20.00 | Warner-Bucks County |
| 1800 | ten plate | $ 25.00 | Forst-Bucks |
| 1801 | ten plate | $ 17.00 | Burroughs-Bucks |
| 1803 | ten plate | $ 16.00 w/ pipe | Harrold-Bucks |
| 1806 | ten plate | $ 15.00 w/ pipe | Hicks |
| 1807 | ten plate | $ 15.00 w/ pipe | Merrick-Bucks |
| 1809 | ten plate | $ 12.00 | Hutchinson-Bucks |
| 1809 | ten plate | $ 15.00 | Hutchinson-Bucks |
| 1813 | ten plate | $ 8.00 | Cox |
| 1813 | ten plate | $ 18.00 w/ pipe | Harmar |
| 1813 | ten plate | $ 6.00 | Trueman |
| 1815 | ten plate | $ 10.00 | Hay |
| 1815 | ten plate | $ 12.00 | Hay |
| 1815 | ten plate | $ 20.00 | Hay |
| 1816 | ten plate | $ 15.00 w/ bell metle s,t | Carlyle |
| 1817 | ten plate | $ 5.00 | Stevenson |
| 1819 | ten plate | $ 10.00 | Arnous |
| 1820 | ten plate | $ 10.00 | Rush |
| 1820 | ten plate | $ 10.00 | Rush |
| 1823 | ten plate | $ 4.00 | Lake |
| 1824 | ten plate | $ 4.00 | carpenter |
| 1825 | ten plate | $ 9.00 w/ pipe | Brown |
| 1827 | ten plate | $ 8.00 w/ pipe | Keen |
| 1827 | large ten plate | $ 8.00 w/ pipe | Cresson |
| 1834 | ten plate | $ 6.00 | Steel |
| 1835 | ten plate | $ 5.00 | Twamley |

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1823 | nine plate | $ 5.00 | Lake |
| 1823 | nine plate | $ 8.00 w/ pipe | Lake |
| 1823 | nine plate | $ 9.00 | Lake |

While functionally the same as ten plate stoves, these were not included when the chart was made up. Because there is one less plate, they ought to be cheaper than ten plate stoves of the same outside dimensions.

4. Stove Prices *continued.*

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1828 | *kitchen* | $ 7.00 w/ Pipe | Rimer |
| 1805 | *kitchen* | $ 12.00 w/ pipe | Carey-Bucks |
| 1806 | *kitchen* | $ 20.00 w/ pipe | Blackfan-Bucks |
| 1807 | *kitchen* | $ 20.00 w/ pipe | Parry-Bucks |
| 1821 | pat. kitchen | $ 20.00 | Engle |
| 1828 | *kitchen* | $ 4.00 | Dreamer |
| 1828 | *kitchen* | $ 7.00 | Sink |
| 1834 | cooking | $ 12.00 | Price |
| 1836 | *kitchen* | $ 3.50 | Bohlen |
| 1836 | *kitchen* | $ 8.00 | Holland |
| 1837 | *kitchen* | $ 3.00 | Cadawalder |
| 1853 | *kitchen* | $ 2.50 | Pierce |
| 1856 | Cook | $ 5.00 | Rittenhouse |
| 1856 | cooking | $ 8.00 | Roberts |
| 1878 | cook | $ 4.00 | Hallowell-Abington |
| 1884 | large coal *kitchen* | $ 15.00 | Teas-Horsham |

*Itlalics* indicate location rather than explicit description.

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1827 | sheet iron | $ 1.00 | Cresson |
| 1834 | sheet iron | $ 1.50 | Price |
| 1834 | sheet iron | $ 1.50 | Price |
| 1834 | sheet iron | $ 1.50 | Steel |
| 1853 | Sheet Iron | $ 0.50 | Pierce |
| | | | |
| 1847 | iron furnace | $ 1.00 | Barret |
| 1847 | case iron | $ 1.00 | Barret |

4. Stove Prices *continued.*

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1856 | Air Tight | $ 3.00 | Rittenhouse |
| 1856 | Air tight | $ 4.00 | Rittenhouse |
| 1856 | Air tight | $ 4.00 | Sutcliffe |
| 1884 | Air tight | $ 15.00 | Teas-Horsham |

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1834 | Parlor iron | $ 10.00 | Bohlen |
| 1836 | *parlor* | $ 3.00 | Rittenhouse |
| 1856 | Parlor | $ 4.00 | Physick |
| 1859 | Parlor | $ 5.00 | Freas-Whitemarsh |
| 1878 | Parlor Heater | $ 15.00 | Hallowell-Abington |
| 1881 | Parlor | $ 15.00 | Badaraque |

| Year | Description | Value | Owner/Decedent |
|---|---|---|---|
| 1776 | iron ornamented | 5.10.0 | Neave |
| 1813 | large cast iron | $ 25.00 | Mifflin |
| | | | |
| 1824 | close | $ 5.00 w/ shovl, tongs | Carpenter |
| 1824 | close | $ 10.00 | Carpenter |
| | | | |
| 1856 | Fire King | $ 8.00 | Roberts |
| 1856 | Radiating | $ 6.00 | Roberts |
| | | | |
| 1835 | coal | $ 15.00 w/ access. | Pritchett |
| 1838 | coal | $ 3.00 | Sheepshank |
| 1856 | coal | $ 5.00 | Rittenhouse |
| 1884 | small coal | $ 4.50 | Teas-Horsham |

This last group is of stoves that could not be catagorized even though they had descriptions.
Stoves where prices where not given, or where there was no description, have not been included in this appendix.

5. Fireplace Equipement & Prices

a. Andirons Alone

| Owner | Year | Value | Material |
|---|---|---|---|
| Montgomery | 1770 | 0.4.2 | |
| Lardner | 1774 | 0.10.0 | |
| Lardner | 1774 | 0.10.0 | |
| Lardner | 1774 | 0.15.0 | |
| Lardner | 1774 | 0.7.6 | iron dogs |
| Bryan | 1775 | 0.12.0 | iron |
| Neave | 1776 | 0.10.0 | brass tops |
| Luken | 1779 | 0.10.0 | iron dogs |
| Luken | 1779 | 0.15.0 | brass heads |
| Wharton | 1780 | 0.15.0 | |
| Paschall | 1785 | 0.7.6 | brass |
| Morton | 1788 | 1.17.6 | brass |
| Morton | 1788 | 1.17.6 | brass |
| Farmer | 1791 | 0.15.0 | |
| Bringhurst | 1795 | 0.1.0 | |
| Warner | 1800 | $ 1.50 | |
| McCulloh | 1800 | $ 5.00 | brass |
| Warner | 1800 | $ 7.00 | |
| Burroughs | 1801 | 0.10.0 | |
| Bedford | 1802 | $ 1.00 | |
| Bedford | 1802 | $ 2.00 | |
| Bedford | 1802 | $ 3.00 | |
| Harold | 1803 | $ 1.00 | |
| Stiles | 1804 | $ 0.50 | small |
| Betts | 1805 | $ 0.50 | |
| Carey | 1805 | $ 1.25 | |
| Blackfan | 1806 | $ 2.00 | |
| Merrick | 1807 | $ 1.50 | |
| Bessonett | 1807 | $ 1.50 | |
| Erwin | 1807 | $ 3.00 | brass |
| Bessonett | 1807 | $ 3.00 | brass |
| Erwin | 1807 | $ 3.50 | brass |
| Bessonett | 1807 | $ 7.00 | brass |
| Erwin | 1807 | $ 11.00 | brass. large |
| Hutchinson | 1809 | $ 2.00 | |
| Griffiths | 1812 | $ 1.50 | |
| Smith | 1812 | $ 5.00 | brass-old |
| Truman | 1813 | $ 1.50 | brass top |
| Truman | 1813 | $ 3.00 | brass |
| du Plessis | 1815 | $ 1.00 | |
| du Plessis | 1815 | $ 2.50 | |
| Hall | 1815 | $ 4.00 | brass |
| du Plessis | 1815 | $ 5.00 | |
| du Plessis | 1815 | $ 6.00 | |
| Rush | 1820 | $ 0.50 | iron |
| Engle | 1821 | $ 2.50 | |
| Engle | 1821 | $ 2.50 | |
| Lake | 1823 | $ 2.00 | |
| McCall | 1824 | $ 1.05 | large |
| Carpenter | 1824 | $ 1.25 | small |
| McCall | 1824 | $ 2.75 | |
| Carpenter | 1824 | $ 3.00 | |
| Carpenter | 1824 | $ 5.00 | large |
| McCall | 1824 | $ 6.75 | |
| Brown | 1825 | $ 1.50 | |
| Brown | 1825 | $ 2.00 | brass |
| Crawly | 1827 | $ 0.25 | |
| Crawly | 1827 | $ 1.00 | |
| Crawly | 1827 | $ 1.00 | |
| Cresson | 1827 | 1.5 | brass |
| Keen | 1827 | $ 3.00 | brass |
| Crawly | 1827 | $ 5.00 | |
| Crawly | 1827 | $ 15.00 | |
| Sink | 1828 | $ 1.00 | |
| Sink | 1828 | $ 1.00 | |
| Price | 1834 | $ 0.75 | |
| Price | 1834 | $ 2.00 | |
| Twamley | 1835 | $ 5.00 | |
| Holland | 1836 | $ 0.75 | |
| Brown | 1836 | $ 1.50 | |
| Holland | 1836 | $ 2.33 | |
| Brown | 1836 | $ 3.00 | |
| Rihl | 1837 | $ 5.00 | brass |
| Sheepshank | 1838 | $ 3.50 | |
| Cooper | 1852 | $ 40.00 | |
| Pierce | 1853 | $ 0.50 | |
| Pierce | 1853 | $ 0.50 | |

b. Andiron's With Other Equipment

Prices are for Anirons with a Shovel & Tongs.

Other items included in the value are specifically listed.

| Owner | Year | Value | other |
|---|---|---|---|
| Shoemaker | 1767 | 0.15.0 | |
| Shoemaker | 1767 | 10.6.0 | bellows |
| Shoemaker | 1767 | 2.0.0 | |
| Shoemaker | 1767 | 2.10.0 | brush |
| Shoemaker | 1767 | 2.5.0 | brush & bellows |
| Montgomery | 1770 | 0.15.0 | brush & bellows |
| Elfreth | 1770 | 0.15.0 | |
| Montgomery | 1770 | 3.0.0 | |
| Montgomery | 1770 | 5.0.0 | |
| Plim | 1773 | 0.10.0 | brass |
| Lardner | 1774 | 0.12.6 | |
| Lardner | 1774 | 1.0.0 | |
| Lardner | 1774 | 1.5.0 | |
| Robinson | 1775 | 0.15.0 | |
| Robinson | 1775 | 0.15.0 | |
| Morton | 1775 | 1.0.0 | |
| Morton | 1775 | 1.0.0 | |
| Morton | 1775 | 1.0.0 | |
| Bryan | 1775 | 1.10.0 | brass |
| Bryan | 1775 | 4.0.0 | brass headed dogs |
| Morton | 1775 | 4.10.0 | brass, p |
| Neave | 1776 | 0.15.0 | brass |
| McKlean | 1776 | 1.2.6 | bar |
| Baynton | 1776 | 2.0.0 | |
| Baynton | 1776 | 2.0.0 | brass |
| Neave | 1776 | 5.0.0 | brush |
| Luken | 1779 | 1.15.0 | brass, large w/ fluted col. |
| Luken | 1779 | 5.0.0 | |
| Wharton | 1780 | 1.10.0 | brass, large |
| Wharton | 1780 | 2.10.0 | |
| Wharton | 1780 | 8.0.0 | |
| Hamilton | 1785 | 0.7.6 | |
| Paschall | 1785 | 1.0.0 | bellows |
| Hamilton | 1785 | 1.10.0 | |
| Paschall | 1785 | 1.16.0 | brass |
| Paschall | 1785 | 3.0.0 | |
| Fischer | 1787 | 1.0.0 | brass, large |

| Owner | Year | Value | other |
|---|---|---|---|
| Boehm | 1790 | 1.5.0 | brush |
| Farmer | 1791 | 3.0.0 | brass |
| Bringhurst | 1795 | 3.0.0 | brass |
| Bringhurst | 1795 | 4.0.0 | |
| Leaming | 1797 | 1.10.0 | |
| Twamley | 1797 | 1.2.6 | |
| Twamley | 1797 | 3.0.0 | |
| Leaming | 1797 | 3.0.0 | brass |
| McCulloh | 1800 | $ 6.00 | brass |
| McCulloh | 1800 | $ 10.00 | brass |
| Richardson | 1800 | $ 25.00 | brass |
| Richardson | 1800 | 1.5.9 | |
| Burroughs | 1801 | 1.2.0 | |
| Bedford | 1802 | $ 1.00 | |
| Bedford | 1802 | $ 1.33 | |
| Bedford | 1802 | $ 4.00 | |
| Hewson | 1802 | $ 12.00 | brass |
| Harold | 1803 | $ 5.00 | |
| Carey | 1805 | $ 1.00 | |
| Betts | 1805 | $ 2.00 | |
| Blackfan | 1806 | $ 2.50 | |
| Blackfan | 1806 | $ 6.00 | |
| Parry | 1807 | $ 2.33 | brass, no tongs |
| Parry | 1807 | $ 2.73 | |
| Merrick | 1807 | $ 3.50 | |
| Bessonett | 1807 | $ 6.00 | |
| Hutchinson | 1809 | $ 2.00 | brass |
| Hutchinson | 1809 | $ 2.00 | |
| Truman | 1813 | $ 2.50 | |
| Truman | 1813 | $ 8.00 | |
| Truman | 1813 | $ 16.00 | |
| Tilhman | 1815 | $ 1.00 | brass |
| Hall | 1815 | $ 2.50 | |
| Tilhman | 1815 | $ 2.50 | |
| Harmon | 1816 | $ 1.50 | |
| Harmon | 1816 | $ 2.00 | broken |
| Harmon | 1816 | $ 5.00 | |
| Harmon | 1816 | $ 10.00 | |
| McKean | 1817 | $ 3.00 | bellows |
| McKean | 1817 | $ 3.00 | |
| McKean | 1817 | $ 3.00 | |

5. b. Fireplace Andirons with Shovels and Tongs *continued.*

| Owner | Year | Value | other |
|---|---|---|---|
| McKean | 1817 | $ 7.00 | |
| Rush | 1820 | $ 0.50 | |
| Rush | 1820 | $ 1.00 | p |
| Rush | 1820 | $ 3.00 | iron |
| Shoemaker | 1820 | $ 6.00 | brass |
| Shoemaker | 1820 | $ 8.00 | |
| Engle | 1821 | $ 3.50 | bar |
| Lake | 1823 | $ 4.00 | |
| Lake | 1823 | $ 8.00 | |
| McCall | 1824 | $ 5.00 | brush &c |
| Brown | 1825 | $ 1.00 | |
| Keen | 1827 | $ 1.50 | |
| Cresson | 1827 | 5 | iron |
| Keen | 1827 | $ 8.00 | |
| Keen | 1827 | $ 8.00 | brass, bar |
| Dreamer | 1828 | $ 0.75 | brass, p |
| Sink | 1828 | $ 3.00 | old |

| Owner | Year | Value | other |
|---|---|---|---|
| Dreamer | 1828 | $ 3.00 | |
| Dreamer | 1828 | $ 10.00 | |
| Price | 1834 | $ 0.75 | |
| Price | 1834 | $ 1.50 | |
| Badaraque | 1834 | $ 2.50 | |
| Steel | 1834 | $ 4.00 | no tongs |
| Price | 1834 | $ 5.00 | brass |
| Steel | 1834 | $ 6.00 | |
| Pritchett | 1835 | $ 19.00 | |
| Brown | 1836 | $ 3.00 | |
| Brown | 1836 | $ 5.00 | |

p = Poker

c. Values of Tools.

Shovels & tongs

| Owner | Year | Value | extras ? |
|---|---|---|---|
| Lightfoot | 1754 | 0.5.0 | brush |
| Plim | 1773 | 0.3.0 | bellows |
| Warner | 1800 | $ 1.00 | |
| Harold | 1803 | $ 0.50 | |
| Stiles | 1804 | $ 0.50 | |
| Blackfan | 1806 | $ 1.00 | |
| Erwin | 1807 | $ 2.00 | |
| Erwin | 1807 | $ 2.00 | |
| Smith | 1812 | $ 2.00 | lot |
| Smith | 1812 | $ 2.00 | lot |
| du Plessis | 1815 | $ 1.00 | |
| Falconer* | 1815 | $ 1.00 | |
| Hay | 1815 | $ 1.00 | |
| du Plessis | 1815 | $ 1.00 | |
| Hay | 1815 | $ 1.50 | |
| Falconer* | 1815 | $ 1.50 | bellows |
| du Plessis | 1815 | $ 1.75 | |
| Arnous | 1819 | $ 2.00 | |
| Rush | 1820 | $ 0.50 | |
| Rush | 1820 | $ 0.50 | |
| Rush | 1820 | $ 3.00 | |
| Engle | 1821 | $ 4.00 | bellows, etc |

| Owner | Year | Value | extras ? |
|---|---|---|---|
| Carpenter | 1824 | $ 0.50 | |
| Carpenter | 1824 | $ 0.75 | |
| Carpenter | 1824 | $ 2.00 | bar |
| McCall | 1824 | $ 2.75 | |
| McCall | 1824 | $ 2.75 | |
| Crawly | 1827 | $ 0.25 | |
| Crawly | 1827 | $ 2.00 | |
| Crawly | 1827 | $ 5.00 | |
| Dreamer | 1828 | $ 0.50 | bellows |
| Sink | 1828 | $ 1.50 | p |
| Price | 1834 | $ 1.00 | |
| Price | 1834 | $ 5.00 | stand |
| Twamley | 1835 | $ 1.00 | |
| Twamley | 1835 | $ 3.00 | P |
| Pritchett | 1835 | $ 3.50 | p.skuttle |
| Brown | 1836 | $ 0.50 | bellows |
| Holland | 1836 | $ 1.00 | p |
| Brown | 1836 | $ 1.00 | p |
| Brown | 1836 | $ 2.00 | |
| Bohl | 1836 | $ 2.50 | |
| Sheepshank | 1838 | $ 0.50 | |

5 c. Fireplace Tools *continued*

| Owner | Year | Value | |
|---|---|---|---|
| Shoemaker | 1767 | 0.4.6 | bellows |
| Shoemaker | 1767 | 0.2.6 | bellows |
| Paschall | 1785 | 0.1.0 | bellows |
| Mortin | 1788 | 0.18.0 | bellows |
| Harold | 1803 | $ 0.20 | bellows |
| Stiles* | 1804 | $ 0.50 | bellows |
| Blackfan | 1806 | $ 1.50 | bellows |
| Erwin | 1807 | $ 1.00 | bellows |
| du Plessis | 1815 | $ 1.00 | bellows |
| du Plessis | 1815 | $ 0.75 | bellows |
| Rush | 1820 | $ 0.12 | bellows |
| Crawly | 1827 | $ 0.50 | bellows |

| Owner | Year | Value | |
|---|---|---|---|
| Warner | 1800 | $ 0.50 | tongs |
| | | | |
| Neave | 1776 | 0.2.0 | brush |
| Mortin | 1788 | 0.1.6 | brush |
| Crawly | 1827 | $ 1.00 | brush |
| Price | 1834 | $ 0.25 | brush & pan |
| Holland | 1836 | $ 0.50 | brush |
| | | | |
| | | | |
| Stevenson* | 1817 | $ 0.50 | brush & bellows |
| Rush | 1820 | $ 1.00 | brush & bellows |
| Price | 1834 | $ 0.50 | brush & bellows |

d. Other Items Related to Fireplace Use - Fenders

| Owner | Year | Value | Material |
|---|---|---|---|
| Neave | 1776 | 1.0.0 | brass-long |
| Neave | 1776 | 2.1.0 | wood w/ tin, large |
| Neave | 1776 | 7.6.0 | brass |
| Stiles | 1804 | $ 1.50 | wire |
| Stiles | 1804 | $ 2.50 | brass |
| Stiles | 1804 | $ 3.00 | wire |
| Stiles | 1804 | $ 4.00 | wire |
| Erwin | 1807 | $ 0.50 | |
| Erwin | 1807 | $ 1.00 | iron |
| Erwin | 1807 | $ 1.00 | iron |
| Hall* | 1811 | $ 0.50 | iron sheet |
| Hall* | 1811 | $ 2.00 | wire |
| Smith | 1812 | $ 6.00 | brass & iron,old |
| du Plessis | 1815 | $ 0.50 | iron |
| du Plessis | 1815 | $ 3.00 | wire |
| du Plessis | 1815 | $ 4.00 | wire |
| Engle | 1821 | $ 0.75 | old |
| Engle | 1821 | $ 5.00 | |
| Carpenter | 1824 | $ 0.25 | tin |
| Carpenter | 1824 | $ 1.00 | |
| McCall | 1824 | $ 2.50 | wire |
| Crawly | 1827 | $ 4.00 | |
| Twamley | 1835 | $ 0.50 | iron |
| Twamley | 1835 | $ 1.00 | Wire |
| Bohl | 1836 | $ 1.00 | |
| Brown | 1836 | $ 1.00 | |
| Sheepshank | 1838 | $ 1.00 | |
| Barret | 1847 | $ 1.00 | |
| Roberts | 1856 | $ 3.00 | brass grate |

d. Other Items Related to Fireplace Use

| Owner | Year | Value | Material |
|---|---|---|---|
| Hamilton | 1785 | 0.4.0 | fire sceen - old |
| Farmer | 1791 | 0.7.6 | fire screen |
| Ross | 1800 | $ 2.00 | fire screen |
| Ross | 1800 | $ 4.00 | fire screen |
| Stiles | 1804 | $ 1.50 | fire screen |
| Stiles | 1804 | $ 1.50 | fire screen |
| McKean | 1817 | $ 5.00 | fire screen |
| Arnous | 1819 | $ 2.00 | fire screen |
| Sheepshank | 1838 | $ 5.00 | fire screen |
| Sheepshank | 1838 | $ 7.00 | fire screen |
| Pierce | 1853 | $ 1.00 | fire screen |
| McCall | 1824 | $ 0.75 | fire screens |
| McCall | 1824 | $ 0.50 | fire screens |
| McCall | 1824 | $ 0.20 | fire screens |
| | | | |
| Montgomery | 1770 | 1.5.0 | Fireboard (Chimney board-painted) |
| Arnous | 1819 | $ 1.00 | Fireboard (chimneyboard) |
| Price | 1834 | $ 0.25 | Fireboard |
| Twamley | 1835 | $ 1.00 | Fireboard |
| Twamley | 1835 | $ 0.30 | Fireboard |
| Twamley | 1835 | $ 0.50 | Fireboard |
| | | | |
| Miscillany | | | |
| Truman | 1813 | $ 2.50 | hearth rug |
| Barret | 1847 | $ 2.00 | hearth rug |
| | | | |
| Engle | 1821 | $ 0.50 | marble shovel stand |
| Brown | 1836 | $ 3.00 | tong stand |
| | | | |
| Luken | 1779 | 0.10.0 | chimney back |
| | | | |
| Ross | 1800 | $ 6.00 | copper coal skuttle |
| Roberts | 1856 | $ 1.00 | coal skuttle |
| | | | |
| Bohl | 1836 | $ 1.00 | grate |
| Bohl | 1836 | $ 2.00 | grate |
| | | | |
| Plate Warmerss | | | |
| Montgomery | 1770 | 2.0.0 | plate warmer - japanned |
| Neave | 1776 | 1.10.0 | plate warmer |
| Ross | 1800 | $ 1.00 | plate warmer |
| Hall* | 1811 | $ 0.50 | plate warmer |
| Falconer* | 1815 | $ 2.00 | plate warmer |

# APPENDIX C

## ANALYSIS SUMMARY OF INSURANCE SURVEYS

### Surveys from the Years 1800-1839

| Heat Source Primary | Secondary | Mantels | No. of Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [fireplaces] | | 4 | | dwl. 3s br | | Sansom Row | Dec | 1806 | M s1040 | [707] 169 Walnut St. | Philadelphia |
| [fireplaces] | | 7 marble, hearths, wood | | dwl 3s br pia 1s | | York Row | Dec. 22 | 1808 | PC 3301 | 716 Walnut St. | Philadelphia |
| | | | | | | | | | | | |
| [fireplaces] | | 6 marble, hearths, wood | | dwl 3s br pia 1s | | York Row | Jun. 2 | 1810 | M 1553 | [712] Walnut St. | Philadelphia |
| [fireplaces] | | 6 marble,neat, plain | [9] | dwl. 3s. br | 2500 | Ann Bisland (Franklin Ro | Sep 13 | 1811 | M s1736 | [228] S 9th St | Philadelphia |
| fireplace in plan | [stove? in store] | 2 wood | | Store & dwl, 3s br | | James P. Lyle | Aug. 24 | 1829 | FF 0 11 | 248 2nd St | Philadelphia |
| fireplaces in plan | | 7 marble pil, neat wood | | dwl, 3s br , 3s | 2000 | John Bowlands | Dec. 11 | 1829 | FF 0 60 | 106 N. 11th St. | Philadelphia |
| | | | | | | | | | | | |
| grates | [Fireplaces] | 7 marble, wood | | dwl 3 st br | 1600 | Thibault, Fred & Felix | May. 7 | 1832 | FF 0 480 | 504 S. 9th St | Philadelphia |
| fireplace in plan | | 3 plain, pil (1) | | dwl. 3s bandbc | 500 | William Lancaster | May. 8 | 1832 | FF 0 481 | [4xx] Harmony | Southwark, Phila. |
| fireplaces in plan | | 5 marble, wood, pil & plain | | dwl. 3s br. pia. | 1200 | Ellis S. Justice | May. 9 | 1832 | FF 0 482 | 812 N. 6th St | Penn Twp. Phila. |
| grates | [fireplaces 3rd flr | 8 marble, blk & gold, col. | | dwl. 3s br. | 4000 | William Hause | May. 10 | 1832 | FF 0 483 | [1208] Chestnut St. | Philadelphia |
| grates | [Fireplaces] | 6 wood; pil. plain, neat | | dwl. 3s br. pia | 1000 | Wesley Ballanger | May. 10 | 1832 | FF 0 484 | Juniper blw Spruce | Philadelphia |
| fireplaces in plan | Grate | 6 marble pil, plain wood | | dwl. 3s. br. | 1000 | Benjamin Seedom | May. 14 | 1832 | FF 0 487 | S. 8th St. abv Fitwater | Moyamensing, Phila. |
| fireplaces in plan | Grate | 4 marble, wood | | dwl 3s br, base | 1000 | Samuel Waters | May. 23 | 1832 | FF 0 489 | [15xx] George St. | Philadelphia |
| [fireplaces] | Grate | [10] marble | | dwl. 3s br, pia, 3 st K | | P F Fontages, Portico Row | Jul. 3 | 1832 | FF 681 | [930] Spruce St | Philadelphia |
| fireplaces in plan | stove niche | 12 marble | | dwl 4s br pia 3 | 5000 | Erskine Hazzard, Fleming | Jun. 4 | 1835 | FF 0 1203 | [712] Spruce St. | Philadelphia |
| fireplace in plan | | 3 wood | | dwl, 3 s. br. ba | 300 | Sampson Naylor | Mar. 1 | 1836 | FF 0 1481 | 7 Jefferson St. | Philadelphia |
| [fireplaces ?] | | 5 marble, wood | | dwl. 3s. br, pia | 2000 | William H. Orr | Mar. 2 | 1836 | FF 0 1482 | [21 S. 16th St.] | Philadelphia |
| fireplaces in plan | | 2 wood, pilaster (1) | 2 | dwl. 3s. br. bar | 400 | West Chester R. R. | Mar. 3 | 1836 | FF 0 1484 | E side Goodwill Alley | Philadelphia |
| fireplace in plan | | 2 wood; column, shelf | | dwl, 3 s. br. ba | 1000 | Stephen Payron, Jr. | Mar. 29 | 1836 | FF 0 1480 | [7xx] Logan St. | Penn Twp |
| ? | | 4 marble, hearths | | dwl 3s., 2s | 2000 | Christian Doerr | Dec. 21 | 1836 | FF 3511 | 60 Union [Delancy] St. | Philadelphia |
| grates | [Fireplaces] | | | Hotel | 4000 | Micheal Hays | Mar. 29 | 1837 | FF 0 1483 | Main & Del. | Burlington, NJ |
| Furnace in cellar | [Fireplaces] | 8 marble | | dwl. 3s br, pia. 3s [1831] | | Portico Row** | Oct. 24 | 1839 | PC 5467 | [902] Spruce St | Philadelphia |

In Description column, a [date] is given for houses older than survey.
In Policy column, * Indicate this is an update of an older policy
Policy $ is the given or average dollar amount for each property when multiple properties are covered by one policy.
Survey Date - if not found, policy date was substituted.
[brackets] indicate interpretation.

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INA = Insurance Company of North America, Policies in the Archives of CIGNA

** Portico Row was Designed by Thomas U. Walter, Architect

APPENDIX C

# ANALYSIS SUMMARY OF INSURANCE SURVEYS

## Surveys from the Years 1840-1849

| Heat Source: Primary heat | Secondary | Mantels | No. of Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [fireplaces] | | 7 marble mantles & hearths | | dwl 3s, br, pia, | 2000 | Joseph Hopkinson Heirs | May. 5 | 1842 | INA P 5 | [13xx] 366 Walnut St. | Philadelphia |
| ? | [stove in store ?] | 4 | | Store & dwl 3s | 700 | Mary Robb | May. 9 | 1842 | INA P 6 | [8xx] 427 S. 2nd St. | Philadelphia |
| ? | | 6 | 6 | dwl. 3s | 250 | James Floyd | Aug. 31 | 1842 | INA P14 | [15xx] N. Phllips St. | Kensington, Phila. |
| ? house unfinished | | 7 Marble, wood | 2 | dwl. 3s br., 1s | 750 | James Floyd | Aug. 4 | 1842 | INA P 12 | [1502] N 2nd St. | Kensington, Phila. |
| ? [stove ?] | | 5 bracket shelves | | dwl 3s. br | 600 | Sargant Davis | Aug.2 | 1842 | INA P 11 | Smith's Court | Philadelphia |
| Furnace in cellar | [Fireplaces] | 5 marble mantles & hearths | | dwl. 4s. br, pia | 4000 | John A. Brown | Dec. 15 | 1842 | INA P17 | NE c. Spruce & Broad | Philadelphia |
| ? | | 3 common mantles | 6 | dwl 3s br; banc | 250 | E.R. Fine Trustees | Mar. 8 | 1843 | INA P 26 | Mary St. btn Spruce & L | Philadelphia |
| Furnace in cellar..l | Fireplaces | 6 marble, iron backs & jambs | | dwl 2s st, 2s b | 2200 | Samuel G. Welsh | Aug. 3 | 1843 | INA P 30 | NW side Schoolhouse L | Roxborough, Phila. |
| ? | | 9 wood | | dwl 4s br | 1200 | Robert Patterson | Dec. 28 | 1843 | INA P 36 | [17xx] George St. | Philadelphia |
| [stoves, niches] | | 1 plain wood | | dwl 2s br, 2s b | 1000 | Samuel Sloan | Feb. 16 | 1843 | INA P 24 | [1x2 N. 15th St.] abv Ch | Philadelphia |
| ? | | 7 marble, hearths | | dwl. 3s, pia, 3s | 7000 | William E. Bowen | Nov. 9 | 1843 | INA P32 | [1517] Spruce St. | Philadelphia |
| ? | | 4 marble, pil., plain | | dwl 3s br. | 800 | J. P. Frietig | Sept. 5 | 1843 | INA P 31 | 85 Brown St. | Northern Liberties, Phila |
| ? | | [6] | | dwl 3s br | 800 | John Cormany | Jan. 16 | 1844 | INA P 39 | [4x1] Wharton St | Southwark, Phila. |
| [stoves, niches] | | 4 common | 4 | dwl 3s br | 1000 | Trustees of Eliz. Fine | Apr. 9 | 1844 | INA P 56 | 14xx Fitzwater St. | Moyamensing, Phila. |
| ? | | 8 marble, hearths, wood | | dwl 3s br, pia, | 3000 | Thomas Flemming | May. 1 | 1844 | INA P 62 | [14x1] Locust St. | Philadelphia |
| [fireplaces ?] | | 4 shelf, fluted pil. plain | [10] | dwl. 3s br [1806] | | Sansom Row | Oct. 17 | 1844 | M 6036* | [707] 169 Walnut St | Philadelphia |
| fireplaces in plan | Grate, coal | | | dwl 3s+b br, [1 | 1000 | Samuel Waters | Sept. 11 | 1844 | FF 0 489* | [15xx] George St. | Philadelphia |
| ? | | 7 marble, wood | | dwl 2s. stone | 3500 | Joseph M Mather | Oct. 27 | 1846 | FF 0 7203 | Bethlehem Pike | Whitemarsh Twp |
| ? | | 2 wood | 2 | dwl 2s. stone | 500 | Joseph M Mather | Oct. 27 | 1846 | FF 0 7205 | Mather Lane | Whitemarsh Twp |
| Furnaces, 2 in cellar | | | | dwl. 3s br, pia, 3 st K | | Portico Row | Oct. | 1846 | PC 6703 | [912] Spruce St. | Philadelphia |
| Furnace | [1 Fpl in plan] | [9] marble | | dwl. 3s br | 5000 | Edward Whelan | Jun. 17 | 1847 | FF 56 7804 | 1722 Walnut St. | Philadelphia |
| [fireplaces ?] | | [5] [marble & wood] | | dwl. 3s. br, pia | 2000 | William H. Orr | Sept. 24 | 1847 | FF 0 1482* | 21 S. 16th St. | Philadelphia |
| Furnace in fr. cella | [Fireplaces] | 7 lt. & clouded marble. pil | | dwl. 3s br, pia, | 5000 | Portico Row | Jul. 2 | 1849 | PC 7727 | [916] Spruce St | Philadelphia |
| Furnaces (2) introduced | | | | dwl. 3s br, pia, 3 st K [1832 | | Portico Row | Dec. 8 | 1849 | FF 681* | [930] Spruce St | Philadelphia |

In Description column, a [date] is given for houses older than survey.
In Policy column, * Indicate this is an update of an older policy
Policy $ is the given or average dollar amount for each property when multiple properties are covered by one policy.
Survey Date - if not found, policy date was substituted.
[brackets] indicate interpretation.

FF = Franklin Fire Insurance, Policies in the Collection of the Historical Society of Pennsylvania
M = Mutual Assurance, Policies in the Collection of the Historical Society of Pennsylvania
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# APPENDIX C

## ANALYSIS SUMMARY OF INSURANCE SURVEYS

### Surveys from the Years 1850-1859

| Heat Source Primary heat | Secondary | Mantels | No. of Hooses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [fireplace in plan] | Grate | 5 whi. marble, wood | | dwl 3s. br. | 2500 | Ann C. Phillips | | 1850 | FF 12088 | 1808 Rittenhouse Sq. | Philadelphia |
| ? | | 5 whi. marble | [4] | dwl 4s br, 3s k | 2500 | John Davis | Aug. 13 | 1850 | INA P 210-1 | 169 S. 9th St.abv Lomba | Philadelphia |
| Furnace in cellar | Fireplace | 11 marble, pil., shelf | | dwl 4s br. pia : | 3000 | Zophar C. Howell | Aug. 23 | 1850 | FF 12207 | 1826 Rittenhouse Sq. | Philadelphia |
| heating Furnaces, (2) | | [6] white lt. marble | | dwl 4s br, 3s b | 2000 | Sophia R Kessler | Sept. 10 | 1850 | INA P 610 | 1621 Summer St. | Philadelphia |
| fireplaces | | 5 panelled, architrave, shelf | | dwl. 2s, 2s br. | 1500 | William Shannon | Jan. 4 | 1851 | FF 0 20489 | E. Market | Chambersburg |
| heater in cellar | | 2 marble w/ fireboards & registers | | dwl 3s br, 1 s fr | | Thomas White | May. 9 | 1854 | FF 0 20482 | 40x0 Pine St. | Philadelphia |
| fireplaces | | | | Hotel 3s. & dw | 4000 | Susan White & Dau. | May | 1854 | FF 0 20488 | NE corner of Square | Easton |
| Heater in cellar | [stoves, niches] | 5 marble, wood, circ. face | | dwl 3s br | 3000 | Ferdinand Sarmiento | Sept. 13 | 1855 | INA P 214 | [16x0] Summer St. | Philadelphia |
| fireplaces | | 5 | | dwl 2s, 2s. br. | 1500 | Benjamin Nead | May. 16 | 1856 | FF 0 20489* | E. Market | Chambersburg |
| Furnace in back ce | [Fireplaces] | 8 marble | | dwl. 3s br, pia, 3 st[1831] | | Portico Row | Jul. 16 | 1856 | PC 5457* | 902 Spruce St. | Philadelphia |
| Heater in cellar | | 7 marble, circ. face, whi, blk & gld | | dwl 3s br, 2s b | 1200 | Andrew Nebinger | Apr. 13 | 1858 | INA P 283 | 1018 S. 2nd St. | Philadelphia |
| [stove ?, no ch in back room] | | 2 marble shelf, wood | | dwl 3s br, 1s fi | 1000 | Catharine Whitney | Nov. 11 | 1858 | INA P 285 | 218 Carpenter St. | Philadelphia |
| [fireplaces or stoves] | | 8 marble, wood | | dwl 3s, pia, 2s | 1500 | P. D. Martin | Jan. 24 | 1859 | INA P 286 | 541 E. York Ave | Philadelphia |
| ? | | 2 marble | | dwl 3s 2s back | 1000 | Thomas A. Reeves | Apr. 9 | 1859 | INA P 288 | 112 Friedlander St. | Philadelphia |
| fireplaces | | | | Hotel | 2000 | Susan White & Dau. | Oct. 24 | 1859 | FF 0 20488* | NE corner of Square | Easton |
| fireplaces | | wood | | dwl. 2s., 1st ba | 3000 | Susan White & Dau. | Oct. 24 | 1859 | FF 0 20488* | NE corner of Square | Easton |
| Furnace | | x | | dwl 3s br 3s br | [6000] | Charles W. Shields | Sept. 22 | 1859 | INA P 3957 | 230 S. 19th St. | Philadelphia |

In Description column, a [date] is given for houses older than survey.
Policy $ is the given or average dollar amount for each property when multiple properties are covered by one policy.
Survey Date - if not found, policy date was substituted.
Name is name of owner at time of Survey, not the last policy holder.
[brackets] indicate interpretation.

In Policy column, * Indicate this is an update of an older policy
FF = Franklin Fire Insurance, Policies in the Collection of the Historical Society of Pennsylvani:
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APPENDIX C

ANALYSIS SUMMARY OF INSURANCE SURVEYS

Surveys from the Years 1860-1865

| Heat Source: Primary heat | Secondary | Mantels | No. of Houses: Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [stoves ?] | | 6 lt. marble, pl wood | | dwl 2s st, 2s fr | 2500 | Robert F. Young | Apr. 4 | 1860 | INA P 295 | 8 mi. stn Germantown R | Chestnut Hill, Phila. |
| ? | | | | store & dwl. 3: | 4000 | William Hause | Aug. 4 | 1860 | FF 0 483* | 1208 Chestnut St. | Philadelphia |
| ? | | 6 bracket | 2 | dwl. 3s br | 700 | Anthony & Catherine Mu | Sept. 21 | 1860 | INA P 3117 | 2022 Catherine St. | Philadelphia |
| ? | | 6 wood; plain, brkt shelves | | dwl 3s br [olde | 800 | Stogden Family | May. 2 | 1862 | INA P 341 | 1343 Earl St. | Philadelphia |
| fireplaces | | 7 pil, brkt, sq. col. | | dwl. 2s, 2s back | | Trustees First Lutheren Cl | Jun. 17 | 1862 | FF 0 30483 | | Chambersburg, Pa. |
| ? | | 2 pine shelves | | dwl 2.5s br | 600 | John Smith | Jan. 15 | 1863 | INA P 375 | W. side Frankford Rd. | Aramingo vil., Phila. |
| ? | | 5 1 marble, pine shelves | | dwl 3s br, 2s k | 800 | Henry M. Andrews | Mar. 26 | 1863 | INA P 393 | 2004 Fitswater St. | Philadelphia |
| Heaters | | 7 gry marble, pine | | dwl. 3s br, 3s | 1000 | Alice Tremper | Apr. 9 | 1863 | INA P 396 | 1906 Pine St. | Philadelphia |
| ? | | 6 bracket, marble shelves | | dwl 3s br, 2s b | 1000 | David Shetzline | Jun. 6 | 1863 | INA P 3088 | 304 Dickinson | Philadelphia |
| fireplaces in plan | [stove in store?] | 1 plain marble pil. | | Store & dwl 3s [1811] | | James P. Lyle | Feb. 7 | 1863 | FF 0 11* | 248 2nd St | Philadelphia |
| grates [noted by owner] | | 7 dk gry marble, pine shelves | | dwl. 3s, k | 2000 | Adelaide A Ginkinger | Feb. 24 | 1863 | INA P 385 | 1106 Sansom St. | Philadelphia |
| Furnace & Heaters, brick | | 6 pine | | dwl. 2s st, 2s k | 1000 | S. Morris Waln | Feb. 26 | 1863 | INA P 386 | Plank Road by Front | Frankford, Phila. |
| ? | | | 4 | dwl 3s, 2s k, 2: | 2000 | Mary Roberts | Jan . 30 | 1863 | INA P 379 | E. side Preston St. | Philadelphia |
| ? [stoves ?] | | 3 Pine, marble | | dwl. 2s br | 600 | Starr Halloway | Jan. 30 | 1864 | INA P 465 | S side Canal St, blw 4rth | Philadelphia |
| ? [stoves?] | | 3 pine | | store & dwl, 2: | 800 | Daniel McCarthy | Mar. 11 | 1864 | INA P 472 | 750 Swanson St. | Philadelphia |
| no chimney in front | | 1 plain shelf | | dwl 2s br, 2s f | 600 | David Stinson | Aug. 15 | 1864 | INA P 510 | 2039 Ritter St. | Philadelphia |
| ? | | 3 marble | | dwl. 4s br & st | 5000 | George W Childs | ? | 1864 | INA P 538 | 1606 Locust St. | Philadelphia |
| brick Furnace & Heaters | | 9 marble | | dwl 3s stn, 1.5: | 10,000 | J E Trexler | Jul. 28 | 1864 | INA P 508 | SW side Skippack Pike | Whitemarsh |
| ? [stoves?] | Grate in k. | 2 Pine | | dwl 2s stn, 1s l | 1500 | George P Loughead | Feb. 8 | 1864 | INA P 466 | SE side Rittenhouse St. | Germantown |
| ? [stoves ?] | | 0 | | dwl 2s br, 2s b | 700 | Alexander Moore | Nov. 14 | 1864 | INA P 531 | 2109 Montrose | Philadelphia |
| fireplaces? | | 4 pine shelves | 4 | dwl, 3s br | 1000 | Edward S Buckley | Oct | 1864 | INA P 474 | 35th St. by Gray's Ferry | Philadelphia |
| ? chimneys in plan | | 2 plain wood, brkt shelf | | dwl. 3s br, k | 600 | William H. Kirkpatrick | Oct. 17 | 1864 | INA P 520 | 807 S. 13th St. | Philadelphia |
| brick Furnace & H | Grates (3) | 4 marble, slate | | dwl 3s stn, 2s : | 4000 | James T. Young | Sept. 17 | 1864 | INA P 497.5 | Chestnut Ave abv Perkic | Chestnut Hill, Phila |
| ? | | 4 bracket | 3 | dwl 2s br | 400 | Joshua Cottrel | Jan 13 | 1865 | INA P 3099 | 1346 Pritchett | Philadelphia |
| Heaters (2) in cellar | | | | dwl. 3s br, pia, 3 st K | | Portico Row | Jan. 25 | 1865 | FF 681* | 930 Spruce St | Philadelphia |
| [fireplaces in plan] | | 4 marble, wood | | dwl, 3s br | 2000 | Charles Conway | Apr. 15 | 1865 | INA P 572 | 603 Pine St. | Philadelphia |
| ? chimneys in plan | | 3 pine, shelfs | | dwl 3s br | 800 | Henry Rathjee | Apr. 20 | 1865 | INA P 521 | 2407 Jefferson St. | Philadelphia |
| Furnace in cellar | [fireplace or wood stoves] | | | dwl. 3s. br. | 5000 | Elizabeth M. Ebbs | Jul. 10 | 1865 | INA P 552 | near New St. | West Chester, Pa |
| ? chimney in middle of wall | | 2 plain wood bracket | | dwl, 3s br&fr l | 500 | Elizabeth Campbell | Apr. 25 | 1865 | INA P 579 | 123 Chenango St. rear. | Philadelphia |
| grate | [stoves ?] | 4 marble, pine, pine shelf | | dwl, 3s br, k | 1500 | George Harris | Apr. 26 | 1865 | INA P 575 | 2122 W. Delancy Pl. | Philadelphia |
| grate | [stoves ?] | 4 marble, pine, pine shelf | 2 | dwl, 3s br, k | 2000 | George Harris | Apr. 26 | 1865 | INA P 576 | 2131 W. Delancy Pl. | Philadelphia |
| stoves & pipes | | | | dwl, 2s br | 5000 | Francis D Kimear | Aug. 18 | 1865 | INA P 615 | Elk & Martin Streets | Franklin, Pa. |
| [fireplace or stove: | Grate in sit. | 9 slate, slate shelves | | dwl, 2s+ stone | 10,000 | Edward S. Buckley | Aug. 19 | 1865 | INA P 602 | Norwood Ave | Chestnut Hill, Phila. |
| fireplace | [stoves] | | | dwl, [18th c. H | 2500 | Morris Waln | Nov | 1865 | INA P 623 | SE crn Schoolhouse Ln. | Philadelphia |
| Latrobe stoves | from stove below | | | dwl 3s br | 5000 | Sarah E. Austin | Oct. 11 | 1865 | INA P 633 | S. side E. Market St. | Chambersburg |

*See Previous Page for Key*

# APPENDIX C

## ANALYSIS SUMMARY OF INSURANCE SURVEYS

### Surveys from the Years 1866-1869

| Heat Source Primary heat | Secondary | Mantels | No. of Houses Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ? | | 2 slate | | dwl 3s+ br, br | 10,000 | Samuel Harlan Jr. | Sep. 20 | 1866 | INA P 783 | SE cr. 17th [& Brown?] | Philadelphia |
| ? | | | 6 twins | dwl 2s br, 1s b | 900 | John Cochran | Sep. 27 | 1866 | INA P 786 | Upland & Edgemont Rd | Chester, Pa. |
| Hot Air Flues [Furnace] | | | | dwl 3s br, 3s b | 4000 | Han & Anna Taylor | Oct. 8 | 1866 | INA P 789 | 36 Church St | West Chester, Chester |
| ? | Grate in parlor | 6 slate, carved pine-old style | | dwl. 3s br | 3000 | Elizabeth Robinson | Aug. 31 | 1866 | INA P 781 | 718 Sansom St. | Philadelphia |
| Furnaces, 2 Hot ai | [stove niches] | 8 marble | | dwl. 3s, pia, 3s | 3000 | Charles F. Corbin | Jan. 27 | 1866 | INA P32* | 1517 Spruce St. | Philadelphia |
| ? | | [3] marble | | dwl. 3s st, 2s, | 5000 | J. C. Henry | Nov. 1 | 1866 | INA P 796 | NW side Fisher's Ln. | Germantown, Phila. |
| Furnace, Brick | | 6 marble | | dwl. 4s br, 3s t | 8000 | Julliet Conby | Nov. 15 | 1866 | INA P 802 | 1001 Green St | Philadelphia |
| Furnace [10 yrs old] | | 6+ marble | | dwl 3s br, 3s b | 5000 | Susan B Clemens | Nov. 20 | 1866 | INA P 815 | N. side Northampton St | Easton |
| stoves | | [3] marble, marble shelves | | 2s br. stn front | 2,500 | Elias England | Sep. 20 | 1867 | INA P 941 | [3?] Benson St. | Camden, N.J. |
| Brick Furnaces (2) | | 7 carved walnut, marble | | dwl 4s br & stı | 10,000 | George Harrison | Oct. 19 | 1867 | INA P 951 | 1618 Locust St. | Philadelphia |
| Furnaces (2 hot air) | | 6 marble | | dwl. 3s br, pia, 3 st[1831] | | Portico Row | Dec. 20 | 1867 | PC 5457* | 902 Spruce St. | Philadelphia |
| ? | | 3 wood w/ brkt | | dwl. 2s, br., ba | 700 | William Armstrong | Dec. 18 | 1867 | INA P 3119 | 2019 Webster St. | Philadelphia |
| ? | | 3 wood w/ brkt | | dwl. 2s, br., ba | 600 | William Armstrong | Dec. 18 | 1867 | INA P 3120 | 2021 Webster St. | Philadelphia |
| Furnace | Grate in office | | | dwl. 3s br, & b | 3500 | David Fleming | Oct. 25 | 1867 | INA P 957 | 108 2nd St. | Harrisburg |
| stoves | | | | dwl. 2s. br & f | 1200 | William Kaiser | Jan. 15 | 1868 | INA P 953 | 616 S. 5th St. | Camden, N.J. |
| ? | | 6 bracket, wood | | 3s br, 2s br & 1 | 1000 | Thomas H. Pitt | May. 5 | 1868 | INA P 3046 | 2129 Sharswood St. | Philadelphia |
| ? | | 4 bracket | 4 | dwl 2s br | 600 | J. Starr Holloway | Nov. 21 | 1868 | INA P 3077 | 244-50 Market St. | Philadelphia |
| Hot air Furnace | stove, close | 9 marble shelves, 1 slate | | dwl. 2s br, 2s t | 5000 | Gloucester Mfc. Co. | Dec. 26 | 1868 | INA P 3055 | Essex St. | Gloucester, N.J. |
| Furnaces, 2 H. Air | [stove?, niches] | [8] | | dwl. 3s, pia, 3s | 3000 | Charles F. Corbin | Dec. 29 | 1868 | INA P32* | 1517 Spruce St. | Philadelphia |
| stoves | | 2 neat marble | | dwl 3s br, br, f | 4000 | C. S. Garrett | Jan. 15 | 1868 | INA P 947 | SE crn Federal & Hudso | Camden, N J. |
| Heater in cellar | | | | 3s br | 2000 | James Garrison | Jan. 16 | 1868 | INA P 944 | 12 Penn St. | Camden, N.J. |
| stoves | | [4] slate, wood shelves | 14 | dwl. 3s br., br, | 1000 | Edward N. Cohn | Jan. 25 | 1869 | INA P 1105- | 116 Pearl St. | Camden, N.J. |
| Furnaces (2) brick | heater in brkfast ı | 7 Ital., clouded marble | | dwl 3s br, pia. | 9000 | A. M. Moore | May. 9 | 1869 | FF 7454 | 1220 Arch St | Philadelphia |
| ? | | 6 bracket | | dwl 3s br | 1000 | Henry R Couloeub ? | Jul. 30 | 1869 | INA P 3024 | 1703 S. 10th St | Philadelphia |
| ? | | 6 marble, 5 brkt | | dwl 3s br, 2s b | 1000 | Willam McAdoo | Sep. 13 | 1869 | INA P 3113 | 1926 Bainbridge St. | Philadelphia |
| ? | | 6 marble, 5 brkt | 3 | dwl 3s br | 1200 | Willam McAdoo | Sep. 16 | 1869 | INA P 3110 | W side 21 St, S. of Kath | Philadelphia |
| Furnaces, brick | stove, fireboard | 3 slate, marble, shelf | | dwl 3s stn w/ t | 4000 | John Power | Jan | 1869 | INA P 1262 | 39th & Locust St. | Philadelphia |
| stoves | | | | dwl. 2s stone, l | 1000 | Peter B Hinkle | Jan? | 1869 | INA P 1263 | 5429 Main St. | Germantown, Phila |
| Furnace, cylinder | | 2 slate shelf, 1 brckt | 8 | dwl. 3s br | 3000 | Henry Boyd & John Rice | March | 1869 | INA P 1265 | NW cr. 32 & Sansom St | Philadelphia |
| Heater, cylinder | | 2 slate shelf, 1 brckt | | dwl. | | Henry Boyd | March | 1869 | INA P 1266 | 32xx Sanson St | Philadelphia |

*See First or Last Page of Appendix C for Key*

# APPENDIX C

## ANALYSIS SUMMARY OF INSURANCE SURVEYS

### Surveys from the Years 1870-79

| Heat Source: Primary heat | Secondary | Mantels | No. of Houses Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Brick Heater in ce | stove, fireboard | 4 marble, slate | | dwl 2s+ st | 5000 | E H Butler Exec. | Mar. 26 | 1870 | INA P 1775 | 5041 Main St. | Germantown, Phila. |
| Heater in cellar..flues | | 1 marble w/ opening for heat | | dwl. 3s br, 2s, | 4000 | E. R. Blackwell | Apr. 7 | 1870 | INA P 1789 | DeKalb St. | Norristown |
| ? | | 6 wood | | dwl 3s br w/ fr | 800 | Ann Edwards | May. 4 | 1870 | INA P 1779 | 2157 Ridge Ave. | Philadelphia |
| ? | | 6 wood, 5 bracket | | dwl 3s br | 1500 | Mary H Riker | May. 6 | 1870 | INA P 3116 | 2023 Bainbridge St. | Philadelphia |
| stoves | | 2 plain wood w/ sawed brkts | | dwl 3s br | 1500 | John M Gowan | Sep. 27 | 1870 | INA P 1792 | 1813 Christian St. | Philadelphia |
| Heaters | Grates, low down | 2 marblized slate | | dwl 2s+ | 5000 | W. A. Wilson | Jun. 8 | 1871 | INA P 1770 | 41 Montgomery Ave | Bryn Mawr |
| no heat | stove | | | store & dwl 3s | 3000 | John Shenberger | Dec. 27 | 1871 | INA P 3013 | 256 Locust St. | Columbia, Lancaster |
| Heater, portable | | 4 marble bracket | 2+ | dwl. 3s br & st | 3000 | Ferdinand P. Hurxthal | Feb. 9 | 1871 | INA P 3086 | 509 S. 42nd St. | Philadelphia |
| heater in cellars (2) | | 1 white marble | | dwl, 2s+ br & : | 4000 | Thomas Clark | Sept. 8 | 1871 | FF 276 4073 | 6x0 S. 42nd St. | Philadephia |
| ? | | 8 shelves; marble, wood | | dwl 3s br, 2s b | 1000 | David Shetzline | Feb. 10 | 1872 | INA P 3088* | 304 Dickinson | Philadelphia |
| stoves | | 2 marble, 1 w/ drop in center | | store & dwl 3s br | | Jos. Culbertson | Apr. 30 | 1872 | INA P 3033 | 1511 N. 22 St. | Philadelphia |
| stoves | | 2 marble | 4 | dwl. 3s br, bac | 1500 | Jos. Culbertson | Apr. 30 | 1872 | INA P 3029- | 1503-9 N. 22 St. | Philadelphia |
| Fornace, brick hot air | | 6 slate | | dwl. 3s br, 2s | 1000 | John V. Buck | Jun. 24 | 1872 | INA P 1763 | 1322 N. 22nd St | Philadelphia |
| ? | stove, fireboard | 2 slate | 12 | dwl. 2s br, 2s t | 1100 | est. of Jos. Cowan | Oct. 18 | 1872 | INA P 3510 | 2553 Marshall St. | Philadelphia |
| Furnace, brick | Heater, portable i | 3 wh marble w/ panel | | dwl 3s, 3s | 6000 | James H. Lyons | Feb. 12 | 1872 | 93.8 | 1530 Green St. | Philadelphia |
| stoves | Fireplace, lg in k. | 6 marble, wood | | dwl. 2s st | 3000 | Jesse Comfort | Feb. 17 | 1872 | INA P 3097 | Newtown Rd. Attleboro | Middletown, Bucks |
| Furnace | Grates, Stoves for back building | | | dwl 3s , bk | 7500 | Edward P. Darling | Jan. 15 | 1872 | INA P ? | S. side River St. | Wilkes Barre |
| hot air Furnace [ce | Grates; low-dowi | 12 marble, walnut, slate | | dwl. 3s+ st. | 5000 | Matilda C. G. Canbry | Jan 18 | 1872 | INA P 3016 | 3726 Walnut St. | Philadelphia |
| stoves | | 3 Ital. amrble, wood, shelf | | dwl. 3s br | 1000 | Henry Gibson | Jan. 24 | 1872 | INA P 3064 | 1614 Chancellor St. | Philadelphia |
| stoves, [Balt. stove | from stove below | 3 1 slate | | dwl. 3s br, bac | 4000 | Mary J. Stewart | Jan. 30 | 1872 | INA P 3069 | 1006 New 2nd St. | Harrisburg |
| ? | Grate, low down | [5] marble, marble | | dwl. 3s st, 2s, | 5000 | J. C. Henry | Nov. 22 | 1872 | INA P 796* | NW side Fisher's Ln. | Germantown, Phila. |
| Heater | Grates, low-dowi | 7 marble, slate | | dwl 2.5 s. st | 3000 | Edward Yarnall** | Jun. 16 | 1873 | INA P 3547 | Haverford Rd. nr. City L | Lower Merion Twp |
| Furnace added in cellar | | | | dwl, 2s br | 8000 | Francis D Kinree | Jul. 7 | 1873 | INA P 615* | | Franklin, Pa. |
| Heaters | Grates, low-dowi | x x | | dwl 2s+, 2s | | Wilson Brown | Nov. 5 | 1873 | INA P 3951 | Torresdale | Philadelphia |
| ? | | | | dwl. 2s br | 800 | Levi Ostheimer | Oct. 16 | 1874 | INA P 3934 | 1204 Hope St. | Philadelphia |
| Heater, register from | | 3 marble, drop in center & register | | dwl. 3s br, 3s t | 2500 | William R Bready | ? ? | 1875 | INA P 4267 | 1921 N. 7th St. | Philadelphia |
| [Furnace, registers] | | 3 marble, drop in center & re | 6 | dwl. 3s br, 3s t | 3500 | H. P. Vesey | ? ? | 1875 | INA P 4235 | 2001 N. 13th St | Philadelphia |
| Furnace | | 5 marble | | dwl. 3s br, bac | 5000 | John B. Myers | Aug. 14 | 1875 | INA P 4210 | High St. | Mt. Holly, Burl, NJ |
| Heater [in cellar?] | | 2 slate | 5 | dwl 3s | 3000 | Albert Demuth | Aug. 25 | 1875 | INA P 4215 | 414 Fourth St. | Camden, N.J. |
| Heater in cellar | [Grate in offc?] | 6 Marble, slate, wood | | dwl. 3s br, & b | 5000 | David Fleming | Jul. 1 | 1876 | INA P 957* | 108 2nd St. | Harrisburg |
| Heaters in cellar | Grates, fpl | 6 walnut, oak. | | dwl 4s br & st, 2 st bk+ | | Bloomfield H Moore*** | Jul. 25 | 1876 | FF 47801 | 510 S. Broad St. | Philadelphia |
| ? | | | 5 | dwl 3s br, 2s br | | Isaac Henry trustees | Mar. 12 | 1879 | INA P 3594 | 308 York St. | Philadelphia |
| grates | Balt. Heater | 5+ marble | | dwl 3s stone, 1 | 4000 | George Crawford**** | May. 4 | 1879 | FF 0 10824 | 504 S. 42nd St | Philadelphia |
| [Furnace, register for heat] | | 9 Ital. marble, wood | | dwl 4s br, 4s b | 6400 | P. Carey | May. 16 | 1879 | INA P 3930 | 1532 Spruce St. | Philadelphia |

x = yes, but no description

** Architect Designed: John E. Carver for Yarnall in 1873

*** Architect Designed: Hewitt & Furness for Moore in 1876

**** Architect Designed: Samuel Sloan owned by Crawford in 1879 for 1863-5 house

*See Following Page For Key*

# APPENDIX C

## ANALYSIS SUMMARY OF INSURANCE SURVEYS

### Surveys from the Years 1880-1903

| Heat Source: Primary heat | Secondary | Mantels | No. of Houses: Houses Represented | Description | Policy $ | Name | Survey Date | Year | Policy | Address | City, County, State |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ? | | 1 slate | | dwl. 3s br, 3s br | | Sellers | Jan. 29 | 1880 | PA 20 11551 | 6x1 S. 42nd | Philadelphia |
| furnace introduce | ? | | | dwl 2s br, 3s b | 2000 | John Bowlands | Dec. 29 | 1880 | FF 0 60 * | 106 N. 11th St. | Philadelphia |
| [ fireplaces ?*] | Grate in office | [5] [marble & wood] | | dwl. 3s. br, pia | 2000 | William H. Orr | Jan. 26 | 1881 | FF 0 1482* | 21 S. 16th St. | Philadelphia |
| Steam Heater, Got | Grate | 9 cherry, walnut, marble | | dwl3s st 3s br 2s br [1850s | | Joseph Martin** | Jan. 31 | 1881 | FF 59208 | 1901 Green St. | Philadelphia |
| Heaters, brick w/ f | Grates, low-dowi | [8+ ft. marble | | dwl 3s br & S, | 10,000 | William Bucknell | Oct. 25 | 1881 | M 8468 | 1631 Walnut St. | Philadelphia |
| ? | | 1 wood shelf | | dwl 2s br [187 | 1,100 | Rebecca Alroig | Mar. 13 | 1882 | INA P 3575 | 513 Rush St. | Philadelphia |
| grates, low d & rai | Fireplaces | 11 marble; pil & pier, wood | | dwl. 3s br, 3s t | 2000 | William Sellers | Oct. 18 | 1882 | FF 12778 | 1819 Vine St | Philadelphia |
| Furnaces | Fireplaces | | | dwl. 3s, pia, 3s | 3000 | Julianna F. Wood | Sept. 22 | 1882 | INA P32* | 1517 Spruce St. | Philadelphia |
| grates [?] | Fireplaces [?] | [7] [marble & wood ?] | | dwl 3s br [183 | 1600 | Thibault, Fred & Felix | Apr. 26 | 1883 | FF 0 480* | 504 S. 9th St | Philadelphia |
| [Furnace, register in board]] | | 1 slate w/ board & regist. | 14 | dwl 3s br, 2s b | 1400 | William R. Matchett | Mar. 12 | 1885 | INA P 9201 | 3901-15 Baltimore Ave | Philadelphia |
| registers [imply fu | Fireplaces | 8 | | dwl. 4s br, 3s t | 2000 | William Sellers | May. 9 | 1885 | FF 12778* | 1819 Vine St | Philadephia |
| Baltimore heater | stoves | 4 marble, wood shelf (3) | | Store & dwl 3s br, br, fr | | Thomas Elliot | Jan. 6 | 1888 | INA P 947* | SE crn Federal & Hudso | Camden, N.J |
| Steam Heater | Grates & fpl | 4 walnut, mahogony | | dwl 3s br & st | | Theodore Engle*** | Sept 17 | 1888 | Teutonia | 1516 N. 16th St. | Philadelphia |
| Steam Heater in ce | Fireplaces | 7 marble, walnut | | dwl 4s br & st, 2 st bk+ | | Cecelin B. Darley | May. 25 | 1896 | FF 47801* | 510 S. Broad St. | Philadelphia |
| Steam, direct & in· | Fireplaces | | | dwl. 4s br, 3s t | 2000 | William Sellers | Jun. 9 | 1903 | FF 12778* | 1819 Vine St. | Philadelphia |

In Description column, a [date] is given for houses older than survey.
In Policy column, * Indicate this is an update of an older policy
Policy $ is the given or average dollar amount for each property when multiple properties are covered by one policy.
Survey Date - if not found, policy date was substituted.
[brackets] indicate interpretation.

FF = Franklin Fire Insurance, Policies in the Collection of the Historical Society of Pennsylvania
M = Mutual Assurance, Policies in the Collection of the Historical Society of Pennsylvania
PC = Philadelphia Contributionship, Policies in the Collection of the Historical Society of Pennsylvania
INA = Insurance Company of North America, Policies in the Archives of CIGNA

** Martin's house was designed by Wilson Bros.Architects - built in the 1850s?
*** Theodore Engle's was Architect desiged: Wilson Bros & Co., Hezog, Doyle.

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Analytical study using probate inventories from the 13 colonies in the year 1774. Methodology is described in volume one, and volume three consists of statistical analysis. Transcriptions of the inventories start in the first volume and continue, colony by colony, into the third. Analysis looked for regional similarities and differences.

Jones, Alice Hanson. *Wealth of a Nation to Be: The American Colonies on the Eve of the Revolution.* New York: Columbia Univ. Press, 1980.
Description and discussion of the results from Jones' study *American Colonial Wealth.*

Kauffman, Henry J. *The American Fireplace: Chimneys, Mantlepieces, Fireplaces and Accessories.* New York: Galahad Books, 1972.
A rare book in that it is a serious look at the form and style of early American fireplaces, in historical context, by a critical and observant author who is familiar with architecture.

Kimball, Fiske. *Domestic Architecture of the American Colonies and of the Early Republic*. New York: Charles Scribner's Sons, 1922.

Larkin, Jack. *The Reshaping of Everyday Life 1790-1840.* New York: Harper & Row, 1988.
Although not academically cited, he usually makes clear the basis for his statements, such as inventory studies (mostly New England). Provided a good understanding for changes in room use.

Mayhew, Edgar & Minor Myers, Jr, *A Documentary History of American Interiors.* New York: Scribner, 1980.
Frustrating because of unsupported statements regarding the use fireplace andirons and fire-backs on page 76.

Mercer, Henry C. *Bible in Iron*. 3rd ed. Joseph E. Sanford editor. Doylestown, Pa.: Bucks County Historical Society, 1961.
This work grew out of Mercer's interested in the decorated stove plates of the Pennsylvania Germans. While it still concentrates on stoves that portray biblical scenes, it also covers those with neo-classical motifs, and touches on "fire-backs" as well. Although its format can take a little while to get used to, the historical information is useful and well documented.

Murtaugh, William "The Philadelphia Row House." *Journal of the Society of Architectural Historians* 16, no.4 (Dec. 1957): 8-13.

Noble, Allen G. *Wood, Brick and Stone: The North American Settlement Landscape*. Vol. 1, *Houses*. Amherst, Univ. of Massachusetts, 1984.

Parissien, Steven. *Palladian Style*. London: Phaidon Press, 1994.

Park, Helen. *A List of Architectural Books Available in America Before the Revolution.* Rev. ed. Los Angeles: Hennessey & Ingalls, 1973.

Perkins, Edwin J. *The Economy of Colonial America*. New York: Columbia University Press, 1980.
A readable and useful text intended for undergraduates. Many references to source materials - generally academic studies.

Peterson, Charles E. "American Notes: Early House-Warming By Coal-Fires." *Journal of the Society of Architectural Historians* 9, no.4 (Dec. 1950): 21-24.

Pierce, Josephine. *Fire on the Hearth: The Evolution and Romance of the Heating Stove*. Springfield, Mass.: Pond-Eckberg Company, 1951.
A well researched book concentrating on, but not limited to, early to mid-nineteenth century stoves. Like Mercer, the emphasis is on the artifact and its history (as opposed to the artifact in the context of its surroundings).

Pilling, Ron "Restoring the Baltimore Heater." *Old-House Journal*. vol.12, no. 9 (Nov/Dec 1992): 191, 206-9.
Has a little history, but he states that it predated the whole house furnace, which we know is not true.

Pillsbury, Richard. "Patterns in the Folk and Vernacular House Forms of the Pennsylvania Culture Region." *Pioneer America* 9, no.1 (1977):12-25.

Roeber, A.G. "The Origin of Whatever is Not English Among Us." In *Strangers within the Realm*, edited by Bernard Bailyn & Philip Morgan. Chapel Hill: Univ. of North Carolina Press, 1991.

Smith, J.T. *English Houses 1200-1800: The Hertfordshire Evidence*. London: HMSO, 1992.

Stifler, Susan. *The Beginnings of a Century of Steam and Water Heating*. Westfield, Mass.: H.B. Smith Co., 1960.
This a history of the H. P. Smith Co. with some research into the history of steam and water heating as it pertains. Occassionally misleading, like the implication that in 1890 their portable boiler was the first.

Tomlinson, Charles. *Rudimentary Treatise on Warming and Ventilating*. 4th ed. London: Virtue & Co., 1867.

While of only limited use for this paper, Tomlinson has done a better job than Bernan in researching his history. First edition was 1850 and was altered and expanded considerably by 1867. It is also interesting to see his description of Perkins system even in 1867, apparently taken mostly from an earlier book.

Walbert III, Benjamin L. "The Infancy of Central Heating in the United States: 1803 to 1845." *APT Bulletin*, vol. III, no. 4 (1971): 76-87.

Walsh, Lorena. "Consumer Behavior, Diet, and Standard of Living in the Late Colonial and Early Antebellum America, 1770-1830." In *American Economic Growth and Standards of Living Before the Civil War*, ed. by Robert E. Gallman & John Joseph Wallis. Chicago: University of Chicago Press, 1992.

Waterman, Thomas. *The Dwellings of Colonial America*. Chapel Hill: Univ. of North Carolina Press, 1950.

Wigginton, Eliot. *The Foxfire Book.* Garden City, NY: Anchor Books, 1972.

Willmert, Todd. "Heating Methods and Their Impact on Soane's Work: Lincoln's Inn Fields and Dulwich Picture Gallery." *Journal of the Society of Architectural Historians* 52 (March 1993): 26 - 58.

Wright, Lawrence. *Home Fires Burning.* London: Routledge & Kegan Paul, 1963.

An entertaining general history that is probably fairly accurate in regards to Britain. Not terribly well referenced. Relies on the 19th-century historians.

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