FIGURE 5

Phase I Testing at Mermaid Tavern Wheelwright Shop Site

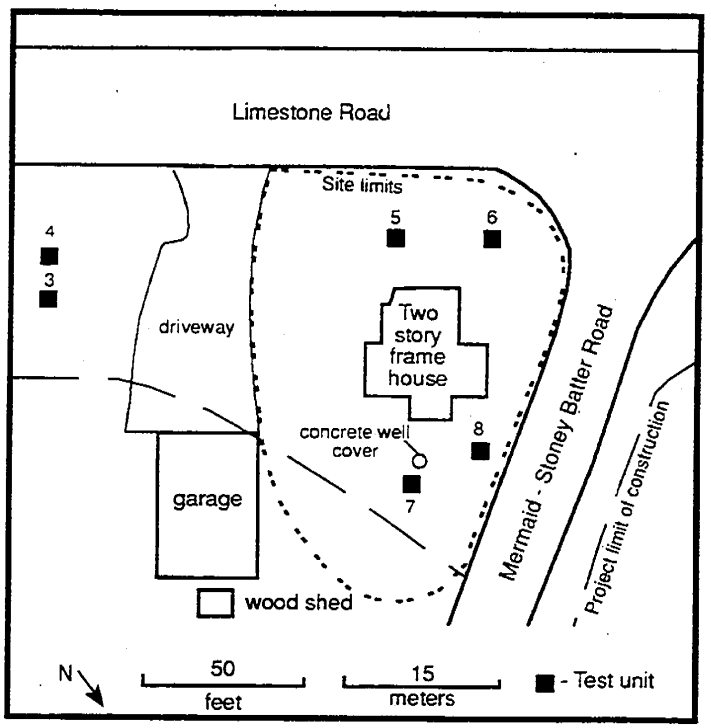
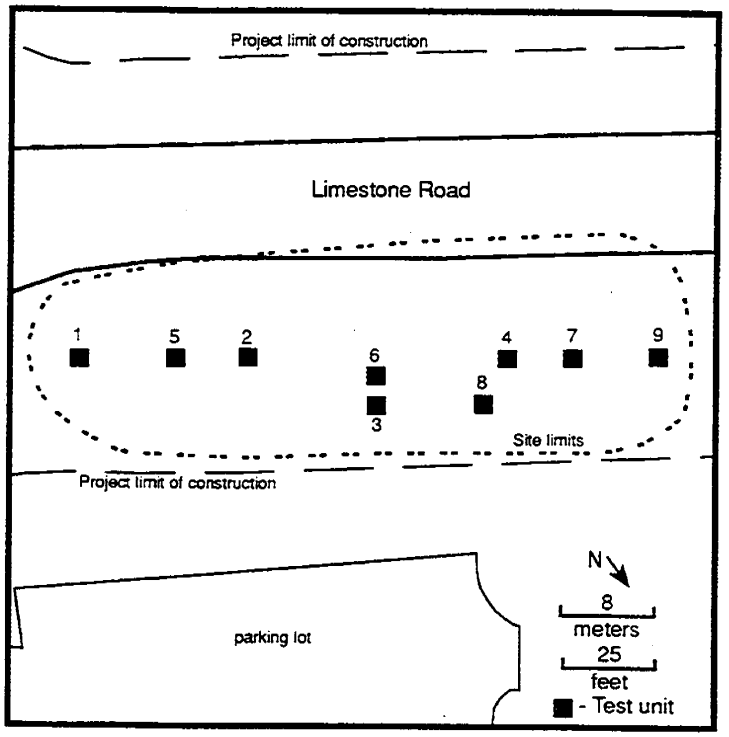


FIGURE 6

Phase I Testing at Mermaid Tavern Blacksmith Shop and Stable Site



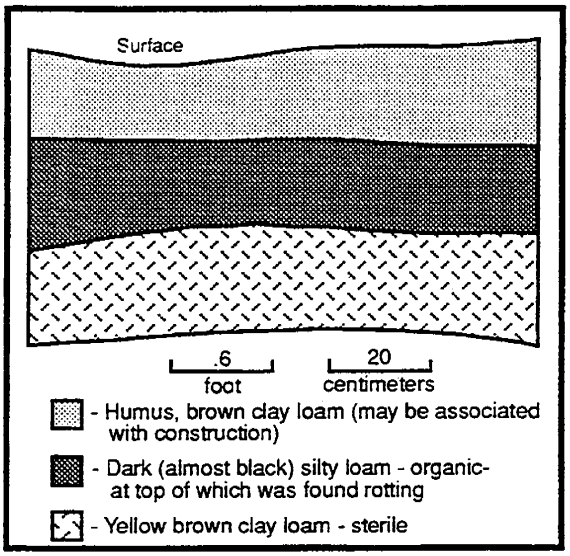
no features were encountered. Artifacts recovered include redwares, whitewares, annular pearlwares, nails, metal fragments, window glass and bottle glass, and oyster shell fragments. The highest densities of artifacts were recovered from Test Units 2 and 6. Based on the results of this Phase I and limited Phase II testing, additional archaeological excavations were considered necessary to determine the eligibility of the site for inclusion on the National Register (Catts et al. 1986:157-160).

RESEARCH CONTEXTS

According to the guidelines established by the Delaware Statewide Comprehensive Historic Preservation Plan (Ames et al. 1989) and further refined for historical archaeological remains by De Cunzo and Catts (1990), the sites at the Mermaid intersections are situated in the Piedmont zone of Delaware, placing the potential date range for the site in a period spanning from 1730 to the beginning of the twentieth century. The professions represented at the sites, blacksmithing and wheelwrighting, fit best into the

FIGURE 7

Mermaid Blacksmith Shop and Stable Site, Profile of Test Unit 2, North Wall



Manufacture and Trade research domain defined by De Cunzo and Catts (1990:19-21). These authors suggest that several aspects of manufacturing can be investigated at production sites such as smithies and wheelwright shops. These aspects include site location and use, alterations to the landscape, architecture, and any other structural features composing the physical site. The production process, including equipment, raw materials, and finished products can also be successfully examined through archaeological remains, as Heite's examination has shown of the Collins, Geddes Cannery (1990). Lastly, shops and smithies are workplaces where patterns of work behavior and activities, and the life of the worker beyond the limits of the domestic setting, can be explored through the investigation of such shops and smithies. Detailed archaeological research at other blacksmith shops (cf. Light 1984; McBride 1987; Faulkner 1986; Pogue 1989; Coleman et al. 1985; Harrington 1969; Geib and Kurtz 1981) can be used to compare and contrast with the results of the Mermaid investigations.

In focusing the research at the Mermaid shops it was necessary to include some discussion of the shops' social and economic contexts and settings; in this case, Mill Creek Hundred and the upper portions of New Castle County and adjacent southeastern Pennsylvania during the eighteenth and nineteenth centuries. Additionally, account books and records of other blacksmiths and wheelwrights operating in New Castle County during the eighteenth and nineteenth centuries were sampled to provide as broad a background context as possible for interpreting the sites. By using a contextual approach in researching the sites, indications of change over time in smithing practices and some of the reasons for this change, such as agricultural reforms, transportation changes, and social reforms may be discerned through the material remains of rural artisans at the Mermaid Intersection.

BLACKSMITHING IN NEW CASTLE COUNTY, 1788-1908

To provide a historical context to view the Mermaid blacksmith and wheelwright shops, several account books, day books, bills, and the U.S. Manufacturers' Census were examined. The records of J.D. McCrea, a blacksmith of Talleyville, Brandywine Hundred (1884-1908), and the account books of John Vining, blacksmith of New Castle Town (1788-1797), Ebenezer Rothwell, blacksmith of St. Georges Hundred (1795-1808), and John Porter and William Ferguson, wheelwrights of New Castle County (1852), are in the collections of the Delaware State Archives, at the Hall of Records in Dover. At the Historical Society of Delaware in Wilmington, the day book of Robert Wier, a blacksmith in Christiana, New Castle County (1830-1833), and several accounts of blacksmiths in the Rodney Papers of the H.F. Brown Collection were examined. The Alexander Wilson records, consisting of daybooks, account books, ledgers, and business correspondence of a blacksmith, wheelwright, and machinist in Pencader Hundred (1852-1877), had been previously examined and reported by Coleman et al. (1985:121-143, 246-249), and were included in the present study. Overall, nine different records of smiths and wheelwrights were investigated, covering the period from the mid-eighteenth century to the beginning of the twentieth century, a period similar to the time that the Mermaid blacksmith shop operated (Appendix II).

In her study of Pennsylvania blacksmiths, Jeannette Lasansky (1980:24) found that the general, day-to-day work of the blacksmith was rather ordinary and mundane. The crucial factor in determining what or how a blacksmith produced an object was the personality, or individuality, of the smith, not the time period he worked in or the materials that he used. In general blacksmiths spend most of their time repairing, shoeing, and forging parts, not making exotic or unusual objects of iron. It was precisely this ability to mend and repair virtually any metal artifact that made blacksmiths so indispensable to their communities.

The sample of Delaware blacksmith accounts examined for this report reaches a similar conclusion to Lasansky's; for the most part, the smiths, whether urban or rural, performed the same types of tasks on a daily basis. John Vining's, Robert Wier's, and Alexander Wilson's records are the best sources from which to draw conclusions. Although working several decades apart and in contrasting urban, rural, and village settings, all three smith's did substantially the same types of work.

The majority of their time was spent in removing and replacing worn horseshoes, and in repairing, dressing, sharpening, or laying on edges for coulters, shears, plows and harrows. Other agricultural tools, such as axes, dung forks and pitch forks, grub hoes, picks, and wheelbarrows, were brought to the shops for repairs, sharpening, or in the case of axes, for "steeling" the edge.

Another mainstay of the shops was the production of spikes, bolts, eyehooks, s-hooks (or "eshooks"), iron rings, chains, rivets, and nails. The nails seem to have been generally of unusual shapes or sizes, such as the "four large nails and steeples" and the "nails for cart bed" that Vining made for George Read in 1794, or the forty cart nails and linchpins he crafted for John Cloak in the winter of 1795. Vining forged nails in large quantities, as in July of 1794 when he made a "steel ring, 3 wedges, and gross nails" for Thomas Nesbit, or the gross of nails he prepared for John Cork in the summer of 1796. Vining also produced more spikes, rivets, and bolts than did Weir or Wilson, probably a result of the effects of mass-produced manufacturing of these types of iron objects that occurred during the first half of the nineteenth century.

Vining, and Weir did some wheelwrighting as well as blacksmithing. Vining was hooping wheels, but this may have been more related to his work with "hooping beef barrels" and other containers. Weir also hooped wheels, as on 23 June, 1830 when he hooped the wheels for Peter Ogle, Joseph William, and John Parsons, in addition to conducting work for thirteen other customers that day. Besides wheel repairs, the Delaware smiths mended or replaced broken chains, wagon rings and keys, swingletrees, and drawing bolts. The iron parts of harnesses or draft-animal furniture were also mainstays of the smith's work, such as repairing the clevis and collars.

Blacksmiths appear to have limited their work on wagons only to metal fixtures, such as hoops, chains, and swingletrees. In comparison the work conducted by Alexander Wilson, and Porter and Ferguson shows that wheelwrights built the entire wagon, or more often repaired and replaced wagon parts. In February of 1852, Porter and Ferguson charged Robert Hudders $36 for a new horse-drawn wagon. The same month they billed Michael Montgomery $1.50 for "repairing two horse wagons" and several months later charged Montgomery for "1 new wagon box." Wagon parts that they crafted included wagon tongues, wheels, axletrees, and slay shafts.

By the middle of the nineteenth century, wheelwrights were also mending agricultural tools and farm machinery. Porter and Ferguson recorded in 1852 that they made harrow trams, a "cradle finger to a rack," and a plow beam. Nearly thirty years later, in 1881, they were still in business putting the rim on a Dearborn wheel, three new spokes, and a new shaft and cross bar all for McDowell Hill.

The wheelwrights did more than simply mending wagons and farm machinery. Like the blacksmiths of the area, the wheelwrights repaired and crafted objects from wood that were used (and perhaps broken) daily. Porter and Ferguson spent much of their time dressing saws, repairing rakes, making wooden tool handles (often for axes), and mending wheelbarrows.

In terms of size, product, marketing, and income, Alexander Wilson's Agricultural Implements Works was unique when compared to the other smiths and wrights working in northern New Castle County. Wilson's shop functioned as a machine shop, a blacksmith shop and a wheelwright shop. Like Vining, Weir, and the other smiths examined, Wilson did small, daily replacement and repair jobs for the surrounding community, such as forging a fireplace poker, sharpening plows, putting teeth on a wheat cutter, and repairing a padlock. Wilson's biggest source of income came from repairing wagons and carriages, such as the work on a cart sill he did in 1857 for E. Armstrong, or the lock plates for a wagon bed he forged for R. Morrison in 1872. The research by Coleman et al. (1985) indicates that Wilson was also an inter-regional entrepreneur, making and selling plows, vegetable cultivators, and other "agricultural implements" from New York to North Carolina. Wilson's business connections clearly dwarfed the more locally-oriented smiths and wheelwrights; by 1880 the annual value of Wilson's products was the largest in northern New Castle County, second only in manufacturing to the Marshall Brothers Sheeting Iron Company in Christiana Hundred (Coleman et al. 1985:132).

Although the majority of the work that all of the blacksmiths and wheelwrights in New Castle County performed was related to transportation (wagons and most especially horseshoes), the distinctive work that the individual craftsmen were known for is apparent in the account books. For example, John Vining fashioned architectural hardware, including cellar door hinges for George Read and Rebecca Williams, a large set of hinges for Alexander Stockton, three sets of window hinges for Lucas Alrich and seven sets for Gunning Bedford, and mended a door lock for Rebecca Williams. Vining also made "three sets of hooks and ties for gates" for Gunning Bedford in the winter of 1796,

and mended a "dog iron" (possibly a shutter dog) for Thomas Nesbit in 1794. Besides large scale work, like hinges, Vining may have made some more finely-crafted hardware, such as a case lock with four corner clips he fashioned for Nesbit, the ladle he mended for Gunning Bedford, and the hook on Alexander Stockton's scale beam. Robert Weir made considerably less architectural hardware, but like Vining he did mend those small, but vital items, such as James McCoy's griddle, William Lloyd's coffee mill, Philip Young's fire shovel, and Charles Allen's square. Both Vining and Weir made and repaired pump stocks for wells.

Unlike more rural blacksmiths, such as the Mermaid smiths, Vining and Weir also did mending jobs for the watermen of New Castle and Christiana. In 1830 Weir altered hatch iron, straightened an anchor, and made a pike, all for Abraham Egbert, a waterman/merchant of Christiana. Vining repaired anchor weights and made boat hinges for Alexander Stockton's stage boat.

Some of the work that Vining and Weir undertook was for the community. Weir dressed two grubbing hoes for New Castle Hundred in the summer of 1830, and for White Clay Creek Hundred in the fall of 1831. In November of 1831 Weir recorded "Free, or district school (Christa.) 1 Scraper", revealing that he made the boot scraper for the public school in the village.

Although John Vining's trade was primarily directed towards the outfitting of horses and carriages to enable freer mobility for most Delawareans, he was also responsible for crafting the implements of bondage that restricted the mobility for another segment of the population. Vining was employed by New Castle County to put on and take off hand and leg cuffs from prisoners at the jail. During 1794 he charged the county for several occurrences such as "taking irons off Woman," "putting on leg Irons an Hand Cuffs," and "taking Iron off Negro Woman Hand Cuffs and Leg Irons."

The late nineteenth-century account book of J.D. McCrea of Talleyville illustrates that the types of jobs performed by blacksmiths had changed little over time. Smithing a century after John Vining worked in the Town of New Castle, McCrea's records show that, like Vining and Weir, he spent the majority of his time horseshoeing, with less time devoted to wagon mending and tool repair. Unlike the earlier smiths, McCrea's book reveals that the "personality" jobs, or those jobs that had set one blacksmith apart from another, seemed to be lacking in his work. McCrea's work was restricted almost

exclusively to mending and repair, and his account book shows little of the creativity seen in the smithing accounts of one hundred years, or even fifty years, earlier. Thus, J.D. McCrea's account book dating from the last decades of the nineteenth century, reveals the twilight years of the rural blacksmith, when mass-produced items could be more easily acquired and more easily replaced.

Based on the U.S. Manufacturers' Censuses, taken every ten years between 1850 and 1880, the blacksmith and wheelwright shops at the Mermaid intersection were rather small operations. The manufacturers' censuses did not record the Mermaid shops at all through this forty year period (the period when Milton Steel was the smith: see Historical Context below), because they were generating an income of less than $500 per year. The shops and iron works in Mill Creek Hundred that were recorded for these years are shown in Table 1. In comparison to these other businesses, the Mermaid shops were clearly not producing a large profit.

Probably the closest shop to the Mermaid intersection was the one owned by Thomas Cavender which was located about 1 mile north of Mermaid. A brief examination of the information provided by the censuses can be of use in providing a local context for the Mermaid shops. Interestingly, the various state directories that listed the residents of Mermaid always recorded Cavender, or the later operators John G. Fisher and Willard Pierson, as the blacksmiths at the intersection. Although Milton Steel was listed occasionally as a smith or a machinist, it is clear from the directories that the shops at Mermaid (those directly across the road from the hotel) were not as important as the Cavender-Fisher-Pierson shops located further north.

Thomas Cavender, a blacksmith originally from Wilmington, purchased a 2-acre lot with blacksmith and wheelwright shops in 1843 (NCCD M-5:149), and continued to operate the shops until about 1870. Cavender's business was modest, annually producing $800 to $1,300, doing what he termed "country work and shoeing horses, etc". Cavender was the master blacksmith, and two other men, probably an apprentice and a blacksmith, were employed at the shops, costing between $40 and $50 per month. In 1860 Cavender used 4 tons of iron and 300 bushels of bituminous coal for raw materials.

By 1870 John G. Fisher of Chester County, Pennsylvania was the blacksmith at the Cavender shop location. The number of apprentices had increased to three men that Fisher was able to keep

TABLE 1

Ranking of Manufacturers, Mill Creek Hundred, 1850 - 1880*

Name	Business	Annual Value of Product
	1850	
Allan Wood	Sheet iron forge	$30,000
C. &T. Marshall	Sheet iron forge	$25,000
Thomas Yeatman	Blacksmith	$1,485
Willliam Jones	Tinsmith	$1,080
Thomas Cavender	Blacksmith	$800
Stephen Morrell	Blacksmith	$650
Thomas J. Moore	Blacksmith	$600
William Newlin	Blacksmith	$600
	1860	
John Marshall and Brothers	Rolling mill	$35,000
Delaware Iron Works	Rolling mill	$30,000
Thomas Cavender	Blacksmith	$1,300
Stephen Morrell	Blacksmith	$1,200
Thomas Singles	Pumpmaker	$1,100
John Hanna	Blacksmith	$1,000
Isaac Morrison	Blacksmith	$750
	1870	
Marshall and Company	Sheet Iron	$66,000
Deweese Chandler	Blacksmith	$2,500
Joseph Chambers	Blacksmith	$1,250
John G. Fisher	Blacksmith	$1,200
Philip Chandler	Wheelwright	$900
William Soward	Blacksmith	$700
	1880	
James Ward	Spokes and handles	$4,000
McCoy Yearsley	Blacksmith	$1,800
Joseph W. Chambers	Blacksmith	$1,600
James Polk	Blacksmith	$1,500
Thomas Ectors	Blacksmith	$1,400
George Chandler	Wheelwright	$1,300
Moore & Mitchell	Blacksmith	$900
Robert Banks	Wheelwright	$800
Willard Pierson	Blacksmith	$500

* Compiled from the U.S. Census of Manufacturers' 1850 - 1880

employed year round. With $2,500 invested in the business, Fisher was generating $1,200 worth of products. By 1880 Fisher had sold the business to Willard Pierson. Pierson invested less in the smithing and wheelwrighting business than his predecessors, and reduced the number of workers back to two men. Working nine hour days, Peirson's shop was open year-round, but probably followed a seasonal, agricultural work cycle; they worked four months full time, three months at three-quarters time, three months at two-thirds time, and two months at half-time.

The seasonal work cycle shown by Peirson's schedule was also illustrated by the sample of smithing accounts examined for this report. The records of Vining, Weir, and McCrea, and to a lesser extent those of Porter and Ferguson, showed that the repair of agricultural tools and machinery was most common in the spring and summer months, when these tools would be most heavily used. Mending and repair work began to taper off in the late fall, and by winter the records showed that blacksmiths probably had a lot of time on their hands and little to do, besides shoeing and sled repair.

Overall, it seems that rural New Castle County blacksmiths and wheelwrights performed substantially the same types of work throughout the eighteenth and nineteenth centuries. The dominant jobs that smiths undertook were related most often to transportation (shoeing and wheel repairs) followed by mending agricultural tools and machinery, and lastly by the creation and repair of broken household items, or the manufacture of unusual or unique hardware. By the middle of the nineteenth century, the availability of pre-manufactured iron and steel goods, like nails and horseshoes, removed much of the smiths' creative handiwork, but allowed more free time for other jobs.

The decline in range of tasks undertaken by blacksmiths mirrored a similar decline in the number of blacksmiths operating in Mill Creek Hundred. The U.S. Population censuses from 1850 to 1900 provide a clear illustration of the nature of smithing in a rural New Castle County hundred in the second half of the nineteenth century (Table 2). The largest number of blacksmiths working in the hundred was attained in 1860, and slowly declined to less than half that number forty years later. Throughout the half-century examined, the vast majority of smiths (whether master blacksmiths, apprentices, or simply smiths) were native born Delawareans, with Pennsylvanians and immigrants from England and Ireland constituting the next largest groups. Generally, few of the smiths were property holders and as the number of master smiths declined the number of property holders became

TABLE 2

Summary of Mill Creek Hundred Blacksmith Data from U.S. Censuses, 1850 -1900

Blacksmiths	1850	1860	1870	1880	1900
Total of blacksmiths:	20	27	21	19	13
Apprentices:		7	7	3	1
Blacksmiths:		13	14	16	12
Master blacksmiths:		7			
Age:					
Average age of apprentices:		18.7	18.1	18	20
Average age of blacksmiths:	29.4	29.4	30.3	34.2	43
Average age of master blacksmiths:		34.3			
Nativity:					
Delaware	13(65%)	16(59%)	13(62%)	11(58%)	8(61.5%)
Pennsylvania	3	4	3	6	4
Maryland	--	--	2	1	--
England	2	2	3	1	--
Ireland	2	2	1	--	1
Prussia			--	--	--
Owners of real estate	7(35%)	4(14.8%)	5(23.8%)	N/A	N/A
Average value	$2694	$4375	$2050		

even lower. The average ages of smiths remained relatively constant around twenty-nine or thirty between the 1850's and 1870's, but rose to thirty-four and then to forty-three by the 1900's. Apprentices were generally in their late teens or early twenties, or about ten years junior to the master smiths. By 1900, however, the age range had widened, and it appeared that fewer apprentices could be induced to undergo a lengthy apprenticeship in a dying rural craft.

The Mermaid shops were not large-scale operations, like the Alexander Wilson Agricultural Implements Works in Pencader Hundred, the shops in Christiana or New Castle, or even the Cavender shops just north up Limestone Road. They were instead shops that served a specific area and a specific custom; in this case, probably the guests and travelers at the Mermaid Hotel, and the teamsters hauling limestone from the nearby quarries. The need for shops of this nature was crucial to the daily lives of local farmers and households, and blacksmith shops served to provide a sense of community for an area's inhabitants (Harrington 1969; Lasansky 1980; Light 1984; Coleman et al. 1985; McBride 1987).