

Marching To War: The Production of Leather and Shoes in Revolutionary Pennsylvania

David L. Salay
Texas Technological University

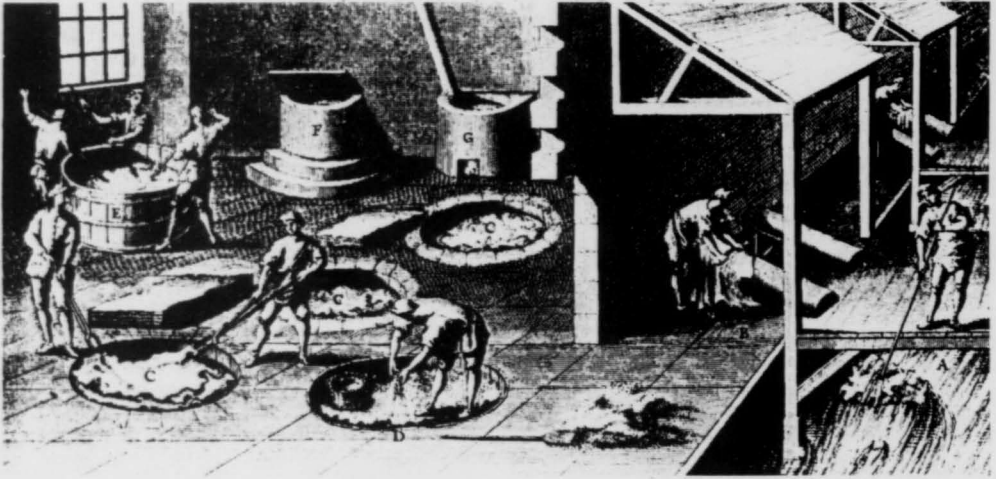
After dark we began our march and by daybreak we reached Darby Creek and a little after sunrise came to old Chester. . . . We moved on all this day, keeping near the British army. When they marched, we marched; when they stopped, we stopped.¹

Sergeant Enoch Anderson's laconic reminiscences certainly belie the pain and effort that was the lot of the common soldier during the American Revolution. An army may travel on its stomach, as the old saying goes, but the men who comprise the army actually moved on foot. During the war soldiers walked long distances to and from battle with only an occasional trip by batteau to relieve their feet. Because combat boots were unknown, the militia and Continental troops wore the same style of shoes as their civilian friends. These wore out quickly, and consequently, the tanner and shoemaker were in great demand.

Throughout the War for Independence, Americans waged a constant struggle to obtain needed supplies and war material. The troops who marched onto the battlefield required muskets, gunpowder, clothing, cannon, and leather for cartridge boxes, belts—and shoes. Although much was imported, American sources of raw material and finished product were not ignored. There were American shoemakers, tanners, founders, gunsmiths, and other craftsmen who could produce for the army as well as the civilian population.

But the organization and leadership necessary to utilize colonial resources were lacking at the outset of the war. The administrative problems which the colonists now faced had troubled the British in previous wars.² This was complicated by American attitudes toward a national government and their concerns for local and colonial interests.³ Americans were more concerned with their own colony than they were with those next to them, or with any Continental organization. Their parochial attitude, coupled with a jealousy of neighboring colonies, hampered military preparations and coordination. Thus, when the conflict began, there was no organization or supply depot on which the Americans could draw.

Illustration, originally from Jerome Le Francis de LaLande, "Art du tanneur," courtesy of Peter C. Welsh, *Tanning in the United States to 1850: A Brief History* (Smithsonian Institution Press)



Lalande's engraving of a French tanyard includes all the elements found in American tanyards.

Scholars have emphasized the role of the French in supplying Revolutionary America's wartime needs.⁴ Recent work has been critical of the failures of Americans quickly to adopt a viable organization or administer production and supply war material. It has been even more critical of American attempts to produce military supplies.⁵ What is ignored is the political philosophy of the day, colonial and British governmental structure, and the technologies available. When those factors are considered, American efforts were remarkable.

Pennsylvania's role in providing shoes to the army illustrates both the administrative and technological problems Americans faced in supplying their troops, and typifies similar efforts in other states. As with other war material, Americans first had to produce the raw material (leather) and then distribute it to craftsmen. They then had to oversee production and have the product (shoes) distributed where needed. The production of leather first required an organization to collect the hides and distribute them to the tanners; it then had to cope with a tanning process that could take two to three years to convert raw hides into leather. The production of shoes also required an organization to get the leather to the shoemakers, oversee the shoemakers' work, and then distribute the finished

shoes to the soldiers. To accomplish these tasks, the Pennsylvania government and the Continental Congress first contracted to buy leather and shoes from individual tanners and shoemakers. When this approach did not meet their needs they appointed commissaries to collect hides and purchase shoes. The process was neither smooth nor entirely successful. Local, state and Congressional efforts often conflicted and competed. It took several years of effort before the American officials established a workable system. Even then, the results were not all that had been hoped for; but at least by the end of the war the troops were no longer barefoot.

The Background

There was good reason to hope that the colonies could supply shoes and other leather goods to the army, since a viable leather and shoe industry existed before the Revolution. Using native hides and skins and those imported from Latin America, the colonial leather industry grew rapidly.⁶ This growth was particularly noticeable in seaport towns, focal points for the importation and exportation of hides and skins and centers of the tanning business. In the early eighteenth century, Philadelphia and neighboring communities supplied the bulk of the shoes and leather used in Pennsylvania's interior towns. In 1773, Germantown had 17 cordwainers, 8 saddlemakers, 2 harness makers, and 10 tanners.⁷ But by the Revolution, tanners and shoemakers had accompanied the development of the frontier and a number of interior towns had tanyards of their own and the shoemakers to convert leather to footwear. Lancaster, for example, with its 500 houses and 2000 inhabitants, was an active leather manufacturing center with four tanyards and 36 shoemakers.⁸ It was tanyards and shops such as these which produced the shoes in which Americans first marched to war. At the outset, the militia provided their own footwear—the shoes they were wearing when their captains called them out.

As the soldiers' shoes wore out, the Council of Safety of Pennsylvania and the Continental Congress had to find replacements. One approach was purchases from local shoemakers. In 1775 and 1776 the Council's records include references to monies paid individual shoemakers for anywhere from two to 235 pairs of shoes.⁹ While these shoes were purchased for the Pennsylvania militia, the Continental Army, too, had men in need of shoes. In 1775, in addition to the troops before Boston, Congress had an army in Canada and another in Virginia, all in need of good strong shoes. At first their method of procuring shoes was haphazard. Special, short-term committees purchased shoes and clothing for a particular

army with little thought of the needs of other departments. Alternately, Congress selected an individual to supply the immediate needs of a commander and his men.¹⁰

The lack of organization and coordination of supplies proved disastrous. While General Philip Schuyler's men marched off to Canada in August 1775 with new shoes and clothing, the additional supplies promised by Congress were not forthcoming. Washington's troops outside of Boston were equally ill-supplied. Because of these needs and their own lack of organization, Congress's only recourse was the colonial governments. In November 1776, with winter coming on, Congress asked the four New England governments to supply the Continental army with 10,000 pairs of shoes and stockings.¹¹ As usual, Congress's request was too late, the colonial response was slow, and the army suffered. A month later, when Washington struck his successful blows at Trenton and Princeton, a sergeant reported that his men "were without shoes or comfortable clothing; and as traces of our march toward Princeton, the ground was literally marked with the blood of our soldiers' feet."¹²

These cases raised questions about the government's ability to draw on local manufacturers or, in some cases, the amount of local production. While Washington's men suffered from a want of shoes, nearby Lynn, Massachusetts was known as a major shoe producing center. Lynn was reported to have produced 80,000 pairs of shoes in 1767 and production there reportedly increased to 400,000 pairs by 1783.¹³ When Washington's army camped near Philadelphia before the battle of Trenton, he had that city and nearby communities on which to draw. But Stephanie Wolf, in her study of Germantown, found no record of government contracts for goods or services from Germantown.¹⁴ Perhaps part of the answer lies in Hessian Captain Johann Heinrich's observation that the Americans "have neither shoes nor stockings; for the shoemaker is either a soldier, or he is a Loyalist, in the former case he is unwilling to work, and in the latter, he cannot because he has been robbed and plundered."¹⁵

Despite Heinrich's comments, shoemakers were able and willing to work if they could get leather. Just as with gunpowder, iron, or cloth production, the success or failure of American efforts to produce shoes often depended on a steady supply of raw materials. Supplying leather to these shoemakers involved two steps: first collecting the raw hides and then having them tanned into leather.

Organizing the Collection of Leather

Congress turned to every known source of raw or green hides. One readily available supply, and the one Congress first attempted to organize, was the hides of slaughtered army beef. In November 1776, about the same time Congress requested a supply of shoes from New England, it passed a resolve

that the commissaries in each department be directed to employ proper persons to take charge of the hides and tallow in their respective districts; that the former be tanned into leather, or at least cured to prevent their being spoiled.¹⁶

This resolution was a step in the right direction but it provided neither the staff nor the authority needed to realize a systematic collection. As the Council of Safety of Pennsylvania pointed out, there was nothing to prevent the commissaries of issues from buying meat from the butcher rather than on the hoof, thus both raising the price of meat as well losing the skin.¹⁷ In addition, without specific instructions and assistants to see them enforced, there was nothing to prevent the butchers from damaging the hides during removal. And, finally, the resolve failed to provide a method of cooperation between the Pennsylvania government and the Continental effort, or a way to eliminate their competing for the same hides, leather, or shoes.

As a solution, at least to the last problem, the Council of Safety suggested a means by which Pennsylvania and Congress could cooperate.¹⁸ Since Congress had to contract with local tanners to produce leather, the Council suggested that the commissaries furnish hides only to tanners who were Associators—those who had sworn allegiance to the new government. This would insure that the tanned hides reached the American army and also eliminate problems caused by unpatriotic tanners who refused to receive Continental bills of credit.¹⁹ Another way to insure cooperation was to supply the commissaries with both a Continental and a Pennsylvania commission. This was done with John Hubley, who was simultaneously a Commissary of Continental Stores and Commissary of Stores for Pennsylvania.²⁰ Unfortunately, these suggestions did not supply the immediate need for shoes and leather or provide the organization necessary to assure a smooth and steady flow of hides.

While the army marched along on frozen feet, Congress dallied. It took that body six months, until June 7, 1777, to form yet another committee "to devise ways and means of supply the army with shoes, hats and shirts."²¹ Once formed, however, this committee acted quickly. Within a week it submitted a proposal to Congress recommending agents be appointed to collect the hides from

government beef and forward them to the Commissary General of Issues. The Commissary would then distribute the hides to tanners to work up on behalf of Congress. Congress promptly agreed.²²

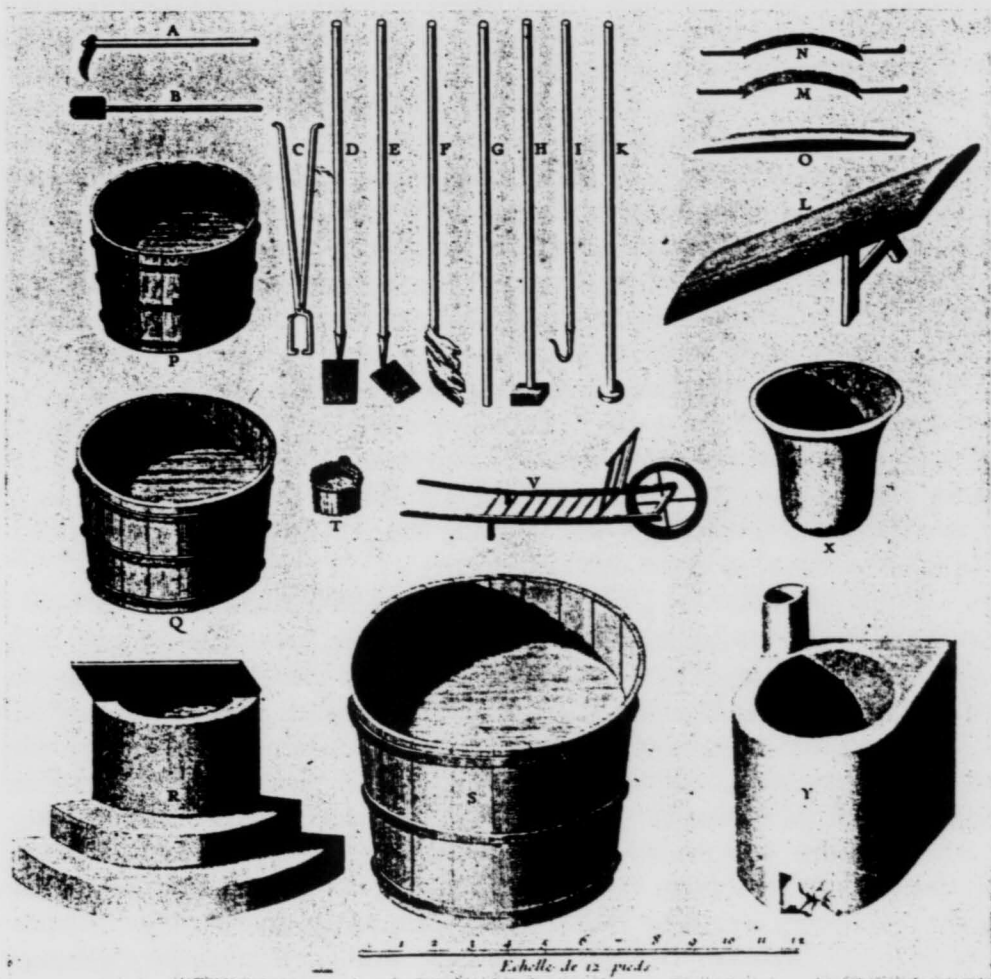
A plan to expand this system followed shortly thereafter. On June 20, Congress voted to appoint a separate commissary of hides to collect all the raw hides belonging to the United States and exchange them for tanned leather or for shoes.²³ If exchanges could not be made on reasonable terms (which some members thought likely) the commissary of hides was authorized to construct tanyards and employ government tanners. Unfortunately, these efforts were for naught. When the man selected for the post of commissary of hides refused the position, Congress did not immediately select a replacement and things went on as before.²⁴

If Congress did not understand that the government had to take a more active role in collecting hides and producing shoes it was not because Washington did not point it out. He reminded Congress that, "Leather is of such Essential use and so indispensably necessary for shoes and other purposes in the Army, that too much care, nor too effectual means cannot be taken to procure it."²⁵ Washington did more than complain; he also made two proposals. First, he recommended the establishment of several public tanneries in each of three or four states. To these he would send the hides of all government cattle. Second, he recommended that deputies accompany the army and collect all the hides and deliver them to the tanners. Washington's concerns, expressed on August 16, 1777, did not cause Congress its usual uneasiness. Two weeks earlier Congress finally appointed a commissary general of hides, George Ewing, "with full power to carry into execution the several matters mentioned in the General's letter relative to hides and Tanneries."²⁶

There were reasons for this Congressional action. In the late summer and fall of 1777, Howe's British army was on the move in Pennsylvania and Burgoyne's forces were advancing through New York. Although the Americans were victorious in the North, they were not in Pennsylvania. After the defeat at the Battle of the Brandywine, Congress had to flee Philadelphia and retreat inland to York. The British capture of Philadelphia resulted in both a loss of the city and the disruption of the facilities for producing war material and the organization to distribute it.

The American army was hard pressed in 1777, and Congress and the Pennsylvania government had to find a way to supply the men with the necessities to keep on fighting. This required a more efficient system and the men to run it. Congress undertook a number of organizational changes including a revitalization of the

Illustration, originally from Jerome LeFrancis de LaLande, "Art du tanneur," courtesy of Peter C. Welsh, *Tanning in the United States to 1850: A Brief History* (Smithsonian Institution Press)



Tannery tools, beams and vats.

Board of War.²⁷ As a result, on October 14 the Board of War appointed William Henry to purchase shoes and leather in Pennsylvania.²⁸ Henry (1729-1786) became a principal factor in Pennsylvania's effort to produce leather and shoes for the American forces.²⁹ The day before, the Pennsylvania General Assembly, meeting in exile at Lancaster, also had appointed Henry as a member of the special Council of Safety

empowered to deal with the British invasion; now he was acting for both the state and the Continent.

Henry's role in the leather and shoe trade seems odd at first. He was a well known Lancaster gunsmith and inventor—not a tanner or shoemaker. But the success of his business ventures made him wealthy and his interest in civic affairs made him well respected in Pennsylvania. Henry had served as justice of the peace, assistant burgess of Lancaster, and as a delegate to the State Assembly of 1776 and the Council of Safety of 1777. In 1777, he also was elected treasurer of Lancaster County, a position he held until his death. After the war, Henry was elected to the Continental Congress. William Henry's business and financial knowledge, his personal integrity, and his service to his state made him a natural choice to serve as a commissary and disbursing officer.

Both William Henry and George Irving, the new commissary general of hides, were to deliver the hides and shoes they gathered to Clothier-General James Mease. Mease was then responsible for distributing the shoes throughout the army. Although the system was to "prevent complexity," the British occupation of Philadelphia and conflicting orders from the Board of War to Ewing and Henry made this a period of chaos and confusion.³⁰

During the winter of 1777-1778, the effort to systematize the collection of hides and leather was temporarily shelved and the army had to fend for itself. Each brigade appointed an officer to exchange government hides for shoes.³¹ This was a temporary measure, however, and by March it had broken down completely. On the fifteenth, Washington ordered the commissaries of issues of each brigade to deliver all their leather to the commissary of hides.³² After three years of effort Congress still did not have a system for collecting hides. An organizational framework had slowly evolved, but it was ill-defined and responsibility and authority were not clearly delineated. This system continued in effect throughout 1778, but by then dissatisfaction with Ewing's performance was evident.³³

In July 1779, the Board of War decided once again to redefine the regulations concerning the hide department. Because of the continued scarcity of shoes and the chaos surrounding the collection of leather, the Board recommended (and Congress agreed) to dismiss Ewing, eliminate the single position of commissary general of hides, and set up a regional system with a commissary of hides for each state or group of states.³⁴ Under this plan William Henry was appointed the sole Commissary of Hides for Pennsylvania, Delaware, and Maryland with "no Continental agents to interfere with you in your district."³⁵

Although the Board of War supplied instructions to the commissaries, two additional agencies supervised the commissaries; activities. To add some cooperation (and a little confusion), the executive of each state superintended the commissary's conduct within his province. If necessary, the state could suspend the agent and inform Congress or the Board of its reasons.

Continental supervision of the commissaries of hides was still through the Clothier-General. He was to receive quarterly returns of the number of hides and the pounds of leather collected by the commissaries. The commissaries also were to deliver all the shoes they gathered to the Clothier-General, who was to distribute them equally throughout the army. The Clothier-General, in turn, was to supply the commissaries with the funds needed for their departments.³⁶ As Washington summarized the new system:

The Commissary of Hides is directed by Regulations of his department to exchange Hides for Shoes whenever he can find an opportunity, but the shoes so obtained are to be returned to the Clothier-General, to be by him regularly distributed to the whole army in proportion to their wants.³⁷

This Continental system of regional commissaries was used throughout the remainder of the war.

The Importation of Hides

The collection of government hides was one source of raw material, the importation of hides from other states was another. Two major American exporters of skins and hides were the Carolinas, and Philadelphia was a frequent market for their wares. In November 1777, Congress, too, became aware of the hides available from North Carolina and ordered the Board of War to purchase hides there and have them made into shoes.³⁸ Rather than wait on random supplies, Congress asked Governor Caswell of North Carolina to appoint people to "secretly purchase and dispatch any leather or deer skins in that state suitable for shoes, breeches, saddles, harness, and military accoutrements."³⁹ Caswell was to retain as much as could be made up in Carolina in the next four months, but the rest was to be sent to the Clothier-General in Lancaster. The Board continued to receive leather from Carolina in 1778 and in October 1779, in anticipation that "there will be a scant supply of leather for immediate purposes in this quarter," placed an order for 100,000 pounds more.⁴⁰

The need for leather in Pennsylvania and its availability in nearby states prompted Washington to make suggestions on other sources of hides. As the Board of War's directive was then stated, a Commissary of Hides could purchase leather and shoes only in his district. Although Washington agreed with the reason

for this order (to prevent conflict and confusion) he wondered if it would “not answer a good purpose, if the Commy, of the State or district, in which the main Army may happen to lie, and in which of course there is the principal slaughter of Cattle, was directed to correspond constantly with the Commissaries in the States or districts nearest to him, and to supply them with Hides when *he* has more than he can dispose of by way of exchange or otherwise, that *they* may endeavor to barter them within their limits.”⁴¹

The Board of War accepted Washington’s suggestion and a few weeks later Secretary of War Benjamin Lincoln notified Henry that Major Hatfield, commissary of hides in New York, where the army was then camped, had 100,000 hides on hand but could not use them all. Two thousand hides were being sent immediately to Philadelphia and Hatfield would send more.⁴² In addition to Pennsylvania, Maryland and Delaware, Henry could also draw on hides from New York.⁴³

Tanning the Hides

The collection of hides was only the first step in the production of shoes. The hides then had to be delivered to a tannery and converted into leather. The process American tanners employed during the Revolution was the same used by tanners throughout the world. In fact, tanyards and tanning had changed little for centuries and, despite recommendations for innovation in the use of chemicals and machinery, they remained little improved for another 100 years.⁴⁴

In brief, the manufacture of leather was as follows.⁴⁵ After the butcher stripped the skin from the carcass, it was dried and salted to preserve it until arrival at the tanyard. Once there, the tanner cut off the horns, ears, and tail, and washed the hide in running water for a day to remove the dirt, blood, fat, and loose flesh. After cleaning, the hair was removed. This involved alternately submerging the hide in a lime vat and then drying it for an equal period.⁴⁶ A month or more of soakings opened the pores and loosened the hair. The tanner could then begin the beaming and fleshing process. Working on a sloping bench, the beam, the tanner used a curved fleshing knife to remove hair and tissue and pare down some of the thickest parts of the hide to give a more uniform size. The hide was clean but still not ready to be made into a finished product.

After dehairing, the leather was soaked in a bate—a mixture of salt, water, and hen dung or dog manure—to counteract the adverse action of lime on leather. This process shrank the hide which had swelled during liming, restored the pliability of the leather, and opened the pores. A final rinsing preceded the actual tanning process.

The purpose of tanning is to preserve the leather from rotting and to make it impervious to water. To accomplish this, the leather had to be infused with a strong astringent, tannin, commonly made from hemlock bark in New York and New England and from oak in the middle colonies. Tanning required a large supply of bark: each hide required twice its weight in bark plus twelve gallons of water during the process.⁴⁷ Thus, the location of tanyards depended on not only a supply of raw hides but also on the availability of bark to produce the tannin required for the tanning process. This was one reason why tanyards were found at frontier posts such as Sunbury, Shippensburg, and Carlisle, as well as in Germantown and Philadelphia.⁴⁸ Tanners prepared their bark by drying it in an oven or kiln and then grinding it into a coarse powder.

To tan the hides, the tanner first placed alternate layers of prepared bark and hides in a pit, filled the tanpit with water, and sprinkled a heading of dry bark on top. The bark and water formed an ooze which slowly penetrated the hides. At regular intervals the tanner shifted the position of the hides with a long pole, a handler, because the strongest tanning action took place at the bottom of the vat. And as the tanning proceeded the tanner transferred the hides to other vats or tanpits with progressively stronger tannin solutions. Depending on the quality of the hides, the temperature and the strength of the tannin solutions, it took from twelve to eighteen months before the ooze completely penetrated the hides. When suitably tanned, a state the tanner determined by cutting out a bit of the thickest part of the hide, the hides were thoroughly dried in special lofts built for the purpose. The thick sole leather was ready for the shoemaker.

Leather for the upper part of the shoes and that for harness required additional work.⁴⁹ This process, currying, involved shaving the inner side of the hide to get a uniform thickness, an initial rubbing with an iron sleeker to smooth the leather, and then rubbing the leather with a mixture of tallow and tanner's oil to make it more pliable. Another rubbing with a board on the hair side of the leather and a knife on the flesh side, followed by a final glossing with a glass sleeker completed the process. Harness, and sometimes upper shoe leather, was blackened on the hair or grain side.

The major technological problem with tanning was obviously the amount of time required. From start to finish the preparation of leather could require two to three years. Before post-Revolutionary improvements were introduced there was no way to shorten the process and any shortcuts resulted in a clearly inferior product.⁵⁰ If the skins were not limed or exposed to tannin for a sufficient period

Illustration, originally printed in *The Book of Trades* (Philadelphia, 1807), courtesy of Peter C. Welsh, *Tanning in the United States to 1850: A Brief History* (Smithsonian Institution Press)



Working the beam.

of time, the middle of the leather was not tanned, causing the soles of shoes and boots to stretch and absorb water. If the leather was incorrectly limed and washed, it impeded the action of the tannin and resulted in insufficiently tanned leather. While this was a problem for the army, it benefited the tanners. As Dr. David McBride pointed out in 1777, "It is the tediousness of the process which enhances the value of the leather."⁵¹

As the war progressed and the demand for leather increased, limiting the liming or the tanning times were the only shortcuts the tanners could use, and the results were predictable. Levy Andrew Levy, Assistant Commissary of Hides and director of the Lancaster shoe factory, summed up many of the complaints when he wrote one supplier:

All the leather from your post is so badly handled that it cannot be worked up for any use. That sent up for sole leather isn't useful for shoes not even harness leather. The uppers are so thick and bad and not well blackened and tanned that the shoemakers cannot work it up.⁵²

Shortening the tanning process could increase production; it could not produce an acceptable product. The only way to insure high quality and a large output was to increase the number of tanpits. But this was another problem. American tanyards were generally small in size and had rudimentary equipment.⁵³ Although Washington recommended the construction of public tanyards, this suggestion was largely ignored and private contractors continued to do the tanning.⁵⁴

Shoemaking

After the hides were tanned, the leather could be turned over to the shoemakers to be converted into footwear. The tools and processes necessary to make a shoe, like tanning, had remained unchanged for centuries. In general, the production of a shoe involved two parts, required four steps, and eight tools.⁵⁵

Shoes have two basic components: an upper, generally made from thinner leather and often blackened on one side, and a sole made from thicker, "butt leather." To combine these into a shoe took four steps: cutting, fitting, lasting, and bottoming. Cutting began with measuring the customer's foot if the shoes were made to order: they noted the length of the foot or traced the outline of the foot on paper and cut the leather to these specifications. Other shoemakers produced shoes to standard sizes. Those sent to the army were obviously made that way. However done, once the measurements were completed the shoemaker used a sharp knife to cut the leather to conform to the pattern selected. If it was needed, a lapstone and hammer were used to pound and soften the leather.

After the sections of the upper were cut out, an awl was used to bore holes where the parts were to be fitted together. A needle and thread were then used to join the parts. When this was completed the upper was slipped over a last, or wooden form. An insole was tacked to the last and the edges of the upper were pulled over the wooden form and nailed into place. The last was held in place by a strap or stirrup held between the shoemaker's knees. In the final step, or bottoming, the shoemaker either sewed the outer sole to the shoe or pegged it together with wooden pegs. The shoe or boot was then ready for use.

The Pennsylvania government purchased shoes from civilian shoemakers from the start, and they continued to buy shoes for their militia forces throughout the war. Likewise, Congress's organization of the hide department involved the commissaries in procuring shoes as well as leather from individual shoemakers. These ad hoc methods proved ineffective and during the winter of 1777-1778, the collection of shoes, as with hides, was temporarily turned over to the army. By January 1778 this plan failed, forcing Washington to offer "a reward of ten dollars to any person, who should by one o'clock on Monday morning produce the best substitute for shoes made of raw hides."⁵⁶ Shortly thereafter, the procurement of shoes was returned to the hide department. Just as the regional organization of Continental Commissaries of Hides was necessary to insure a steady flow of leather, a more systematic approach was needed for the production of shoes.

One solution was the establishment of public shoe factories. In the eighteenth century, factories were places where raw materials were distributed to individual craftsmen to manufacture in their own homes or shops, and were the collection sites for the finished products. There also were factories where craftsmen gathered and the product was produced on site. The shoe factories established during the Revolution were both—they were distribution points and centers of production. These Revolutionary factory buildings were any structure large enough to hold the workers and the supplies of leather. As the need arose, academies, prisons, or army barracks served as public shoe factories.

In late 1777, William Henry seems to have established the first government shoe factory in Lancaster.⁵⁷ With his connection with the Pennsylvania government and his later appointment as Commissary of Hides and sole agent for Pennsylvania, Maryland and Delaware, his was a natural choice. Henry drew on a wide area for raw materials and regulated the flow of hides to the factories or local shoemakers in his area. He also supplied tools and materials, paid the workers, and collected the finished shoes. Some specialization was evident as a number of

men were paid for just cutting out shoes while others were paid for doing the sewing.

As with tanning, output could only be increased by increasing the number of workers. In October 1777, Congress established another shoe factory in Easton under the direction of one Duncan Oliphant.⁵⁸ But this factory lasted less than a year. To bring the work closer to a supply of leather, it was moved to Allentown.⁵⁹ Both the Lancaster and Allentown factories served as distribution and collection centers for materials supplied to and collected from local tanners and shoemakers. Both also served as manufacturers. The Allentown factory provided good service until 1780 when, for some reason, Oliphant's performance began to decline.⁶⁰ Although he was discharged in November, the Allentown factory continued in operation.

A third shoe manufactory, in Philadelphia, was housed in two state buildings—the barracks and the state prison.⁶¹ Over 37 shoemakers (including four women) worked in these buildings. Others received their leather at the factory and worked it up in their own shops. Some of these master shoemakers had three or four men working for them so that the Philadelphia work force was actually larger than the listed 72 man force.

The shoemakers employed on contract or in the public shoe factories came from a variety of backgrounds. Many of the shoemakers who contracted with the state or Congress were craftsmen whose shops were located near army camps and supply depots or in large cities occupied by the Americans. Because of the nature of the tanning business, some worked both as tanners and shoemakers. When not required in the tanyard, they made boots and shoes.⁶²

Some shoemakers agreed to make shoes for the army in exchange for an exemption from military duty.⁶³ Although paid for their service, the shoemakers were required to sell the shoes they made during the period of their exemption (usually 48 pair) to the army. As the war progressed, shoemakers, like other craftsmen, found it more and more difficult to obtain exemptions from military service. To provide the needed workers, shoemakers were obtained for the shoe factories from the hospital.⁶⁴ Convalescing soldier-shoemakers were sent to the factories, with the threat that if they did not perform properly they would have to return to the front.⁶⁵ Still another source of labor was the shoemakers among the Hessian prisoners captured at Trenton and the captured British shoemakers from Burgoyne's army.⁶⁶ Henry employed Hessians at his factory in Lancaster, and British and Hessian prisoners composed most of the workforce at the Allentown factory.

The workforce was diverse and the prices paid the workmen also varied. Standardization was unknown in the American army and this was true for both the method and price paid and the size and quality of the goods received. In some cases, shoemakers agreed to trade leather for shoes. In 1779, the exchange rate was 30 pounds of green hides for each pair of shoes; leather was exchanged at the rate of five pounds of raw hides for each pound of sole leather and eight pounds of green hides for each pound of upper leather.⁶⁷ Cash payments depended on the best deal the army contractor (or the shoemaker) could negotiate. In 1776, shoes cost anywhere from 13 shillings to 21 shillings 6 pence.⁶⁸ This arrangement had mixed benefits. In some cases the army agents could vary the price paid according to the quality of the goods received. At the same time, as Washington complained, there was no control over the "exorbitant price extracted by the merchants and venders of every Necessary they dispose of."⁶⁹ As the war progressed and inflation increased, the price of a pair of shoes rose to 30 shillings in 1777 and between 75 or 90 shillings in 1780.⁷⁰

Later, set prices were established and the factory workers and shoemakers were paid on a standard per piece basis. This system, too, was not without problems. One worry was that shoemakers would pass off shoes that were "pinched in every part and very unfaithfully put together."⁷¹ William Henry, for one, did not like the idea of one set price and he continued to inspect the shoes delivered on contract or made in the factory and paid according to quality.⁷²

Government transactions do not mention shoe sizes and it is uncertain how the necessary variety was obtained. It was not feasible to measure each soldier's feet and make the shoes individually. The army had to take a chance, often with disappointing results. A number of the contract shoes were "too small and of little use."⁷³ To deal with this problem, Quartermaster General Timothy Pickering offered two suggestions to the Board of War: either buy the leather and cut the shoes before they were delivered to the shoemakers or get a number of pattern shoes of the necessary sizes and deliver them to every contractor.⁷⁴ Pickering argued against the first method because he felt the shoemakers could exchange good public leather for inferior leather of their own and because they could get away with doing their work badly. Pickering favored having shoes made to patterns. If the shoes were made poorly, he argued, the public could refuse them; fear of rejection would induce the contractors to make good shoes.

The appropriate shoe sizes were one problem, the quality of the shoes was another. The only criticism made more often was that there was an insufficient supply of shoes. In early 1779, when shoes were in short supply, Washington wrote

the Clothier-General that some regiments had condemned twelve hogsheads of shoes—all that they had received.⁷⁵ The complaints continued the following year. Although the troops at Morristown now had a sufficient supply of shoes they were considered “such miserable truck” that the men refused them.⁷⁶ It is important to remember that these complaints were aimed at foreign imports as well as American-made shoes.⁷⁷

As in any war and in any business there were men willing to take advantage of the situation and workers who were unskilled in their trade. The army complained bitterly of the poor product some craftsmen sent. But there were other tanners and shoemakers who did produce a decent product and there were Commissaries, such as William Henry, who were diligent in the discharge of their duty. From these an increasing supply of shoes reached the army. The question then becomes how much was supplied by American tanners and shoemakers.

Conclusions

Available statistics on leather and shoe production in Pennsylvania during the Revolution are scattered and incomplete and thus can only be suggestive. A list of tanneries which supplied leather to American forces is not available and production figures from individual tanneries are almost non-existent. Where records do exist they indicate a disparity of output for different tanyards. The output of tanner Charles McClure and tanner Michael Musser is illustrative.⁷⁸ Existing records seem to indicate that McClure delivered only 204 pounds of leather to the commissary of hides during the period 1779-1780. Musser, on the other hand, turned out 335 pounds of upper leather in March 1779 alone, and over 3300 pounds of leather between March 1779 and August 1781.

The records of the commissaries of hides are more enlightening. The returns of hides, tallow, leather, and shoes of Assistant Commissary of Hides Daniel Rees' for the period September 1779 to May 1780 show a steady production and regular deliveries.⁷⁹ In December 1779 Rees collected 2090 pounds of leather and 12,000 pounds in January 1780; in May 1780 he collected 7821 pounds of leather. The regularity of the collection and production of leather was probably as important as the overall output.⁸⁰

William Henry's records are even more enlightening.⁸¹ From September 1777 to September 1779, Henry's hide department collected over 57,000 pounds of hides and leather.⁸² One tanner alone supplied him with over 18,000 pounds of leather from 1777 on. During these two years Henry distributed 15,727 pairs of

shoes and 700 pairs of boots at Lancaster.⁸³ In May 1779, Henry had 3000 pairs of shoes on hand ready for distribution.⁸⁴ Part of the success came from the factory system. The Allentown shoe factory promised 1000 pairs of shoes a month if leather was available.⁸⁵ And during this same period, Philadelphia employed over 72 cordwainers who produced shoes. The factory system worked in other colonies as well. In New York, Commissary Hatfield reported that he had 10,000 hides on hand in November 1779, could furnish 1500 pairs of shoes per month, and would send 2000 pairs to Henry immediately.⁸⁶

The amount of funds Henry expended is another indication of the magnitude of his operations. Beginning with a \$10,000 grant Congress made to the state in October 1777, he was supplied with money at irregular intervals throughout the remainder of the war.⁸⁷ Henry expended over £50,000 for leather and shoes and boots in 1779 alone.⁸⁸ In 1780, Henry wrote Pennsylvania President Reed that the state owed him between £60,000 and £70,000 which he had paid on behalf of the hide department.⁸⁹ Even with the inflation prevalent during this period, these are significant sums.

What the figures do not show, of course, is to how adequately the leather and shoe department supplied the army's needs. What they do show is that an organization was in place and that it worked. After 1777, the army had every reason to expect to be supplied. While the time required to tan the leather and to handcraft each pair of shoes could not be hastened, the collection and distribution system for leather and shoes was organized and they had shoemakers to produce footwear. In 1779 and 1780 when complaints were raised, they were not about the lack of shoes. In June 1780, the Clothier-General could report that he had over 24,000 pairs of shoes in stock.⁹⁰ There were a sufficient number now so that those rejected could be sent back for shoes of a proper quality. The leather and shoe department was functioning—finally—and the army no longer had to take just what was available. The tanners, shoemakers and factories in Pennsylvania could supply a significant part of the army's need. The remainder came from New York, New Jersey, New England, and from foreign imports.

Notes

1. Henry Steele Commager and Richard B. Morris, eds., *The Spirit of 'Seventy-Six* (New York, 1967), p. 620.
2. For an overview, see Lawrence Henry Gipson, *The British Empire Before the American Revolution* (15 vols. New York, 1936-70) and Douglas E. Leach, *Arms for Empire: A Military History of the British Colonies in North America* (New York, 1973). On British supply problems, see Arthur Bowler, *Logistics and the Failure of the British Army in America, 1775-1783* (Princeton, 1975) and Norman Baker, *Government and Contractors: The British Treasury and War Supplies, 1775-1783*, (London, 1971).
3. Jack P. Greene, ed., *The Reinterpretation of the American Revolution, 1763-1783* (New York, 1968), pp. 2-75, provides a synopsis of the historiography. See also, Robert L. Brunhouse, *The Counter-Revolution in Pennsylvania, 1776-1790* (Philadelphia, 1978); Richard A. Ryerson, *The Revolution is Now Begun: The Radical Committees of Philadelphia, 1765-1776* (Philadelphia, 1978); Wayne L. Bockelman, "Local Government in Colonial Pennsylvania," in Bruce C. Daniels, ed., *Town and County: Essays on the Structure of Local Government in the American Colonies* (Middletown, Conn., 1978), pp. 216-37; Gordon S. Wood, "Conspiracy and the Paranoid Style: Casuality and Deceit in the Eighteenth Century," *William and Mary Quarterly*, 3rd Ser., 39 (1982), pp. 401-41; and E. Wayne Carp, *To Starve an Army at Pleasure: Continental Army Administration and American Political Culture, 1775-1783* (Chapel Hill, 1984).
4. Thomas Balch, *The French in America* (Philadelphia, 1891); Claude Van Tyne, "French Aid Before the Alliance of 1778," *American Historical Review*, 31 (1925), pp. 20-40; also, William C. Stinchcombe, *The American Revolution and the French Alliance* (Syracuse, 1969); Don Higginbotham, *The War of American Independence* (New York, 1971).
5. See, Carp, *To Starve the Army*, and Neil Young, "Technology in Revolutionary America, 1760-1790" (Ph.D. Thesis, University of California, Santa Barbara, 1978).
6. J. Leander Bishop, *A History of American Manufacturers, From 1608 to 1860* (Philadelphia, 1864), 1, p. 445.; Lucius F. Ellsworth, *The American Leather Industry* (Chicago, 1969), pp. 4-11; Harry B. Weiss and Grace M. Weiss, *Early Tanning and Currying in New Jersey* (Trenton, 1959).
7. Stephanie G. Wolf, *Urban Village: Population, Community, and Family Structure in Germantown, Pennsylvania, 1683-1800* (Princeton, 1976), pp. 106-07.
8. Rolla M. Tryon, *Household Manufactures in the United States, 1640-1860: A Study in Industrial History* (Chicago, 1917), p. 262.
9. Samuel Hazard, ed., *Pennsylvania Colonial Records* (Harrisburg, 1853, 11, pp. 32ff. As late as July 1780 the Supreme Executive Council of Pennsylvania ordered James Searle to Europe to purchase clothing and shoes and boots. (*Pa. Col. Recs.*, 12, p. 416.)
10. Worthington C. Ford, et al, eds., *Journal of the Continental Congress, 1774-1784* (Washington, D.C., 4, pp. 159, 296; 5, p. 637; 6, pp. 973-74.
11. *Ibid.*, 6, p. 984.
12. Sergeant _____, "The Battle of Princeton," *Pennsylvania Magazine of History and Biography*, 20 (1896), p. 515.
13. Paul G. Faler, *Mechanics and Manufactures in the Early Industrial Revolution: Lynn, Massachusetts, 1780-1860* (Albany, N.Y., 1981), pp. 9-12. Faler attributes this growth to the encouragement of home manufactures and cutting off of imports prior to the war.
14. Wolf, *Urban Village*, p. 179.
15. "Extracts from the Letter-book of Captain Johann Heinrichs of the Hessian Jäger Corps, 1778-1780," *Pennsylvania Magazine of History and Biography*, 20 (1896), p. 139.
16. *Journals of the Continental Congress*, 6, p. 973. Little is said about the procurement of the tree bark for tannin.
17. Samuel Hazard, ed., *Pennsylvania Archives*

(Philadelphia, 1852-60) Ser. 1, 5, p. 684.

18. *Pa. Col. Recs.*, 11, p. 58.

19. *Ibid.*, 10, p. 774.

20. *Ibid.*, 11, p. 86.

21. *Journals of the Continental Congress*, 8, p. 414.

22. *Ibid.*, p. 447.

23. *Ibid.*, pp. 487-89.

24. John C. Fitzpatrick, ed., *The Writings of George Washington* (Washington, D.C., 193), 9, p. 73.

25. *Ibid.*, pp. 72-73. Washington also recommended collecting existing supplies. After hearing of 3400 pairs of shoes in Philadelphia and some in Lancaster, he asked Congress to procure them (*Ibid.*, pp. 250, 259-60) and Congress acted. (Jared Sparks, ed., *Correspondence of the American Revolution being Letters of Eminent Men to George Washington* [Boston, 1853], 1, p. 436.)

26. *Journals of the Continental Congress*, 8, p. 656.

27. Carp, *To Starve the Army*, pp. 29-36.

28. *Ibid.*, 8, p. 607; 9, p. 803; for the sums of money issued Henry, see *ibid.*, pp. 937, 963; 12, p. 892; 14, pp. 735, 983.

29. *Pa. Arch.*, Ser. 4, 3, pp. 612-13; *Dictionary of American Biography* (New York, 1928-37), 7, pp. 560-61; Francis Jordan, Jr., *The Life of William Henry of Lancaster, Pennsylvania, 1729-1786* (Lancaster, Pa., 1910).

30. *Pa. Arch.*, Ser. 1, 5, p. 683.

31. [George Weedon], *Valley Forge Orderly Book of General George Weedon . . . in the Campaign of 1777-8* (New York, 1902, p. 197.

32. *Ibid.*, p. 260.

33. Clothier-General James Mease supervised the leather department for the last year. See Richard Peters to William Henry, November 17, 1777, William Henry Manuscripts, Historical Society of Pennsylvania (HSP).

34. *Journals of the Continental Congress*, 11, pp. 489-90.

35. *Journals of the Continental Congress*, 9, pp. 870-71.

36. Jordan, *The Life of William Henry*, p. 103. The

pay for a commissary of hides was \$300 a month plus one ration and the value of three more rations per day, and forage for one horse. Assistant commissaries received \$140 a month, one ratio plus the value of a ration, and forage for one horse.

37. *Writings of Washington*, 16, p. 476.

38. *Journals of the Continental Congress*, 9, p. 939.

39. *Ibid.*, p. 966; see also *ibid.*, 10, p. 282.

40. *Ibid.*, 15, pp. 1215-16; see also William Henry to Richard Peters, September 29, 1778, Henry MSS, HSP.

41. *Writings of Washington*, 17, pp. 24-25.

42. Jordan, *William Henry*, p. 114.

43. William Henry to Captain Postlethwait, December 4, 1779, Carlisle Papers, 9, D-114, Carlisle Army Barracks (CAB); William Shannon to Henry, October 21, 1779, Henry Papers, Shoe Correspondence, Reel 14, Hagley Museum and Library (H&ML); Washington to Nathaniel Greene, October 25, 1779, Greene Papers, American Philosophical Society.

44. Peter C. Welsh, *Tanning in the United States to 1850: A Brief History* (Washington, D.C., 1964). See also, Ellsworth, *American Leather*, pp. 4-11 and Peter C. Welsh, "A Craft that Resisted Change: American Tanning Practices to 1850," *Technology and Culture*, 4, pp. 129-317.

45. The following is summarized from the accounts in Weiss and Weiss, *Early Tanning*, pp. 16-39.

46. Another method of loosening the hair was to pile the hides in a heap until they began to putrify and then scrape the skin.

47. Welsh, *Tanning*, p. 21.

48. Bishop, *American Manufacturing*, 1, p. 445; Jonathan Chuyey certificate, no date, Henry Papers, Reel 14, HM&L; Samuel Ripley receipt, August 24, 1779, Box 11, Misc., 1775-1779, CAB; *Writings of Washington*, 10, p. 343. Tanyards mentioned include Col. Watson's above Chamberstown, Philip Gloninger in Lebanon, Samuel Rippey in Shippensburg, George Ilick near

Grubb's forge, and Jacob Krug in Lancaster.

49. Weiss and Weiss, *Early Tanning*, pp. 32-39.

50. Welsh, *Tanning*, pp. 21ff.

51. *Ibid.*, Dr. David McBride (1726-1778) was a Dublin physician who advocated the use of lime water in tanning as early as 1767. For this discovery he was made an honorary member of the Dublin Royal Society. He presented his paper on improved tanning to the Society in 1777 and it was published in the Society's *Transactions* in 1778.

52. September 3, 1779, Box 11, Misc. 1775-1779, CAB.

53. Weiss and Weiss, *Early Tanning*, pp. 58-59. Bishop states that most tanyards were rude affairs with a number of rectangular boxes or hogsheads, without outlet or cover, placed in the earth near a stream, to serve as vats or leaches; a number of boxes above aground for lime vats, an open shed which served as a beam house, and a circular trough with wheels of stone and wood to crush bark. This may have been an oversimplification to illustrate Bishop's thesis about the need for improvements in American manufactures. Even so, there was much truth in it. (Bishop, *American Manufacturing*, 1, p. 453).

54. *Writings of Washington*, 9, pp. 72-73. There was at least one public tanyard located in New Jersey. (John Mehlem to Walter Stewart, August 26, 1777, Stewart Collection, New York State Historical Association).

55. Blanche E. Hazard, *The Organization of the Boot and Shoe Industry in Massachusetts Before 1875* (Cambridge, 1921), pp. 3-7, 24-29.

56. *Writings of Washington*, 10, p. 94. Washington later forgot the problems that the army had supplying itself when he angrily wrote the Board of War in October 1779 of "some mismanagement . . . in the Hide Department. While the Brigadiers, thro' the necessity of the Case, undertook to make contracts of Hides for shoes, the Brigades were not only well shod, but generally had a stock on hand." (*Writings of Washington*, 16, p. 390)

57. Richard Peters to Henry, October 20, 1777,

Henry Papers, Reel 14, HM&L.

58. *Ibid.*; Robert Lettis Hooper to Whom it may concern, February 18, 1778, Society Collection, HSP.

59. Hooper to Duncan and Andrew Oliphant, September 28, 1778, Henry Papers, Reel 14, HM&L; Hooper to Oliphant, October 8, 1778, Society Collection, HSP; Jonathan Okley to Oliphant, October 17, 1778, Letters of the Pennsylvania Provincial Congress, Vol. II, HSP. For an attempt to move it from Allentown to Perkaskie, see William Shannon to Duncan Oliphant, April 8, 1779, and Timothy Pickering to Duncan Oliphant, April 10, 1779, Henry Papers, Reel 14, HM&L.

60. William Shannon to Duncan Oliphant, July 17, 1780, Society Collection, HSP.

61. "List of Persons drawing rations and working at the state prison and elsewhere for the Continental shoe factory at the barracks under the direction of Alexander Rutherford," Henry Papers, Reel 14, HM&L.

62. John Kilsey to Duncan Oliphant, April 15, 1779, Henry Papers, Reel 14, HM&L. On November 3, 1778, William Shannon wrote Duncan Oliphant that he had sent a load of leather and expected to send more since the season was at hand when leather was ready, Henry Papers, Reel 14, HM&L.

63. "Shoes Made for the U.S. in Lieu of Military Duty," Henry Papers, Reel 14, HM&L.

64. Col. Richard Hampton to Duncan Oliphant, May 15, 1778, Henry Papers, Reel 14, HM&L.

65. Robert Lettis Hooper to Duncan Oliphant, November 17, 1778, Society Collection, HSP.

66. *Pt. Col. Recs.*, 11, p. 85; William Henry to Richard Peters, November 25, 1778, Henry MSS, HSP; William Shannon to Duncan Oliphant, September 18, 1779, Henry Papers, Reel 14, HM&L.

67. L. Greug receipt, November 30, 1779, Henry Papers, Reel 14, HM&L; William Henry to ?, November 10, 1779, Box 10, Misc. 1775-1779, CAB.

68. *Pt. Col. Recs.*, 11, pp. 32ff. In 1778 one agent paid 40 shillings for each government hide a tanner finished (Dan Callahan to Duncan Oliphant,

November 26, 1778, Henry Papers, Reel 14, HM&L).

69. *Writings of Washington*, 9, p. 72.

70. "Cash Paid . . . at Lancaster . . . for Shoes and Boots, 1777-1780," Henry Papers, Reel 14, HM&L; Henry wrote Duncan Oliphant, November 20, 1779, that he could pay \$6 to \$10 for making shoes and \$24 to \$36 for new ones. (Henry MSS, Vol. 1, HSP).

71. Timothy Pickering to Henry, June 28, 1779, in Jordan, *Life of William Henry*, p. 106.

72. Henry to Board of War, July 4, 1779, Henry MSS, Vol. 1, HSP.

73. *Writings of Washington*, 8, p. 292.

74. Jordan, *Life of William Henry*, p. 106.

75. *Writings of Washington*, 15, p. 274.

76. Melvin Boyer, ed., "The Letter Book of Jacob Weiss, Deputy Quartermaster General of the Revolution," *Proceedings of the Lehigh County Historical Society*, 21 (Allentown, Pa., 1956), p. 91; Edward Boynton, ed., *General Orders of George Washington . . . at Newburgh on the Hudson, 1782-1783* (Newburgh, 1883), p. 44.

77. Washington wrote James Mease in July 1777 that he was short of shoes and those on hand were "in a manner good for nothing, they are thin french pumps that tear to pieces when ever they get wet." *Writings of Washington*, 8, p. 432.

78. U.S. Account with Michael Musser, Henry MSS, Vol. 2, HSP; Box 11, Misc. 1775-1779, CAB.

79. Daniel Rees accounts are in the Henry Papers, Reel 14, HM&L.

80. The Weisses believe that leather always was available in the colonies—it just was not reaching

the army. William Shannon supports this. In 1779 he wrote George Ewing that he had leather but needed someone to haul it. Shannon added that since the teamsters owned their own horses it proved impossible "unless you tie them and load their wagons to make them take more than 1000 pounds." This situation was one Deputy Commissary of Hides Shannon refused to condone because it let "the Cont. be Robbed by every Absurb fellow." (Shannon to Ewing, August 6, 1779, Henry MSS, Vol. 1, HSP.)

81. A computation of the output of leather and shoe production during the American Revolution is almost impossible. General works such as Hazard's *Organization of the Boot and Shoe Industry*, Harry and Grace Weiss's *Early Tanning*, and Peter Welsh's *Tanning in the United States to 1850* do not provide production figures for the Revolutionary period.

82. Henry Papers, Reel 14, *passim*, HM&L.

83. July 1, 1776-1796, Final settlement of tanner's account, Henry MSS, 2, HSP.

84. "Sept. 1777-Sept. 1779, Return of Shoes, Boots, etc. . . . Delivered by William Henry at Lancaster," William Henry Corr., 2, HSP.

86. January 15, 1779, R. L. Hooper to General Edward Hand, Hand Papers, 1, p. 60, HSP.

87. *Journals of the Continental Congress*, 9, pp. 803, 937, 963; 12, p. 892; 14, pp. 735, 983; 16, p. 97.

88. Henry Correspondence, Vol. 2, HSP.

89. *Pt. Arch.*, Ser. 1, 7, pp. 207-08.

90. October 25, 1780. *Secret Journal of the Acts and Proceedings of Congress* (Boston, 1831), 1, p. 170.