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SOCKS AT WAR: AMERICAN HAND KNITTERS AND MILITARY FOOTWEAR PRODUCTION FOR THE WORLD WARS

Abstract: In both World Wars, combatant nations, including the United States, Britain, and Germany, learned that inadequate or poorly-maintained footwear produced costly and preventable casualties from trench foot and frostbite. While provision of shoes and boots to troops were major issues in earlier conflicts, no nation before World War I had fully appreciated the significance of warm, dry, well-fitting socks to the effectiveness of soldiers in the field. The large numbers of trench foot casualties in World War I, especially among the French and British, convinced policymakers that this vital commodity must receive a higher priority in military production planning, but few nations in wartime could shift production to knitting mills rapidly enough to make a difference. Thus, in Britain and the U.S, the best policy option proved to be recruiting women and children civilians to knit socks by hand for the military in the first war, and for refugees, prisoners and civilians in the second. This paper discusses the economic and military importance of this effort, including the numbers of pairs produced, and the program's role in supplementing industrial production. The production of this low-technology but crucial item of military apparel is typical of detail-oriented tasks performed by women under conditions of full mobilization for war, in that they have a high impact on battlefield and home front performance and morale, but very low visibility as significant contributions to national defense. Often, both during and after the emergency, these efforts are ridiculed as trivial and/or wasteful. Unlike women pilots or industrial workers, handcrafters of essential supplies are regarded as performing extensions of their domestic roles as makers and caretakers of clothing and food. This was especially true in the U.S. in and after World War II, a wealthy industrialized nation that took pride in its modern - and thoroughly masculinist - military industrial complex.

Keywords: socks, knitting, military clothing, producer logistics, world war, trenchfoot, home front, women in war, voluntary organizations, handcrafts.

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For want of the nail, the shoe was lost;
For want of the shoe, the horse was lost;
For want of the horse, the rider was lost;
For want of the rider, the battle was lost;
For want of the battle, the kingdom was lost;
And all for the want of a horseshoe nail!

--*Mother Goose's Nursery Rhymes*, 1880

INTRODUCTION

In both World Wars, combatant nations, including the United States, Britain, and Germany, learned that inadequate or poorly-maintained footwear produced costly and preventable casualties from trench foot, immersion foot, and frostbite. While provision of shoes and boots to troops were major issues in both conflicts, no nation before World War I had fully appreciated the significance of warm, dry, well-fitting socks to the effectiveness of soldiers in the field.¹ The large numbers of trench foot casualties in World War I, especially among the French and British, convinced policymakers that this vital commodity must receive a higher priority in military production planning [Regnier C. 2004: 315-332], but few nations in wartime could shift production to knitting mills rapidly enough to make a difference.

Thus, in Britain and the U.S. in World Wars I and II, the best policy option proved to be recruiting women and children civilians to knit socks by hand for the military. This paper discusses the economic and military importance of this effort, including the numbers of pairs produced, and the program's role in supplementing industrial production. The production of this low-technology, but crucial, item of military apparel is typical of detail-oriented tasks performed by women under conditions of full mobilization for war, in that their work has a high impact on battlefield and home front performance and morale, but very low visibility as significant contributions to national defense. Often, both during and after the emergency, these efforts are ridiculed as trivial and/or wasteful, as the cartoon illustration to this paper shows Figure 3 [Sakren W. 1942: 64]. Unlike

¹ The German military author Maurice de Saxe (1696-1750) included stockings and other footwear in Chapter 2, "Clothing Troops," of his *Mes Rêveries; ou Memoires sur l'Art de la Guerre*, published posthumously in 1757 [Saxe M. 1971]. On footwear for Czarist Russian military, see Knorr K. [1956: 113].

women pilots, soldiers, or industrial workers, handcrafters of essential military and emergency supplies were regarded as performing extensions of their domestic roles as makers and caretakers of clothing and food. This was especially true in the U.S. in and after World War II, a wealthy industrialized nation that took pride in its modern - and thoroughly masculinist - military industrial complex.

The wartime role of socks illustrates the process of historical learning in war from costly mistakes in producer logistics, including discounting and/or underestimating the importance of what seem to be small things (socks) and their producers. The U.S. military failed in World War I to recognize that sending hundreds of thousands of soldiers into battle without adequate footwear would result in an unacceptable rate of trench foot casualties, and had to rely on hand knitters to make up the difference. In World War II, an adequate number of socks were manufactured for the military, but for refugees, prisoners of war, and civilians, hand knitters were again required to make up the shortfall. Even in the second conflict, the U.S., unlike Britain, had not developed sufficient supply discipline to persuade troops in the field to keep their socks dry, and eventually solved the trench foot problem, near the end of the war, by inventing a new combination of socks, liners, and boots called "shoepacs" (Figure 8).

THE THEME OF SOCKS AS "HORSESHOE NAILS"

In the summer of 1944, American forces in Europe pushed south and east from their beachhead in Normandy, forcing the German enemy to retreat from an ever-larger territory in Southern France. Although it had been planned to the smallest detail many months in advance, the Normandy invasion fell behind almost at once, as German resistance prevented the capture of major ports. Without essential ports along the French coast, necessary supplies, additional troops, and weaponry could not be landed [Waddell S. R. 1994: 39-40].

After the breakout, supply continued to be a problem. Three months after D-Day, the front lines were about 200 miles from the supply depots. Daily deliveries by truck, the famous Red Ball Express, brought badly needed supplies to troops fighting at Metz, Verdun, Antwerp and Liège [Axelrod A. 2008]. These transport units carried ammunition, rations, gasoline, and one further supply necessity to the American front: dry socks [Huston J. A. 1966: 533].

The horseshoe-nail significance of dry socks had become painfully apparent the previous year, when forty per cent of the casualties in the Attu Islands campaign in Alaska, 1,200 of 2,900, were due to trench foot. In November 1943, trench foot, caused by exposure to cold and wet, accounted for twenty per cent of the casualties of the first winter campaign in Italy [Risch E., Kieffer C. L. 1953: 105-6]. The famous (or notorious) American general George S. Patton (1885-1945) sent a memo in November 1944 to the effect that "To win the war, we must conquer trench foot" [Gole, H. G. 2008: 57]. Patton's 1947 *War as I Knew It* devotes more than 11 pages to the General's experiences with trench foot among the soldiers under his command [Patton, G. S. et al. 1947: 155, 170-71, 174, 188, 233, 340, 352-53, 415]. A cartoon by the famous American war cartoonist Bill Mauldin depicts the iconic Willie, an infantryman, thanking his comrade Joe for saving his life by presenting him with his last pair of dry socks.²

The U.S. Army Quartermaster Corps made frantic efforts to acquire adequate footgear for the Normandy invasion, but they could not get delivery of critical items in time to prevent 70,000 American cold-injury casualties in the European theater during the winter of 1944-45. Most of the troops affected by these injuries were trained, battle-hardened riflemen. Each spent an average of sixty days in field hospitals before returning to the front. Some were so seriously disabled that they were removed from active duty and sent home. The price exacted by wet socks from American military efforts in Europe was so impressive that it was the subject of an investigation in 1945 [*Military Establishment Appropriation... 1945: 362-63, 555*].³ Army historian Roland Ruppenthal reports that by January 1945, "loss of personnel from trench foot and frostbite ... approximated the strength of three divisions in the 12th Army Group" [Ruppenthal R. 1953, v.2: 218, 229-32, the quotation is from p. 230].

Trenchfoot, a very common trauma of battle, is an injury to the lower extremities caused by wet cold, tight and/or infrequently-changed footgear, standing for long periods, and, significantly, wet socks. Immersion foot and immersion hand are similar injuries caused by immersion of the extremities in water. All have a high rate of permanent defect and disability (see figure 7) [Redisch W. et al. 1951: 1163-68]. Military physicians Tom

² The image is available at the Argunners website "Bill Mauldin and the Dogface," <https://www.argunners.com/bill-mauldin-dogface/>, accessed September 19, 2019; see also Mauldin B. [2003: 75, 114, 118, 226].

³ On socks, see pp. 427-28 and 434.

Whayne and Michael DeBakey, analyzing the nearly half a million cold injuries to American soldiers in World War II, observed in 1958 that “the upper limit of temperature at which cold injury can occur has not been established” [Whayne T. F. et al. 1958: 7].

Troops cannot be depended upon to recognize their own self-interest in supply discipline, especially when it requires such chores as changing socks and airing bedding daily, and military authorities must prevent them by training and discipline from impairing their own combat effectiveness. Consequently, textile supply discipline is included in all modern military training [Atenstaedt R. L. 2006: 282-9; Holden L. G., Nicholson G. 2014: 36-7; Adnot J., Lewis C. W. 1994: 55-68.]. The British, for example, reduced the incidence of trenchfoot in their army to one tenth that of the American rate in Italy in 1944-45, in part by classifying it a “self-inflicted wound,” a punishable military offense that added its ignominious character to the deterrent effect [*Preventive Medicine in World War II* 1969: 77-8, 232-49]. Army historians William Ross and Charles Romanus describe the British experience:

Having suffered nearly 100,000 casualties from this source [trench foot] in 1914-15, the British armies in France and Flanders instituted a rigorous program of daily foot inspection and exercise or massage, and only 443 cases were hospitalized for trench foot during 1916-18. In World War II the British record in France was even better—only 206 hospitalized cases of trench foot.

... the lesser incidence of cold injury in the British armies was not due to any special or unusual type of footwear [Ross W. F., Romanus C. F. 2004: 608].

Although the results of American efforts to reduce trench foot casualties were not as successful as those of the British, U.S. troops suffered relatively little from the privations of climate compared with the wool-short German invasion force in Russia in the winter of 1942, and civilians in Japan in 1945. Surrounded at Stalingrad, the Germans shivered in temperatures that fell to minus 30° F (-34.4 C), miserable and demoralized in thin cloth coats. Blankets fastened around their shoulders provided little additional protection [Galbraith J. K. 1945: 174]. Their Russian captors, accustomed to and prepared for the harsh winters of their homeland, were fully outfitted in fleece-lined coats, fur hats and heavy gloves [Werth A. 1964: 500].

To alleviate the hardships at the front caused by these shortages of materials and labor, the German High Command issued instructions to soldiers operating in the winter of 1942-43 to stuff their socks with straw or paper, to improvise leggings from fabric bought or stolen in invaded territory,

and to wear their shelter halves as snow parkas.⁴ Meanwhile, voluntary civilian groups of German women, largely excluded by Nazi ideological constraints on women in the work force from factory production of textiles, unraveled the jute yarn from old burlap bags and re-knitted it into socks for soldiers at the front [*Kliot Kaethe (1930-2002). Personal communication...*; see also Galbraith J. K. 1945: 177-78; Milward A. S. 1965: 35; Ratner S. 1970: 471; Rupp L. J. 1978: 11-50]. Given the abrasive qualities of jute, it seems unlikely that the product of this cottage industry was comfortable to wear.

Because the shod feet of walkers, and, more importantly, marchers, are in constant and robust contact with a potentially hostile environment—rocks, mud, snow, rain, sand and so on - their footwear must be free of wrinkles and folds that can produce skins lesions and blisters -these garments must literally “fit like a glove”. Socks must fit closely, but not so tightly as to restrict circulation, and be soft enough for comfort yet sturdy enough at the heel turning and toe cap to resist abrasion from the shoe. As General Patton expressed it in 1947, “loose or tight socks make sore feet”⁵ [Patton G. S. at al. 1947: 415].

Although garment construction with seams, knitted flat and then sewn together, can be suitable for sweaters, for example, the hard wear of long marching or walking makes seams anathema in military and other types of heavy-service socks. No other textile structure is as well adapted to these requirements as knitting. The engineering of full-fashioned knitted garments like socks and gloves, as Claudia Kidwell suggests about clothing generally, is mathematically nontrivial, as the illustrations from Mary Thomas’ *Knitting Book* show (Figure 1) [Kidwell C. B. 1979; Thomas M. 1938]. Despite the mathematical challenges, especially at the heel turning, historically, innumerate and illiterate knitters of both sexes have produced millions of pairs of socks by these methods [see, for example, Hartley M. 1951].

The scale of textile procurement in emergencies can be estimated by citing a few examples: in World War II, the U.S. Army alone ordered 519.1 million pairs of socks and 229.4 million pairs of trousers⁶ [Milward A. S. 1967, 1977: 68]. In the same mobilization period, textiles were second only

⁴ Shelter halves are half-tents included in the gear of individual soldiers, who are intended to share their half with that of another soldier [*Germany. Heer. Oberkommando 1943: 128-133*]. This document prohibits the use of issue cloth for improvised leggings or foot wrappings.

⁵ Patton reportedly showed his troops how to improvise sock driers.

⁶ Combined U.S. military purchases of trousers in the war was a reported 270 million pairs [see *Army Industrial...* 1979: 3].

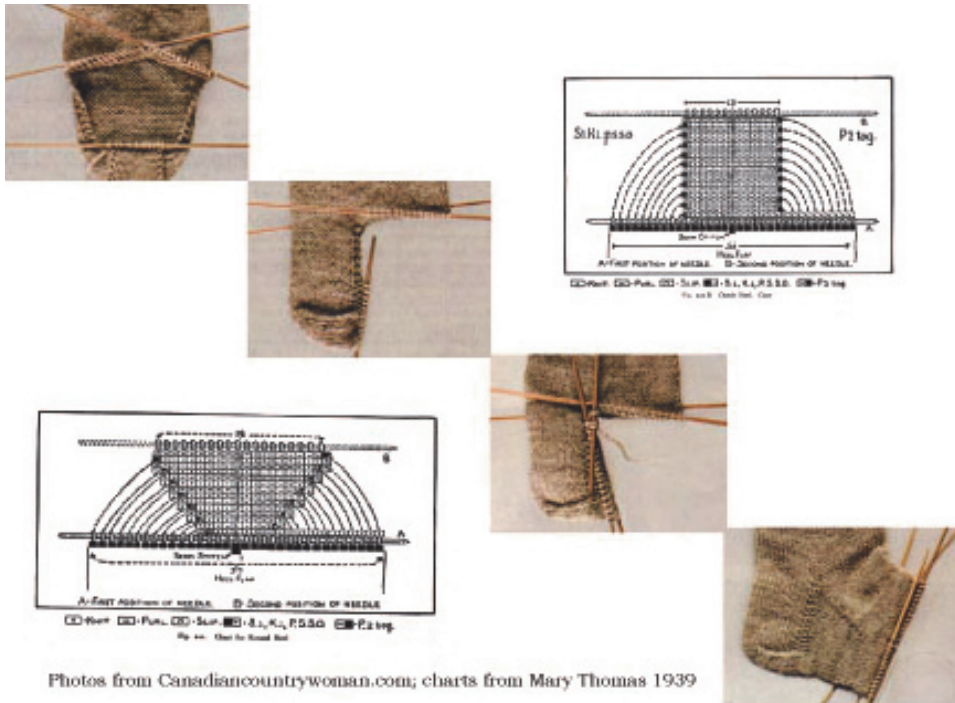


Figure 1. Method of Turning the Heel of a Sock. Diagrams from Mary Thomas, *Knitting Book*, 1939

Source: Canadiancountrywoman.com [Thomas M. 1939: 219-21].

to steel in Armed Forces volume procurement [*People of Peace...* 1943: 1]. The U.S. armed forces spent about \$7 billion on clothing and equipment between July 1, 1940 and June 30, 1944 [Kaplan A. D. H. 1944: 27]. As the Viet Nam War was winding down in 1973, the Defense Personnel Service Center handled 21,300 different textile items valued at \$830 million, including 3.43 million pairs of socks [Belden D. L., Cammack E. G. 1973:59; *U.S. Memorandum To: Prospective Clothing...* 1981].

SOCKS IN THE FIRST WORLD WAR

When the U.S. entered World War II in 1941, it had already had experience with the importance of socks in warfare, although, unlike the British, it seemed to have learned little from the experience.⁷ In the nearly 1200

⁷ On the British learning curve in World War I [Atenstaedt R. L. 2006: 282-89].

pages of George Dunham's Medical Field Service School textbook *Military Preventive Medicine* (3rd edition), published in 1938, there is no mention of prophylaxis for trench foot [Dunham G. C. 1938].⁸

When World War I began in Europe in 1914, the United States was the world's premier manufacturer of knitting and spinning machinery. Exports of this equipment, however, did nothing to increase the manufacturing capacity of American knitting mills, which proved to be a significant bottleneck for military textile production [*The New Position of Women* ... 1920: 21]. Despite the conversion of silk and cotton knitting equipment to wool, industrial knitters were unable to supply the Army with the more than 150 million pairs of heavy wool socks it required in 1917-1918.⁹ The problem was exacerbated by massive departures of women from the industrial textile and clothing workforces during the war to better-paying jobs in munitions and other manufacturing.¹⁰ Two strategies were employed: the hasty construction of 1200 knitting machines, which were by the end of the war capable of producing 8 million socks a month, and home production by hand knitters [Baruch B. M. 1941: 243, 253].

The hand knitters may not have been as fast as the machines, but they could be mobilized and deployed much more quickly. Even at the highest levels of mobilization for war, there remains in combatant-nation economies a residual population of unemployed who are unable to work outside the home because they are too young, too old, or housebound due to disability or the need to care for young children or older adults.¹¹ In the early 20th century, systematic efforts were made by combatant nations to tap the productive potential of this hard-core reserve in wartime. Such workers, if they are to contribute to the war economy, need decentralized tasks with low capital requirements that can be performed in or near their

⁸ Prophylaxis against influenza, appropriately enough, is well-covered, including a stern prohibition against "promiscuous sneezing" [Dunham G. C. 1938: 38].

⁹ Some knitting mills were reluctant even to sign government contracts [Cuff R. D. 1973: 74].

¹⁰ In 1929, about half a million Americans were employed in the textile industry and about 375,000 in apparel manufacture [Benham E. D. 1939]. By 1939, "The textile industries gave employment ... to upwards of 1.2 million persons" [Davis H. S. 1945: 17]. On the later departure of much of this work force for defense jobs [Bowles C. 1946: 14; Banning M. C. 1942: 86; Clem R. E. 1942: 446-58]. On wages for women in the clothing industry see Brown J. C. [1940: 10-12].

¹¹ In World War II, some American cities, including, for example, Dayton, Ohio, instituted house-to-house searches for women workers, offering homemakers worksite child care and high wages as incentives to enter the work force [Mariano J. H. 1944: 151-152].

homes. In casting about for necessary tasks that could be delegated to this group, the attention of policymakers has inevitably fallen on the two foundation stones of human survival: food and textiles, both associated with traditional female domestic responsibilities [Reid M. G. 1934]. "Victory gardens" and the home knitting and bandage-rolling campaigns thus became, in World War I and to a lesser extent in World War II as well, the lower frontiers of mobilization as the war effort reached down through the many tiers of the labor force.

In the First World War, women, the elderly and children worked with such voluntary associations as the American Red Cross to make up the shortage of knitted wool socks for the Army, and to produce hospital bedding and surgical textiles from fabric and cotton lint (unspun cotton fiber), with some work done by hand sewing and the rest on sewing machines.¹² Clothing was made at home and in Red Cross workshops for both American servicemembers and allied refugees. Elementary school children mobilized to produce socks, sweaters, wristlets, washcloths, Balaclava helmets and similar goods for the "Sammies" in France.

By the end of 1917, the reorganized Red Cross had shipped 13,336 cases containing some 13 million dressings and hospital items to Europe, 424,000 articles of hospital clothing, and a quarter of a million hand-knitted items¹³ [Clarke I. C. 1918: 149 and 159-60]. Not even this monumental labor met the demand; the Red Cross had to purchase half a million commercially knitted sweaters in 1917 to clothe soldiers still not fully outfitted by the War Department [*New Work...* 1917: 599]. By October 1918, the Red Cross had distributed nearly three million garments made by a membership of more than 8 million [*No Wool Famine...* 1918: 20-21]. Of seven standing committees of the Red Cross, three were concerned with textiles [*American Red Cross...* 1917: 549]. At the end of the war, 371.5 million relief articles had been produced, about 11 million garments had been knitted for members of the U.S. armed forces, and close to two million French refugees had been fed and clothed by the American Red Cross [*The Work of the American Red Cross...* 2019: 1].

Not only did such voluntary activities provide an opportunity to contribute for those whose circumstances prevented other kinds of partic-

¹² On the clothing and textile challenges faced by the entirely unprepared U.S Army Quartermaster Corps during the mobilization for World War I, see Sharpe H. G. [1921: 132-143, 174-225].

¹³ For a discussion of the paramilitary reorganization of the American Red Cross, see *Red Cross...* [1915: 311-312].



Figure 2. Geraldine Gilbert knitting two socks at once,
B. F. Day Elementary School, Seattle, Washington, 1918

Source: *Women during World War 1 & 2*,
<http://www.ddoughty.com/women-at-war.html>, accessed 25 September 2019.

ipation in the war effort, it offered an outlet for those who, because of religious or moral scruples, had reservations about assisting organized violence of any kind.¹⁴ Women who held such views were channeled into home production for refugee relief [*The Woman...* 1916: 9]. Uniform quality of work and speed of production were the main emphases in these programs; home knitters even devised a method of knitting two socks

¹⁴ See, for example, Rankin J. [1917: 17]. Rankin (1880-1973), a prominent feminist and pacifist, was the first woman to be elected to the United States Congress.

simultaneously on the same pair of needles¹⁵ (see Figure 2) [Reeder A. 1918: 12].

Home production, besides activating otherwise unemployable labor reserves, functioned also as a form of psychological warfare by maintaining home-front morale. Citizens involved in voluntary war work felt they were, in some sense, doing something to protect themselves and/or loved ones serving in the armed forces. Home production relieved the feelings of helplessness and fear that undermine civilian morale, especially in a nation under attack [see, for example, Ayling K. 1942: 72]. Home knitters, for example, were encouraged to believe that every stitch was a blow struck for victory. For morale purposes, it hardly mattered whether or not this was an illusion. In 1918, a fictional male participant in a school program of war knitting expressed this as follows:

Winter is coming on, and our brave Sammies will soon be suffering for warm garments. They are fighting to save our homes, to save our schools, to keep back the Zeppelins that any day might come sailing over Mapleton Hill and drop bombs on our schoolhouse, and kill or maim us all as heartlessly as they did the little English children. It is the least we can do to help them in any way we can turn our hands. We can't make school-gardens for months now, and we remember that, when we did the garden, the girls were just as eager to help as the boys, and they will do their share again when April comes. But it is six long months till April, and the soldiers need warm clothing now as much as the world will need good gardens in the spring. Would be be patriotic for only girls to do the knitting and the boys just to sit and look on? [Blake M. 1918: 603-610]¹⁶.

At the time of the Armistice, the American Red Cross had over a million pounds of knitting yarn remaining on hand [*No Wool Famine...* 1918: 20-21]. By the following year, critics of the voluntary program had begun to speak out, pointing to the large postwar surplus and to the relative inefficiency of home production compared with knitting mills. A wool manufacturer, Samuel S. Dale, complained that:

Never in the history of the world has there been greater need of clothing to relieve human suffering than at the present time, and never, so far as we can learn, has [sic] there

¹⁵ Errors in this technique would have resulted in the two socks being joined, one inside the other. For additional technical descriptions of home production of textiles for the military [see *Directions for Knitting...* 1861; Goodheart E. 1917: 6; *Instructions for Knitting...* 1917; *War Work for ...* 1918: 4; and Newcomb E. 1918: 8].

¹⁶ Jo March in Louisa May Alcott's novel *Little Women* (published 1868-69) taught her young male friend to knit socks for the American Civil War troops by the European method for greater efficiency [Alcott L.M. 1993: chapter 13].



Figure 3. Sakren W. "Here's a Lovely Parachute I Knitted for You [Cartoon]."

Source: *Colliers*, 110 [July 11, 1942: 64].

been more wasteful and inefficient methods of wool-manufacturing than in the production of these knitted and woven fabrics of the Red Cross [Dale S. S. 1919: 88-90].

World War I was in fact the last occasion on which knitting for the military had official U.S. War Department sanction; by World War II such work by American hand knitters was limited to production for hospitals, prisoners of war and refugees.¹⁷ The former conflict accounted for the largest Red Cross membership in U.S. history; the Second World War brought half a million fewer volunteers into the organization, mainly because more women workers were employed in war industry, including textile and clothing production, despite the inevitable attrition of workers attracted by higher wages in other defense industries.¹⁸ Sixty percent of women em-

¹⁷ For technical information about the Red Cross textiles/apparel program, see *Red Cross Garment Manual* [1935 and revisions]; *Organization Plan for Knitting* [1940]; and *Standard Surgical Dressings* [1943]. On work for hospitals, see Adams G. [1941: 18-20 and 43]; Ayling, K. [1942: 150-177]; and Adams D. S. [1970: 34-35].

¹⁸ On workers in textiles, see *Textiles Stretch* [1943: 19]; on efforts to keep them at their spindles and looms see *Wage Order for...* [1941: 170-71]; and *What Next?...* [1943: 76-78]. See also *Red Cross Service ...* [1946].

ployed in U.S. defense industries in 1941 were in textile manufacturing [*Handbook of Labor...* 1942: 148]. In 1940, according to *Business Week*, textiles were the “largest employer among domestic industries,” with women representing a little over half of the industry’s work force [Benham E. D. 1939].

To a large extent, the policy change regarding hand knitting was the result of two factors: a larger production base in industrial knitting by 1941, and a change in attitudes toward home production, which essentially trivialized such activities, except for the preparation of surgical dressings and other medical supply items [Wiltse C. M. et al. 1968: 24-25 and 63-64].¹⁹ The American fighting man, it was believed, was too sophisticated and virile to wear garments knitted by children and old ladies [Macdonald A. L. 1988: 289-320].²⁰ Quality control was also an issue. The returning veterans of 1917-1918 had brought home with them a derogatory quatrain, that went:

Thank you, kind lady,
Your socks are some fit.
I use one for a hammock
And one for a mitt.²¹

SOCKS IN WORLD WAR II: MILITARY PRODUCTION AND CIVILIAN RATIONING

Armed with their experience in the earlier conflict, other combatant nations in World War II had various responses to shortages of hosiery and other clothing. Britain, for example, struggled to adjust its large textile industry to wartime conditions [Hancock W. K., Gowing. M. 1949: 18, 140, 177, 321-22, 332, 444-496, 540 and 550; Hurstfield J. 1944: 1-31; and 1953]. First, textiles were required by the military, as in all belligerent nations, in large quantities. Second, they were Britain’s most vital trade commod-

¹⁹ About 60 percent of home-produced items in 1941 were textiles or apparel [*Handbook of labor...* 1942: 447].

²⁰ Although women were encouraged to knit gifts for soldiers and other servicemembers in World War II, socks were not actively solicited by the military as they had been in the previous conflict.

²¹ *Libby, Barbara Bancroft...* [1968]; a version of this doggerel verse, plus cartoons about hand-knit socks in World War I, are available at the Kingston (Canada) Public Library website, “Knitting for Soldiers,” <https://www.digitalkingston.ca/wwi-in-kingston-frontenac/knitting-for-soldiers>, accessed September 19, 2019.



Figure 4: Service shoes, wet and covered with mud, removed from feet of a soldier who contracted trenchfoot in fighting in Rapido River Valley, February 1944

Source: from Whyne T. F. et al. [1958: 114].

ity and invaluable as a source of foreign currencies. Third, textiles and clothing were essential to civilians, especially in the aftermath of bombings which destroyed much existing consumer stock.²²

Textiles had not been controlled at the consumer level in the United Kingdom in 1914-1918, a policy (or lack thereof) severely criticized in the postwar years. By 1917, clothing prices had risen by 260 per cent over 1914 while declining markedly in quality [Hargreaves E. L., Gowing M. 1952: 477].²³ Since labor and plant capacity were badly needed for military production in World War II, quotas were imposed on the textile industry in September 1940. By February 1941, civilian wool and cotton were reduced to 20 per cent of their prewar production levels. Employment in the industry declined dramatically, as workers were inducted into the army or drawn to better-paying defense industries. Work clothing was in critically short supply because apparel workers were needed in the aircraft and electronics industries [Hancock W. K., Gowing M. 1949: 321].

²² On resupply of civilians in Britain see Graves C. [1948].

²³ Much of what follows in this section is drawn from this official history of civilian policy. For the U.S. experience, see Rosen R. W. [1955: 304-308]; and Maycock T. J. [1943: 1-6].

The President of the Board of Trade, the British agency for most civilian economic controls, was asked in 1941 to release 200,000 tons of raw materials and 350,000 workers to relieve civilian shortages. Faced by the possibility of crippling military production by so doing, the Board imposed textile/apparel rationing in June 1941.²⁴ The number of commodities controlled was substantial, covering nearly all textile/apparel items and, in all, about half the goods available in the prewar U.K. market [*The Impact of the War...* 1945: 27-28]. The official history describes it as follows:

What this ration meant to the ordinary consumer who had no supplements is illustrated by the following figures: with a forty-eight-coupon ration a man could buy one pair of socks every four months, one shirt every twenty months, one vest and one pair of pants every two years, one pair of trousers and one jacket every two years, one waistcoat every five years, one overcoat every seven years, leaving about three coupons a year over for odd items such as handkerchiefs [Hargreaves E. L., Gowing M. 1952: 315].

Towels and other household textiles were included in this ration, reducing its buying power still further. Germany, as we have seen, even with rationing of clothing and footwear after August 27, 1939, could not supply socks and other critical commodities even to the military, and civilians made ends meet as best they could by darning old socks, and knitting more when they could get wool [Woolston M. 1941: 92 and 106]. Shoddy, yarn unraveled from old garments, was more often used for this purpose than new wool [see, for example, Watkins P. 2000: 259]. Toward the end of the war, clothing and food rations could not be honored, and civilians resorted to the black market [Seydewitz M. 1945: 108, 119, 227]. Similar conditions prevailed during the Berlin Blockade later in the 1940s.²⁵ In wartime Italy, wool socks were unavailable at any price, even in the black market; similar shortages prevailed in France as well [*Wartime Control ...*1943: 27; *Rationing of Textiles...* 1943; and U.S. War Department. *Civil Affairs...* 1944: 3, 37, 51].

Jerome Cohen observed of Japan in the Second World War that "Suzuki-san started with little and ended with less" [Cohen J.B. 1949: 353-416]. Socks, and indeed textiles and apparel generally, were among the

²⁴ For a first-person account of how wartime textile shortages affected the average British consumer, see Lee-Mitchell A [1974: 152-172]. For the much less austere American conditions see O'Brien R. [1944: 83-86].

²⁵ For accounts of these, see Arnold-Forster M. [1979: 82]; Balabkins N. [1964: 35-108]; Morris, E. [1973: 112 and 116]; Riess C. [1952: 90-135]; and Winner P. [1948: 14-18].

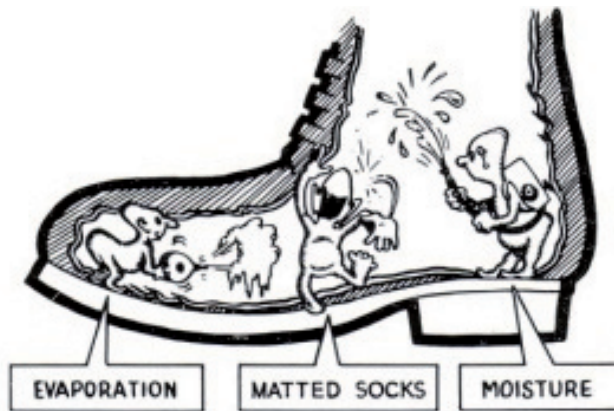


Figure 5: Educational illustration, used to instruct troops in causes of trenchfoot
 Source: from Whayne T. F. et al. [1958: 125].

many commodities that had virtually disappeared from legal Japanese markets by 1944 [Guillain R. 1981: 93-160]. Some attempts were made to alleviate the civilian hardships that accompanied these trends. During the late Thirties, Japan had built up her rayon staple fiber capacity so that a reliable domestic supply of rayon would be available to civilians. New methods and feedstocks for staple fiber were attempted [Asahi I. 1939: 163-170]. Silk, in the prewar period almost exclusively an export fiber, was released for use in domestic blended fabrics [Michl H. E. 1938: 242-243; Peterson R. E. K. 1945: 1-2; Ryder O. B. 1919]. Maximum prices for key commodities, including textiles and apparel, were set in September 1939. Clothing styles were standardized in order to achieve economies of scale in production.

None of these measures were effective [Olson M. 1963: 674-78]. Price ceilings could not be enforced because of black market operations. These, in their turn, drained goods from the legal market, creating new shortages [Rice R. 1979: 689-706]. This trend accelerated dramatically in 1945, when the several million victims of strategic bombing, their paper and wood houses burned to the ground, turned to the market to re-equip themselves with clothing. Since production was hopelessly inadequate, virtually none was available in the legal market. What little voluntary assistance existed was not equal to the task [Toland J. 1970: 670-671]. Having no choice, consumers purchased what little they could find and afford on the black market. Illegal market prices were so far above those of legal channels that no incentive whatever existed for suppliers to sell through approved retail

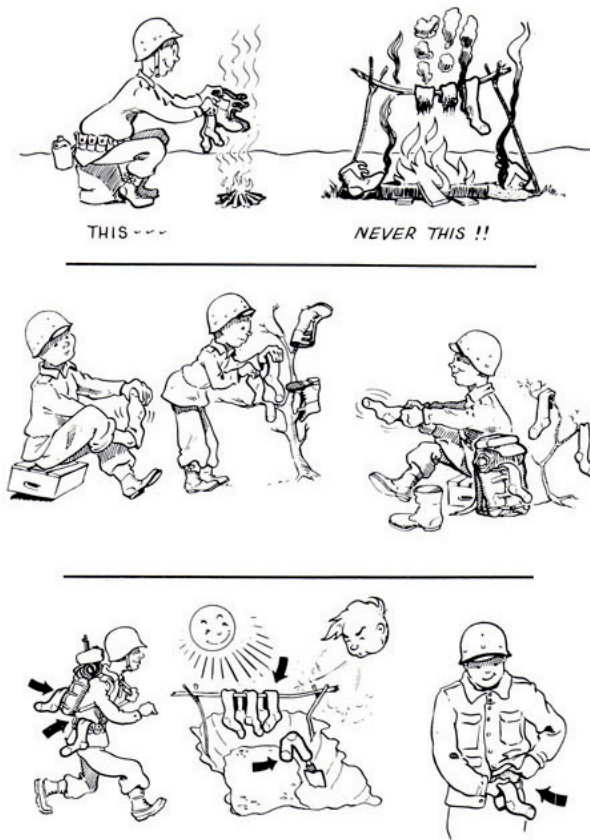


Figure 6: Instructions to soldiers for drying socks in the field

Source: from Whayne T. F. et al. [1958: 124].

outlets. For example, a pair of *tabi*, Japanese socks, was officially priced at .8 yen from December 1943 to July 1945. Since none were actually for sale in the legal market, this price was meaningless. The black-market price for a single pair of socks, as recorded by the Bank of Japan, was 3.5 yen in late 1943 and 60 yen by the end of the war [Cohen J. B. 1949: 353-416].

Other commodity prices showed similar gains. Few Japanese had the means to build personal textile stocks before the war, and wartime prices, let alone supplies, prevented their doing so later, Japanese civilians were forced to do without new apparel, suffering doubly from real caloric shortages in their diets and, in 1945, from the loss of their urban homes. The 1945 median adult food intake was just over 1200 calories a day, not enough to replace calories lost through the skin in the cool months

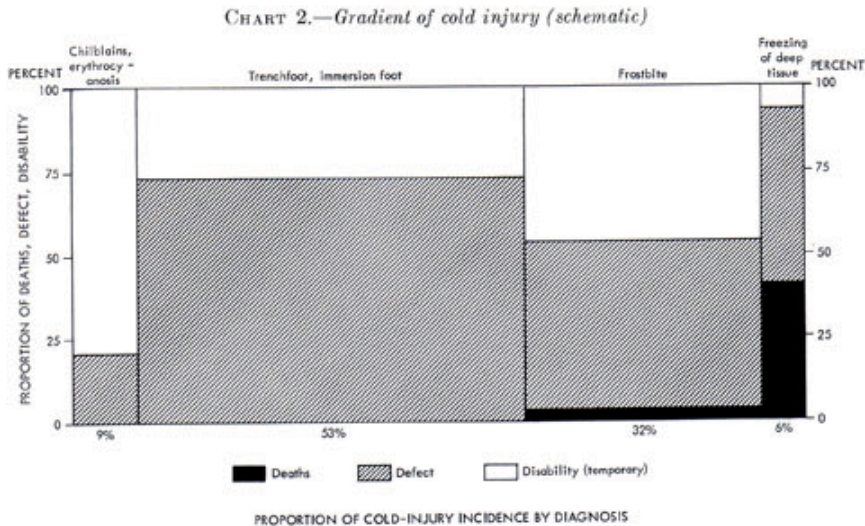


Figure 7: Severity gradient of trenchfoot and frostbite injuries

Source: from Whyne T. F. et al. [1958: 28].

[Guillain R. 1981: 108-9, 178; Yamashita S. H. 2015: 35-57].²⁶ In the U.S., where restricted clothing supplies were not life-threatening in either world war, labor shortages reduced cotton textile production from its 1942 high of 11.8 billion yards to about 9 billion in 1943 despite continuing strong demand. 1944 showed a 25 per cent decrease in production from 1942; in July 1944, 77 per cent of stores surveyed by the U.S. Bureau of Labor Statistics were out of stock on percale cotton yard goods. More than a third had no men's overalls, and about a quarter lacked men's knit shorts, bedsheets, diapers, fine yard goods, women's socks, and work pants [*Investigation of... 1945*].²⁷

The American military, however, enjoyed an abundance of clothing that astonished their German, French, Japanese, and British counterparts. The U.S. Army, for example, calculated its outerwear requirements on the basis of nine issue jackets per soldier per year of war, to make up for attrition losses when soldiers damaged, discarded or lost their gear [Huston J.

²⁶ On Japan's first rationing efforts, see Farley M. S. [1940: 203-4].

²⁷ On efforts to control prices while maintaining wartime production, see Armstrong R. B., Caplan B. [1947: 229-248]; and Carsel W. [1947].



The shoepac of 1944, to be worn with two pairs of socks
Source: from Worthpoint.com.

A. 1966: 533].²⁸ U.S. military wool requirements in World War II were prodigious, calculated at the rate of 75 pounds per soldier initial issue, 100 pounds a year per person for troops in combat, and 40 pounds annually per soldier in the supply pipeline [Klein J. W. 1948: 7]. Another case in point was the U.S. Quartermaster Corps' introduction of the Eisenhower jacket to the European theater in 1944. This garment, an all-wool adaptation of a British field jacket design, was intended as a substitute both for an existing field jacket design, the M-1943, and for the bulky wool overcoat used in cold wet climates.²⁹

Its principal attraction to troops, however, was not functional but sartorial in nature: it was dressy, fashionable, and created a crisp, military im-

²⁸ For a first-person account of wearing and carrying standard U.S. gear, including two pairs of socks, in the European theater of World War II, see Dupuy T. N. et al. [1995: 220].

²⁹ The most detailed account of U.S. military apparel supply 1941-45 is Risch E., Pitkin T. [1990].

pression.³⁰ In October 1944, the theater commander ordered four and half million of these to be shipped to his supply depots by the following winter. The War Department, which did not entirely approve of this sudden enthusiasm for military elegance, offered instead to ship an equal number of the new M-1943's, which were then in production. This offer was rejected. The conflict continued into 1945, when production of the Eisenhower jacket was delayed, and troops had to accept substitutes, including not only the M-1943, but the obsolete 1941 Parsons jacket, and the heavy wool serge jackets that were unanimously despised by American GIs. Clearly, a lack of resources was not the issue with respect to supply of U.S. military clothing at this period.

CONCLUSIONS: HISTORICAL LEARNING FROM SOCKS

The horseshoe-nail lesson of the two world wars (and, to a lesser extent, the Korean conflict) seems to have been learned in the case of military supplies, but remained vulnerable to policy myopia as a civilian necessity as late as 1980.³¹ In the U.S. during the Reagan civil defense years, when the Federal Emergency Management Agency was charged with the unenviable task of producing effective nuclear sheltering on a budget of 50 cents per American, studies were funded of what civilians should bring to their hastily-dug countryside shelters.³² A list of "Helpful Survival Items" suggested that men bring 8 pairs of socks, but neglected to mention any footgear for women other than shoes [Brown W., Yokelson D. 1979: 17].

The problem of wet socks at war in World War II, however, was ultimately resolved for the U.S. Army in late 1944 by the approval for distribution of a new type of footwear that later revolutionized civilian cold weather gear: the M-1944 shoepac, "a moccasin-type rubber boot" with a leather upper and removable wool felt lining (Figure 8) [*Military Establishment...* 1945: 434-436].³³ After a few false starts in the refinement of this footgear,

³⁰ For a photograph and overview of the history of this item of high-fashion military apparel, see *Object Record: Eisenhower Jacket...*

³¹ On Korea, see Westover J. G. [1987: 149-174].

³² For examples of the many critiques of this plan, see Scheer R. et al. [1982]; Zuckerman, E. [1984 which makes reference to socks: 100].

³³ See also Gole H. G. 2008: 57, where the General recalls seeing the shoepac in the European theater for the first time in late December 1944 or early January 1945, when replacement troops for trench foot losses arrived with shoepacs as standard issue.

the chief surgeon for the European theater determined in December 1944 that “the shoepac had been found to be the only mechanical aid which contributed substantially to the prevention of trench foot” [Ruppenthal R. G. 1953: 201, 604-8, 618]. The United States had learned the importance of footwear the hard way over a period of decades, 1917-1944, paying a significant price in trench foot casualties. A military-industrial establishment with the resources to provide nine jackets a year for more than 8 million Americans over four years had finally figured out how to keep its socks dry without the assistance of hand knitters.

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