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US Army Field Jacket Development in Response to Material Shortages and the Exigencies of World War II

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Abstract
Hwang explores how the combined power urgency and material shortages forced the US Army into a specific pattern of uniform design and development during World War II.

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Necessities created by World War II pushed the development of technologies in various ways. For example, war injuries pushed the development of medicine and resulted in the widespread use of antibiotics. In weapons, the nuclear arms race pushed physics research and resulted in the development of the atomic bomb. In a similar manner, material shortages and the exigencies of war pushed uniform technology to adapt quickly and resulted in multiple versions of the Army field jacket. This paper will discuss the development of the US Army field jacket and the ad hoc design changes between each version, necessitated by quickly changing wartime conditions. Designers and researchers had to create suitable field jackets while overcoming the obstacles of various material shortages and the need for quick uniform production during the war. During World War II, the urgency of the war and wartime material shortages caused field jacket technology to develop in an ad hoc manner, each revision reacting to a specific problem, without a definite long-term goal of a permanent all-purpose field jacket.

The advent of World War II brought about a sudden and urgent need for advanced uniform technologies. Research into clothing technology and material substitutes had begun in the interwar period, mainly to replace “strategic” and “critical” materials, where strategic materials were essential wartime commodities produced abroad and critical materials were the ones produced in America. The hope was to find substitutes for these materials in the event that they would become a scarce resource. However, research halted between 1934 and 1939 as indicated by the Quartermaster General’s annual reports for those years, which each stated that there had been no funds available “for the development of substitutes for strategic and critical raw materials, and as a consequence, no work in this connection was accomplished during the year” (Risch and Pitkin 18). A lack of foresight into the urgency of the impending necessity for substitute materials demoted materials research in the Army’s priorities. Because clothing

development was neglected before WWII, US Army soldiers entered combat wearing outdated uniforms that had been introduced in the First World War (Connell 37). Now suddenly, the urgent necessity for suitable combat uniforms became a priority and pushed the progress that had stalled during the interwar period. However, by not taking advantage of the peaceful and plentiful interwar period to preemptively fight the threat of material shortages, uniform development during WWII would be continually left behind in the race to develop material substitutes before the existing materials ran out. This race would lead to inefficiently applied and rushed developments, scrambling to react to arising material shortages and wartime needs.

The design of the Army uniform was further complicated by its dual role as a functional piece of equipment and a symbolic piece of clothing. Congress Representative Mrs. Edith Nourse Rogers explained to the House of Representatives:

> The most distinguished characteristic of the soldier is the uniform. It is a definitive source of national inspiration second only to the flag. An attractive uniform, in addition to the natural protection which it furnishes to the soldier, greatly improves the morale. The proper uniform for the soldier, either in peace or war, has always been a matter of great interest to those in charge of the Nation's destiny. (Blue Dress 2).

The uniform's roles in combat and dress situations placed a burden on designers to develop technologies that would increase soldiers' defense and protection while not compromising the style and appearance that would represent the Army to the American and international public. Guided by military requests, numerous research facilities contributed to and collaborated on the research and development of Army uniforms. The resources and effort dedicated to clothing developments had increased a great deal since the onset of war. The need to quickly clothe

soldiers in a uniform that could fulfill a dual role in combat and dress conditions confronted the Army, and the Army was rising to meet the occasion.

One of the key components of the US Army uniform was the field jacket, intended for both combat and dress wear. The WWI field jacket was poorly crafted and lacked real combat utility, and desperately needed to be redesigned (Stanton 2). The Army planned to make the new version warmer since the growing Japanese threat in Alaska and the occupation of bases in the North Atlantic were placing inappropriately dressed soldiers in cold climates (Pitkin 2). In addition, the dual-role field jacket was forced to become even more multi-purposed due to the elimination of specific Army uniforms in order to streamline the collection, removing dress and mess uniforms to decrease the number of uniforms from nine to four (Connell 37). The beginning of the war presented the US Army with the challenge to develop the technologies to create a field jacket that would satisfy the functions of a combat uniform, the appearance of a dress uniform, the warmth of a winter uniform, and the comfort of a leisure uniform—all in one.

The M-1939 was the first redesign of the WWI field jacket and set the precedent for uniform development in WWII as a short-sighted process. Many adjustments had to be made post hoc to compensate for oversights in material shortages and the Army shied away from long-term clothing research in exchange for quick fixes. Figure 1 shows a military policeman wearing the full uniform of 1926, which was only slightly modified by the beginning of WWII to become the M-1939 field jacket. The jacket was single-breasted with a notched collar, lapel, non-pleated breast pockets, and four large brass buttons down the front (Connell 40). It was made from 18-oz wool serge in a dark olive drab (OD3) cloth, a color meant to camouflage and disguise troops to avoid detection (Fussell 57). The onset of the war gave the Army an opportunity to comprehensively research camouflage technology and develop the optimal uniform disguise.

Figure 1 (Stanton 6)

However, such studies would take two years and thousands of dollars—an investment the Army didn't consider justifiable (Risch and Pitkin 35). The Army instead settled for the one-tone olive-drab color from simple camouflage analysis. In trying to save its limited resources, the Army made a hurried, short-sighted decision that delayed camouflage development. The topic would be revisited in each version of the field jacket, changing the shade of the olive drab multiple times over more than two years rather than conducting a one-time comprehensive study. This wasted money and production on subpar camouflage designs in order to respond to the exigent wartime need for uniforms.

The quick mass production of subpar camouflaged jackets also exemplifies one of the threats to uniform advancement in WWII. That is, once an initial version of camouflage had been distributed, it became costly to supplant it with a new, improved version. Despite the potential benefits of better camouflage, the costs of production, distribution, and old disposed uniforms combined with a tight wartime budget might decide to leave its soldiers in outdated camouflage. This tradeoff could occur in any one of the many different uniform features. However, the War Department had issued a "policy of modernization" to protect against this very threat:

> The policy of the War Department is to develop and complete the best types of equipment and armament in time of peace, irrespective of the amount on hand as a result

> of the World War. Wherever the amount of a particular article of equipment or armament on hand precludes the possibility of production of a newer type, nevertheless the new type will be adopted, and complete specifications drawn up and approved. (Risch 53)

To monitor uniform conditions and deficiencies, each Army branch was required to produce annual surveys that listed their equipment and armament, whereupon the Supply Division of the General Staff would call for revised designs where considered necessary. In the very first year, seventy items were reported as needing design improvement with many of the complaints concerning the WWI uniform quality and constantly arising needs for changes (WPA Sewing). The problems were reported "in the form of directives for specific developments" and addressed one at a time when they arose rather than predicting possible future problems and preempting them with innovative design (Pitkin 2). While this policy aimed to propel uniform advancements in spite of existing stocks, it effectively encouraged the ad hoc development of uniforms. By having uniform deficiencies be reported and resolved one at a time, the Army would always be responding to the last problem instead of anticipating future problems and designing a field jacket with foresight and long-term goals.

This lack of foresight in regards to material shortages is seen in the changes applied to the M-39 field jacket over the course of its use. A year after its production in 1940, a silk shortage replaced the silk tie with a wool tie. Only a year later, the wool shortage led to both the substitution of the wool tie with an olive drab mohair tie and the removal of the jacket's pleats to conserve material (Stanton 23; Risch 88). The material shortages had been anticipated since the onset of war, but the rushed necessity for combat jackets paired with the lack of materials and clothing research preceding the war led the Army to quickly produce basic and usable jackets,

only later amending them in response to the material shortages. Already at the beginning of the war, there was a clear lack of foresight in Army field jacket design.

Still after the changes, the M-1939 left a lot to be desired by the soldiers. The jackets were poorly insulated and provided little protection from the wind and rain, and the ineffective olive drab camouflage left the soldiers as readily visible targets (Henry 5). In addition, increasing material shortages pushed the Army to remove all unnecessary uses of scarce materials from the uniforms. On June 11, 1941, The Under Secretary of War emphasized the need for a comprehensive conservation policy, and supply services were tasked with the job of developing a "Priorities Critical List," which identified the items that absolutely required the use of a critical material (e.g. a material that was scarce) and could not be made with a substitute material without compromising essential military efficiency (Risch 59). The Army began development of suitable substitutes for non-obligatory uses of critical materials, with emphasis that "substitutes should not be construed as meaning 'equal' or 'equivalent,' but should be interpreted as meaning 'those that will serve the same essential purpose even though may be less durable and involve some increased initial or ultimate cost" (Risch and Pitkin 19). This policy would see the development of some substitute materials that were used only for temporary fixes while others would develop into long-lasting and widely used materials. However, the Army was ready to compromise certain aspects of the field jacket in order to save critical materials during the wartime emergency. With a willingness to use sub-optimal materials in the uniforms, the Army was not hoping to create an optimal, permanent uniform, but to settle during the chaotic wartime for acceptable uniforms made with whatever materials were available.

The increasing material shortages pushed the US Army to discard the wool-serge M-39 jacket and develop the M-1941, or the Parson's jacket, which was named after its designer Major

General J.K. Parsons and constructed for style and comfort (Stanton 82). The wool and metals shortages were the driving force behind the quick development and implementation of the M-41.

Figure 2 Parson's Jacket/M-1941 (U.S. Field)

Figure 2 shows soldiers shipping out wearing Parson's jackets. In order to address the problem of wind and rain resistance, the Parson's jacket was modeled after civilian windbreakers, which lent a more weatherproof nature to the jackets (Henry 6). This jacket was made of water-repellent cotton poplin instead of the scarce wool-serge and featured slash pockets with flaps and plastic buttons, which replaced the formerly brass buttons. In addition to the existing wool shortage, a metal shortage was arising, and the copper shortage in particular affected the clothing industry (Stanton 81).

The copper shortage was more unexpected than the wool shortage since in 1937, the US had been producing copper at a record amount. However by 1941, the 1940 rearmament program's production of ammunition and shell casings along with the expanding industrial economy were making active use of the copper resources, resulting in an acute deficiency and need for substitutes (Risch and Pitkin 20). A considerable amount of uniform hardware, including buckles, clips, grommets, snaps, and eyelets, used copper alloys such as brass and bronze. Bronze was used for its durability and strength while brass was valued for its high polish

and gold-like appearance, a status symbol for its wearer. In fact, brass buttons were rarely seen on civilian dress and distinguished the revered soldier (Fussell 35). However, as these metals became harder to procure, the military had to make concessions in the uniform's appearance in order to preserve its function. Enamel-coated iron, steel, and zinc replaced the brass in grommets and legging eyelets, but proved too soft for cartridge and pistol belt eyelets. The search for a harder substitute material led to the advancement of plastics technology in uniforms (Risch 62).

Plastics were a relatively new field of industry and its importance during WWII in developing uniform technologies lent huge progress to the field. Plastics were harder than zinc, able to withstand friction, and such a versatile material that secondary plastic substitutes became necessary to replace the first substitutes that began running low in availability (Risch 74). However, plastics were classified as "substitute standard," giving them a reputation as a substitute, temporary material "to be tolerated only for the duration" of the war (Raeburn 143). This public opinion reflects the Army's ad hoc application of plastic substitutes, using them only to directly address brass shortage problems rather than applying them innovatively and fully exploiting their development and capabilities (Beall). The Army had introduced plastics as a cheap imitation substitute material rather than the technological advancement that they truly were. After the war, there was uncertainty about plastic's continued role during peacetime. Thus, while the scarcity of metals during WWII brought about redesigns of the field jacket and the development of substitute technologies such as plastics, its short-sighted treatment of the replacement materials as temporary fixes had far-reaching effects into other industries, nearly preventing America from entering what could be called "the plastic age" following the Second World War (Raeburn 141).

Figure 3: M-1941/Parson's jacket (left) and M-1943 experimental field jacket (right) (Stanton 95)

In 1993, the Army undertook a project to consolidate the multitude of special-purpose troop uniforms and by developing an all-purpose field jacket to replace the Parson's jacket, which proved too light for cold climates. This experimental field jacket endured one of the most rigorous research and trial periods of any of the WWII field jackets. The Military Planning Division adopted layering technology, taking advantage of warm air trapped between layers of clothing, producing a versatile garment that could be worn alone for mild weather or combined with pile garments for more severe climates (Siple). The result was the M-1943 field jacket, which is shown on the right in Figure 3 compared to the Parson's jacket on the left.

The new technologies seen on the M-43 field jacket had very specific functions in combat. Adjustable tie cords were added at the wrists, waist, and throat for wind protection; four large 'handwarmer' cargo pockets largely increased carrying capacity and ease of access; a neck flap could be buttoned across the throat for warmth, and a hood was added a year later also for warmth. The jacket was olive drab OD7, a darker shade, retained the bi-swing back and the plastic buttons, a reminder of the metals shortage (Henry 6). In August of 1943, the M-43 was

standardized and used to replace the arctic, winter combat, mountain, and parachute-jumper jackets. It was made of 9-ounce sateen for increased wind and tear-resistance and only two years later again replaced with oxford cloth to further increase wind-resistance (Risch 90). The entire layered combat uniform consisted of the M-43 worn over a wool-serge field jacket, over a high-neck sweater, over a flannel shirt, over an undershirt. However, the 1941 summer mobilization was proceeding at such a rate that wool shortages were becoming even more desperately problematic.

Increased efforts to conserve critical materials led to further ad hoc changes to the field jacket. A conference was held between the War Production Board and Quartermasters Corp to discuss the wool conservation program and possibilities for the elimination of woolen items in the M-43 uniform. This untimely meeting was held after the uniform had already been produced and distributed, discussing amendments to the finished uniform rather than design during its conception, illustrating the lack of foresight in uniform development. The WPB hoped to reduce the amount of wool in a number of items, including the 19-ounce serge and the flannel shirting, components of the M-43. However, the OQMG representatives argued that at the current weight of 18-ounces, the wool serge was already lighter than the material used in previous wars and in other armies; reducing it to 16-ounce would be inappropriate for troops located in colder climates. In addition, the flannel shirting had already been modified to include twenty percent of cotton. To further increase the cotton content would reduce the material's water-absorbing abilities (Risch and Pitkin 25). This convinced the WPB to look elsewhere for wool conservation opportunities. As a result, the bi-swing back was removed from the M-43, saving twelve percent of wool serge per jacket. A test was also conducted to convert old surplus wool-serge coats into wool field jackets; unfortunately, resulting samples was unsatisfactory in workmanship, design,

and uniformity but did make progress in design technology (Risch and Pitkin 59). The wool shortage spurred the quick response of research into wool substitutes, exploring wool and rayon mixtures and reworked wool. Four years into the war, America was still struggling to produce substitute materials and uniforms while combating its material shortages. Though innovative uniform technologies such as uniform conversion, wool substitute research, and simple uniform modifications were progressing uniform technologies, they were occurring in an ad hoc manner, quickly reacting to the existing material shortage with short-sighted results.

By 1943, wool was no longer in short supply and as a direct result, research in wool substitutes halted. The number of enlisted men had stabilized, there was little chance of conflict with Australia and other wool-producing countries, and America had a large wool stockpile (Risch and Pitkin 26). The circumstances had completed reversed over the course of two years. Accordingly, the next evolution of the field jacket returned to the use of wool, truly illustrating how America's material availabilities dictated the development of new Army uniforms.

The M-1944, or the famed Eisenhower jacket, or Ike jacket is shown in Figure 4, worn by its namesake, ETO Commanding General Dwight D. Eisenhower. In 1943, Eisenhower suggested to the Quartermaster that a new winter uniform was necessary after seeing the attractive British uniforms and deciding that "Americans should design something distinctive for themselves" as well (Fussell 42). He hoped to develop a uniform that would both enhance soldier protection and encourage a patriotic, symbolic fashion statement. Responding to feedback from soldiers, the M-44 was designed "with a view to increasing comfort and improving their appearance, while retaining their present basic style" of the M-43 (Uniforms Redesigned). The shoulders were broadened to give flexibility and the row of buttons on the front were concealed by a vertical placket, designed to prevent the buttons from snagging. The Eisenhower jacket was

Figure 4: Ike Jacket/M-1944 (Connell 42)

a quick hit with the soldiers because of its high quality material, stylish look, and Eisenhower's personal endorsement.

As resources became more plentiful in America, the problem with M-44's arose not with materials shortages but rather with soldiers' application and interpretation of the uniform. Instead of wearing the M-44 underneath the M-43 and over a cotton liner as was regulated, they were saving the Ike jacket for dress wear and wearing only the M-43 and cotton liner into combat, which was insufficiently warm (U.S. Field). Soldiers liked the look of the Ike jacket and preferred to wear it for the public and for dress occasions and did not take it into combat. The Army had attempted to create a dual-function uniform, but the soldiers had separated the uniform into two dress and combat components on their own. This time, a quick design and construction of a new version of the field jacket was not enough to resolve the standing problems, which lay with soldier preferences and uniform production. Because its soldiers would not accept this uniform as both dress and combat, the Army had not fulfilled its initial goal of producing an all-purpose uniform. The external material shortages and conditions had played a critical role in pushing uniform changes during WWII, but during the end, internal issues involving soldier preferences and the need for an attractive uniform turned out to be the main roadblock in creating the ideal uniform. This is because by this point in the war, the material availabilities had largely stabilized and field jacket material composition had essentially come full circle as the M-44 returned to using wool, like the jacket worn at the beginning of the war.

After the war ended in 1946, the US Army resolved to develop its first truly permanent Army uniform. The various WWII versions of the field jacket had been produced out of quick necessity with hurried substitutes, creating uniforms that were "expedients for one war only" (Fussell 59). Now, with the material shortages and urgency relieved, the military had the time and resources to plan and design a permanent ideal uniform. To start, the military discarded the tradition of dressing its men in the unseemly olive drab in order to reinstate the impressive appearance of its troops. All through World War II, the various shades of olive drab that dressed the soldiers drew ridicule from the British who called soldiers "Brown Jobs" and even their own American women who called them "Drab Tommies" (Fussell 56). Army soldiers "were the most poorly dressed enlisted men in the military services", a perception that the military was determined to change (Fussell 58). Great effort and research was invested in the new uniform technology, with contributions from various research and clothing institutions. The uniform took almost a decade to produce, finally ready in 1954 and made mandatory and standardized in 1961. The resulting uniform was a forest green shade 44, replacing the dreary olive drab, and included dressy black shoes and a necktie. Additional components allowed for weather versatility, with optional sweaters, a lightweight version, a raincoat, and an overcoat (Fussell 60). The Army had at long last developed the all-purpose permanent uniform it had longed for, made possible by material availability as well as the end of the war and its quick demands.

The plentiful availability of resources allowed the Army to move away from its ad hoc tendencies. Throughout the war, the availability of materials, whether scarce or plentiful, had truly dictated the course of uniform development. Wool shortages pushed the jacket to change from wool to cotton, brass shortages replaced traditional buttons with plastic buttons, and silk shortages replaced the tie multiple times. In addition, the urgency of the war was over, allowing

the Army time and peace to further their research in clothing technologies, developing the ideal camouflage and new synthetic materials. In addition, the Army was no longer pressed to fix every small deficiency as it arose, instead spending about a decade to invest in clothing research and craft its dream uniform. WWII uniform development had far-reach and long-lasting consequences even outside of the Army, on American society. The plastic age boomed and became incredibly wide-spread following the war. In addition, by the 1940s, the US' production of synthetic yarn surpassed that of the world, with research laboratories producing yarns that were washable, were insulating, and were cheap (Wilcox 169). Uniform development even influenced citizen fashion, with American citizens inspired and attracted to the uniforms and the symbolism that the soldiers wore (Chenoune 212). Truly, material shortages and the war urgency had been the main causes for the ad hoc development of WWII field jackets, for when both factors were eliminated with the end of the war, uniform development shifted from ad hoc to comprehensive research and a long-term design. While the inefficient method of short-sighted uniform design fixes was not optimal for creating a US Army field jacket, the material shortages and war urgency made it necessary during WWII.

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