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**Chief's Corner**

Welcome to the early summer issue of the *AMEDD Historian*! If you are familiar with the *Historian* you know it as an eclectic newsletter of articles about AMEDD history and artifacts found in the AMEDD Museum. However, this issue is taking a historical look at specific programs the Army conducted regarding what we characterize today as the "Performance Triad." In this issue Lew Barger, a staff historian of the AMEDD Center of History & Heritage, has written about sleep deprivation and the artificial means to keep soldiers awake. Professor Whitfield B. East discusses the history of the Army Physical Fitness Program that began in the 1880s at West Point. Sanders Marble at ACHH wrote about the history of the field ration from the Revolutionary War to today's current MREs.

As a reminder, we are still collecting documents for our archive, and three dimensional artifacts for the AMEDD museum, so if you something, please consider ACHH for your donation! Also, we are looking for articles from you to include in the *Historian*, so please send us submissions.

Finally, if you have some thoughts or comments on the *Historian*, please let me know.

Bob Driscoll

**Background on Army Efforts at Health Promotion**

The Army has long sought to promote health, as preferable to curing illness. While the earliest efforts (e.g. fluoridation of water, public health nursing advice) would not now be defined as health promotion, in 1971 Surgeon General Hal Jennings created a Directorate of Health and Environment in OTSG; a main goal was promoting health through education. In 1972 the Health Promotion Branch was established within the Directorate of Health and Environment, composed largely of Army Health Nurses; one of its major programs was nutrition education to soldiers, families, and Army communities. Public health nurses customized vans to go into housing areas, engage families, and educate them outside the MTFs. Nutrition continued to be a major topic in the mid -1970s, with initial entry training soldiers a specific audience but Army newspapers and Armed Forces Network used to reach the whole Army. (This was before the Army established weight standards and a weight control program.)

In 1982 Surgeon General Bernard Mitemeyer opened Health Fitness Centers at Fort Bliss and Carlisle Barracks; these were soon organized into the Army Physical Fitness Research Institute. He spoke about the "increased emphasis on wellness and self-care health promotion in support of the Army's efforts toward total fitness." In 1985 Surgeon General Quinn Becker appointed a fitness consultant and sought funding for wellness/health promotion centers on every Army post to advise soldiers on 6 items: tobacco cessation, physical fitness and well-being, nutrition and weight control,



*It isn't the minutes at the table that make you fat --- It's the seconds*



stress management, alcohol and-drug-abuse prevention and control, and lifestyle health-risk appraisal. Becker said the Army Health Promotion Program "is the real beginning of the turning of our medical care system away from disease-only and toward health promotion." At the same time, AR 600-63 (Army Health Promotion) was published to "enhance quality of life of soldiers, family members, Department of the Army civilians, and retirees and to encourage lifestyles that improve and protect physical and emotional health" and by August 1986 each MTF had a health fitness team working with the local Army community. Installation commanders had to create a Health Promotion Council. In 1987 nutrition advisers were appointed to combat divisions, and used post newspapers as a main tool to reach soldiers outside MTFs. An "Army Wellness Check" was created with individuals (soldiers, dependents, retirees, and DA civilians) filling in circles on a computer-readable card, which was read on the spot. The individual received an individualized printout of the major health risk factors and corresponding educational messages. Topics included smoking, drug and alcohol, nutrition, hypertension, cholesterol level, physical fitness, stress management, safety and suicide prevention.

In the early 1990s Surgeon General Alcide Lanoue tried to shift the AMEDD from crisis intervention to a wellness and health promotion focus. Patients were taught to administer self-care for minor illnesses and offered health fairs; drug, alcohol and smoking-cessation programs; and ready access to advice nurses. Lanoue reorganized assets and programs to create the US Army Center for Health Promotion and Preventive Medicine in 1994. The first commander commented "We've done a lot of health promotion throughout the Army; however, all of these efforts can now be focused under one command, with specific direction and purpose." USACHPPM continued until 2008, when reorganization planning began to create Public Health Command. Surgeon General Eric Schoomaker stated "The establishment of the USAPHC (Provisional) is the most visible step in Army medicine's efforts to transform the nation's sick-care paradigm to a healthcare paradigm where disease and injury prevention become the foundation for American and military healthcare."



From *HSC Mercury*, February 1977

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**Sleep: you're not really zzzzz-ing your life away**

## Fighting Sleep: The Army's use of amphetamine to combat sleep deprivation

Lewis Barger, Office of Medical History

For the last few years, the Army has promoted the importance of sleep as a component of the Performance Triad, a campaign designed to improve the medical readiness of soldiers by improving the quality and quantity of their sleep, activity (exercise), and nutrition. With slogans like “Sleep 8 to Be Great” and “Loss of Sleep = Loss of Performance” it is clear that the underlying motive for encouraging soldiers to get enough sleep is to maximize their physical and mental performance, or more specifically, to eliminate the decrements to alertness, mental acuity, and physical stamina associated with sleep deficit. For much of the last century, though, the Army's attitude towards sleep has been focused on finding ways to reduce soldiers' requirement for sleep, while searching for the sweet spot that balanced a minimum rest requirement with an acceptable level of functionality.

Until the 20th Century operational tempos were lower. Armies usually campaigned when draft animals could graze, and fought few night battles. Patterns of combat for industrialized nations began to change during the late 19th Century. By the time of the First World War, armies were routinely able to sustain operations longer than the human soldier could function effectively without sleep; operations could take place night or day, disrupting circadian rhythms. Industrialization, in general, and the introduction of technological capabilities including gasoline-powered vehicles, field telephones and radios, shelf-stable rations, and global transportation networks made it possible for armies to engage in combat regardless of the season, weather, or time of day. An army that could operate continuously held a significant advantage over an opposing force that lacked the same capability, and the greater the mismatch, the earlier the war could be concluded, reducing the long term cost in blood and treasure, even if it meant a short term increase in both.



With the limits of human endurance proving to be one of the remaining stumbling blocks to continuous operations, the Army followed two approaches. The first was to train soldiers to operate effectively even under conditions of reduced sleep. Beginning with basic training, reduced sleep demonstrated for the trainee their ability to operate under less than ideal conditions, and facilitated the trainee's transition from civilian to soldier. The second approach was to find an artificial method of replacing, or at least forestalling the need for sleep.

Advances in physics, chemistry, and biology in the first half of the 20th Century led some to believe that no problem was unsolvable, although the serendipitous nature of some discoveries also offered the possibility that a happy accident might lead to a new wonder cure. In 1929 Gordon Alles, a chemist, synthesized amphetamine and conducted animal and human tests as part of a search for a substitute for ephedrine. Alles patented an orally consumable formulation in 1932, and the following year the pharmaceutical company Smith, Kline, and French patented a different form of the same drug for use in an inhaler. Sold over the counter under the name Benzedrine, the inhalers were available to anyone searching for a decongestant. Smith, Kline, and

French acquired Alles' patent in 1934 and in 1937 began marketing Benzedrine sulfate tablets in prescription form to treat narcolepsy and minor depression. The euphoric qualities of amphetamines had been noted as a side effect, along with the drug's ability to enhance mental acuity and cause insomnia. When the US entered the Second World War, the Army provided ground troops Benzedrine tablets and inhalers to aviators.

The Japanese, British, and Germans had been supplying amphetamine (or methamphetamine, in the case of the Germans) to their soldiers and as the US entered the war, the idea of not providing their own soldiers with all the chemical advantages enjoyed by both ally and enemy seemed downright un-American. The

National Research Council chose Andrew C. Ivy, head of the Division of Physiology and Pharmacology at Northwestern Medical School, to serve as their point man for fatigue research. Ivy's principal qualifications for the job were having co-authored a review of the literature on Benzedrine sulfate, the oral form of the drug, and having performed some informal experimentation with himself as the subject. Ivy's review noted that Benzedrine was safe, promoted wakefulness, and left the user with "a subjective feeling of "augmented energy, relief from fatigue, mental stimulation, increased confidence, loquacity, general expansiveness, optimism, and euphoria." Significantly, Ivy noted neither that the American Medical Association's Council on Pharmacy and Chemistry had advised against using amphetamine to promote wakefulness in 1939, but he also suggested that further testing should be performed to quantify the physical and mental effects of amphetamine on exhausted subjects. In 1941 the National Research Council directed research along those lines which included studies by the Harvard Fatigue Laboratory comparing the effects of amphetamine, caffeine, and methamphetamine. Of the three, only caffeine definitely improved the quantity of work performed and none of the three held promise for speeding up recovery times. Later studies, though, indicated that at simulated high altitude, caffeine reduced a flyer's fine motor control while amphetamine could, for a short period, forestall an exhausted soldier's requirement to sleep and might improve eye-hand coordination and mental acuity, all while improving his mood. Benzedrine's original use as a vasoconstrictor was effective in relieving the congestion of bomber pilots using oxygen masks at high altitudes. Ivy eventually recommended amphetamine for issue in emergency situations when mission requirements would preclude fatigued soldiers receiving adequate rest. Neither caffeine nor amphetamine held any great advantage over the other in this area, but the potential side effects of caffeine at altitude rendered it the less desirable of the two drugs. Ivy also proposed that the decision to issue amphetamine for this purpose should be a tactical, not a medical decision.

Smith, Kline, and French ran advertisements in medical journals to ensure that physicians were aware of the non-traditional uses for Benzedrine. One advertisement, intended for doctors serving with ground forces, noted that although issuing Benzedrine sulfate tablets to soldiers "when intense or prolonged operations, without opportunity for normal rest, are anticipated" was a "tactical rather than a therapeutic use," military doctors "would be interested to know that this familiar, clinically established drug has such a unique military application." Flight surgeons, meanwhile, were advised of the "convenience and therapeutic effectiveness" of Benzedrine inhalers, and even offered a coupon to fill out so that Smith, Kline, and French could send an inhaler for the flight surgeon's personal use.

The Army issued amphetamine throughout World War II and it remained available for issue after that, although tactical use dropped substantially after the end of the war. The Air Force, established in 1947, did not approve tactical employment of amphetamine until 1960. The formulations changed somewhat along the way – dextroamphetamine, a chemically pure isomer of amphetamine sold under the trade name Dexedrine was about three times more potent than Benzedrine, and so became the oral amphetamine of choice.

During the 1950s and 1960s the civilian medical community grew increasingly aware of and concerned about the risk of abuse associated with amphetamine. Initial beliefs that amphetamine had a low risk of addiction were reversed as it became apparent that abuse of the drug could lead to dependence. Still, under medical supervision, and for limited periods, the military considered the risks of amphetamine use manageable, and lower than the risk of entering battle in a fatigued state against a rested enemy.

In 1958, the Army Aviation Center's flight surgeon announced that the Benzedrine in inhalers had been "removed because of its habit forming qualities." In its place, Benzedrex (propylhexedrine) inhalers were issued. Dexedrine remained available for issue to aircrews during continuous operations, but the Army was also searching for other pharmaceuticals which could provide the benefits of amphetamine without the undesirable side effects. In peacetime, aircrews were still the most likely to be issued amphetamine to support operations under sleep-deprived conditions. The risks associated with even a short period of inattention in the cockpit when fatigued aviators were required to continue flying justified the practice.

Dexedrine remained available for combat issue to ground troops through the Vietnam War, although actual employment was substantially lower than it had been during World War II. Dexedrine and

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methylphenidate (Ritalin) reportedly were routinely issued to the soldiers assigned to at least one unit's Long Range Reconnaissance Patrol element, who found the drugs particularly useful during the period when the unit was returning to their base, and most likely to be fatigued and inattentive to the tactical situation. Commanders may have been less likely to require soldiers to take a drug for tactical reasons at the same time they were trying to curtail unapproved drug use, which included amphetamine abuse. The availability of opiates, marijuana, psychedelic drugs, and amphetamine, changing societal values, and an unpopular war led to significant rates of drug abuse and addiction, particularly in young, junior enlisted soldiers serving in Vietnam. Military drug abuse reflected increases in the civilian community, and the US Government responded in 1970 with passage of the Controlled Substances Act. Amphetamine was classified as a Schedule III drug in the initial legislation but was bumped up to a Schedule II listing the following year, indicating that it had valid medical use, but was also at high risk for abuse, and if abused, represented a significant hazard to the abuser. As a Schedule II drug, amphetamine could only be administered by written prescription. Widespread distribution of the drug, as had been the practice with ground forces during World War II and to a lesser extent during Vietnam, was no longer possible. Air crews continued to plan for amphetamine use during wartime and specific peacetime conditions, routinely referring to Dexedrine as "go pills" after the early 1960s. For nearly all of the rest of the Army, though, amphetamine, originally seen as an essentially harmless drug that enabled soldiers to operate for extended periods with less rest during World War II, and considered a justifiable and manageable risk when given under appropriate medical supervision during the 1950s and early 1960s, had been transformed into a necessary evil, but a necessity that the military preferred to keep out of the public eye.

In 1991, the Air Force ceased permitting "in-flight medications, including amphetamines, by Air Force personnel," but a few years later returned to allowing amphetamine use in specific conditions, under supervision. Army aviation units continued to plan for the use of amphetamine, but also placed more emphasis on achieving a sufficient state of rest to support continuous operations through rigorous adherence to crew rest schedules and by close management of missions and crews. As part of the effort to ensure that crews received adequate rest, investigations into hypnotic drugs in the benzodiazepine family were undertaken as a means to ensure that crews actually could achieve useful rest when changing time zones or otherwise being required to time-shift their sleep cycle, or even because the environment precluded effective sleep. Triazolam (Halcion) and Temazepam (Restoril) were approved for operational use in war and peace, respectively, but Triazolam also demonstrated some undesirable side effects and by 2005 it was no longer included in the approved list of sleep aids. Despite the increased focus on rest, stimulants remain in the inventory, recognizing that there will be times pharmacological enhancement of vigilance and wakefulness will ensure best accomplishment of the mission.

Amphetamine's time in military service may be coming to a close. Modafinil, a drug developed in the 1980s and marketed under the brand-name Provigil, has been added to the Army's approved list of performance enhancement drugs. In the civilian community Provigil is supplanting Adderall, another amphetamine formulation, as the drug of choice for treating narcolepsy and improving mental focus, the same qualities that made amphetamine so attractive for military use. Modafinil, however, does not impart amphetamine's eupho-



Once amphetamine was no longer available over the counter, Benzedrex replaced Benzedrine in inhalers to relieve nasal congestion for aviators. Illustration by Donald R. Smith, US Army Aviation Digest, May 1957.

ria, presumably removing much of the motivation for recreational abuse.

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The Veterinary Corps was established on 3 June 1916 to care for the Army's animals and inspect food. The large-animal mission largely disappeared after World War II, but military working dogs became increasingly important. In this picture, 1LT David W. Sorokwasz, VC, of the 936th Medical Detachment (ID) mentally reviews before an operation on 'Baron' at Tan Son Nhut Airbase, Republic of Vietnam, 22 October 1966.

Due to increased numbers of working dogs in Vietnam, the 936th was established in the country in January 1966 to provide high-level veterinary care. The 504th Veterinary Detachment (small animal dispensary) arrived in October 1966 to supplement the hospital's resources.

### Medical supplies via artillery shells

In late October 1944, German counterattacks isolated much of the 1st Battalion, 141st Infantry Regiment of the 36th Division. Supplies were dropped from fighter-bombers, but the weather deteriorated and German pressure pushed in the “Lost Battalion” perimeter. In desperation, resupply was conducted by artillery, which could both be more precise and operate 24/7.

The top two photos show the loading and sealing of artillery shells that normally carried propaganda leaflets to carry food (D-rations, essentially vitamin-fortified chocolate bars), water-purification tablets, and medical supplies. The bottom left photo shows men of the “Lost Battalion” unloading the supplies.

All photos are from the National Archives; the bottom left image comes via [www.ww2db.com](http://www.ww2db.com).



## A Brief History of Army Physical Readiness Training and Assessment

Whitfield B. East, Professor, Department of Physical Education, U.S. Military Academy

Over the past 200 years U.S. Army's physical readiness training (PRT) efforts have experienced varying levels of support and neglect. Beginning in the early 1880s Army PRT was almost entirely West Point-centric. Many historians have concluded that the progenitor of Army PRT was CPT Alden Partridge, the 4th Superintendent of the United States Military Academy (1815). Partridge was an avid outdoorsman who valued physical conditioning as an integral part of officership. In mid to late 1800s leadership of Army PRT fell to a series charismatic USMA military officers such as John Kelton and Edward Farrow. USMA "trained the trainers" who would ultimately lead Army physical readiness training. In 1885 the legendary Herman Koehler was selected as the Master of the Sword in the Department of Military Training. Trained at the Milwaukee Turnverein, Koehler imported the training methodologies of Prussian educator Frederick Jahn directly into Army PRT. By incorporating a series of progressive body-weight exercises that utilized various apparatus such as vaulting horse, parallel bars, ropes, and ladders, Koehler significantly changed the physical condition and readiness of West Point cadets and therefore the Army.

At the onset of WWI the United States Army faced its first large-scale troop mobilization, starting significant changes for Army PRT. Although Koehler was an advocate of organized sport, he viewed sport as a functional application of physical training. With the mobilization of approximately 10 million soldiers, Army training camps were overwhelmed and became a magnet for prostitution, gambling, and drinking. In an attempt to combat this moral decay President Woodrow Wilson appointed Raymond Fosdick to lead the Commission on Training Camp Activities. Although Fosdick took a multidisciplinary approach to the morality problem, he primarily relied on sport participation to provide a "healthy" diversion. Utilizing his educational connection to Princeton University, Fosdick selected Dr. Joseph Raycroft, Director of Princeton's Department of Health and Physical Education, to develop a comprehensive sport program for millions of volunteer and conscript soldiers. Known for introducing "mass athletics" (intramural sports) into the physical education curriculum at Princeton, Raycroft set about utilizing sport to solve three problems; occupy large blocks of "down" time, improve functional fitness, and promote unit cohesion. When WWI came to an abrupt end in 1918, Raycroft and Fosdick endeavored to preserve their PRT model by incorporating it into Army doctrine. With the aid of the "training camp" cadre of military and civilian physical trainers, Raycroft formulated two main efforts: (1) the development of the Physical and Bayonet Training "course" at Camp Benning (1919) and the publication of a new PRT manual, *Mass Physical Training* (1920).



WWI Army PT formation.

During the two decades between WWI and WWII physical readiness training slowly reverted back to its roots with the publication of three doctrinal manuals: Training Regulation 115-5 (1928); Basic Field Manual (1936); and FM 21-20 (1941). All three manuals were published under the guidance of the Superintendent, United States Military Academy. Although Koehler's training doctrine worked well at West Point, where there was sufficient time to prepare cadets physically, preparing recruits for combat in 12 weeks was an entirely different matter. In virtually every combat after action review, leaders expressed concerns over how poorly citizen-soldiers were prepared for the physical rigors of combat. "Of the first two million men examined under Selective Service, fully half were found unfit for military combat service." "Had we had proper physical fitness programs in America for the 23 years prior to Pearl Harbor, many of our boys that made the supreme sacrifice would be alive today."

In late 1941 and early 1942 Col. Theodore Bank (chief of the Athletic and Recreation Branch of special services) enlisted the services of noted civilian physical education professors Charles McCloy and A.A. Ess-

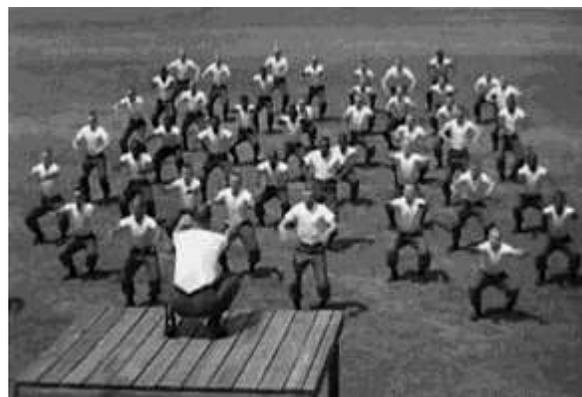
linger to develop the Army's new physical training and assessment program. They began by administering 25 different physical fitness assessments to over 400 soldiers to determine which fitness assessments best measured combat readiness. They determined ten items that best discriminated between fit and unfit soldiers: pull-ups, 20 sec. burpee, triple bound - 3 successive broad jumps, shot put, push-ups, 75-yd pick-a-back run, dodging run, 6-sec run, sit-ups, and 300-yd run. In the first 6-week training study that employed their new PRT program, significant improvements in total physical conditioning were observed: 30% in pull-up strength, 50% in push-up and abdominal strength, 8% in cardio-respiratory endurance, and 11% in muscular endurance. In the second 5-week training study soldiers in the "control" company reported a 3.5% increase in physical fitness, while soldiers in the "experiential" company reported a 23.5% increase in total physical conditioning.

In March 1942, while Esslinger, Bank, and McCloy were developing the new scientifically-based PRT program, the War Department initiated a major reorganization of the force. The Army Ground Forces (AGF) was created to provide ground forces that were properly equipped and trained for combat. Only a month later, the Army published Bank's new physical training guidance in the form of Training Circular 87 (TC 87). TC 87 contained specific distances/times for ruck marching and more specific guidance for calisthenics, grass and guerilla drills, and running exercises. Special emphasis was given to mobility runs and "double exercises." In order to increase the leg and shoulder strength and endurance, soldiers were directed to lift a partner and carry him some specified distance – effectively "doubling" the training load. These exercises utilized the overload principle to enhance strength and power, as well as improving functional casualty evacuation skills. They also served as the impetus for the 75-yard pick-a-back test item, which was included a year later in the Physical Efficiency Test Battery. Based upon the research by Bank, McCloy, and Esslinger, for the first time the Army had empirical data to support a physical training program and assessment battery.

Following WWII, Army leaders acknowledged the shortcomings in the physical readiness program and formally established the Physical Training School (PTS) in late 1945 at Camp Bragg, NC. The PTS was given two primary missions: (1) revise of FM 21-20 based upon lessons learned, and (2) develop and implement two educational courses: the Physical Education Supervisors Course and the Physical Training Instructors Course. Both courses were designed to provide knowledge and skills on how to design and implement a scientifically-based physical training program. The supervisor's course lasted seven weeks and the instructor's course lasted three weeks.



Following its Prussian Turnverein heritage, the U.S. Army historically did PT by units. The group exercise model (1) promoted a reflexive responsiveness to auditory cues (considered valuable during combat), and (2) prepared soldiers for more strenuous physical activity. These exercises were often called "disciplinary" or "setting up" exercises.



On 30 November 1950, only five months after the Task Force Smith debacle in Korea, the Army revised FM 21-20 for the third time. Interestingly there were only minor changes in the physical training doctrine: (1) the principles of exercise were identified as progression and overload; and (2) the phases of physical development were identified as toughening, slow improvement, and sustaining. The most significant content revision was the deletion of all “hand to hand” fighting activities that had first appeared in the 1946 FM 21-20. The approved physical fitness test remained the 5-item Physical Fitness Test Battery (Outdoor): pull-ups, squat jumps, pushups, sit-ups, 300-yard shuttle run or the alternative fitness test battery (indoor), which allowed for the substitution of an indoor shuttle run (250-yards at 25 yards per link) or 60-sec. squat thrust test for the 300-yard shuttle run.

### The Shift to Fitness

Beginning in the early 1970s two major paradigm changes evolved that would significantly influenced Army PRT doctrine and assessment, coalescing in the PRT surge of the 1980s. The first change, the birth of the fitness industry, resulted from the influences of physical fitness gurus like Ken Cooper and Arthur Jones. The second major paradigm change resulted from 1975 legislation that allowed women to enroll at the nation’s service academies. In the pervasive Cold War environment, from 1979 to 1981 Army leaders formulated a plan to change the focus of PRT and assessment from “combat readiness” to health-related fitness and weight control. The guidance from Army leaders prior to the 1980 revision of FM 21-20 – Physical Readiness Training was to develop and implement a gender integrated physical readiness training and assessment program. Prior to 1980 most men took the Advanced Physical Fitness Test, which purported to measure combat readiness by testing the inverted crawl, run-dodge-jump, horizontal ladder, bent leg sit-ups, and the two-mile run in boots. Most women took the Advanced Physical Fitness Test, which was composed of the 80 meter shuttle run, run-dodge-jump, modified push-ups (from the knees), modified sit-ups, and one-mile run.

The Army was not immune to the “fitness craze” that sweep the country in the early 1980s and on 26 April 1982 the US Army Soldier Fitness Center was reestablished at FT Benjamin Harrison. Following a 1981 recommendation from the DoD Military Services Physical Fitness study group, in early 1983 the US Army Soldier Physical Fitness Center created a program of instruction designed to develop subject matter experts in physical readiness training. The Master Fitness Trainer (MFT) course (with the associated “6P” Additional Skill Identifier) was a comprehensive, 4-week resident course taught at FT Benjamin Harrison by qualified fitness professionals. The program of instruction involved approximately 80 hours of classroom instruction and 80 hours of practical instruction. The MFT course was also incorporated into Advanced Individual Training for the “03C” military occupational specialty, Physical Activity Specialist.

Due to difficult economic times in the late 1980s, the Army initiated cost-savings efforts based upon recommendations by the Vanguard Task Force, including closing Ft Benjamin Harrison. Initially, plans were made to decentralize PRT doctrine and distribute authority to instillation commanders across the country. After significant discussions between the U.S. Army Infantry Center (USAIC), Army Medical Department (AMEDD), and Training and Doctrine Command (TRADOC), the decision was made to move the US Army Physical School to FT Benning and place it under the command of the USAIC. The move from FT Ben Harrison to FT Benning marked the beginning of a 20-year transition from emphasizing physical fitness to focusing on combat readiness.

### Recent Developments

In response to the lessons learned over the past 10 years a new Army PRT manual was published on 1 March 2010, the first significant revision in almost 20 years. This comprehensive revision marked a significant shift in PRT focus to preparing soldiers, leaders, and units for the physical challenges of fighting in the full spectrum of operations. “Combat readiness is the Army’s primary focus as it transitions to a more agile, versatile, lethal and survivable force.” Soldiers are trained to standards in mobility, strength, and endurance in the initial

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conditioning phase, toughening phase, and the sustaining phase. The three overarching principles of PRT training are precision (adherence to optimal execution standards), progression (systematic increase in intensity, duration, and volume), and integration (using multiple training activities to achieve balance and appropriate recovery).

Although FM 7-22 provides a solid foundation for Army PRT, over the past 10 years many combat-centric unit commanders have developed and implemented PRT programs that provide higher levels of training intensity. Most notably ancillary PRT programs have been developed by the 75th Ranger Regiment (Ranger Athlete Warrior Program), the 101st Airborne Division (Eagle Tactical Warrior Program), and the 3d Combat Brigade Team/4th ID (Tactical Athlete Warrior Program).

These programs generally have three unique features. The first feature is a comprehensive personnel support structure, to include certified strength trainers, registered dietitians, and athletic trainers/physical therapists. Onsite supervision and training is a significant factor in performance progression and injury prevention. The second feature is a modern strength training facility, such as Garcia Physical Fitness Center at FT Carson. This facility was repurposed for the Tactical Athlete Warrior Program and offers state of the art strength training equipment. The third feature is a shift in focus from unit PRT to the individual soldier. Historically the Army has opted for the more cost effective mass athletics (unit) PT model, which generally forces the unit to regress to the weakest soldier. In the soldier-centric model PRT leaders assess the individual soldier's physical readiness and design a periodized training program designed to enhance optimal performance. In 1913 Captain Merch B. Stewart proposed the solution to the "unit PT" problem. In the introduction to his book *Physical Development of the Infantry Soldier* he wrote: "...in the training of the soldier, the greatest benefit is not derived by indiscriminate and impartial use of these exercises. Each individual soldier presents a special problem in physical training; each should be studied and diagnosed as to his particular requirements and each should be given the training his condition requires."

The most valued resource in the U.S. Army is the individual soldier. Throughout the past century of armed conflict physical readiness has been universally recognized as a force multiplier for combat effectiveness, resilience, and survivability on the battlefield. The Army spends billions of dollars each year developing and producing tactical weapons and funding the associated training necessary to deploy them. Although we have the most technologically advanced Army in the world, the Army's commitment to physical readiness training is desultory in comparison. As the Army moves forward to a smaller, lighter, more mobile force in the fight against the global war on terrorism, a long-term, comprehensive commitment to the highest quality physical readiness training is mandatory to ensure our future success.



Logo of the 'RAW' unit program.

## Sources

This article is based on the author's *A Historical Review and Analysis of Army Physical Readiness Training and Assessment* (Ft Leavenworth: Combat Studies Institute Press, 2013).

Images come from Dr. West's book, pages 56 and 132, courtesy of Combat Studies Institute.

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## Artifacts of Exercise

Charles Franson and Paula Ussery, AMEDD Museum

The Surgeon General's Performance Triad emphasizes the importance of regular exercise and physical activity that can lead to long-term health benefits and reduce the risk of many chronic diseases such as depression, diabetes, heart disease, high blood pressure, obesity, stroke and some forms of cancer. Type II diabetes, cardiovascular disease, cancer and death. And the Army has long encouraged its soldiers to engage in a variety of physical pursuits, either as recreation or specifically dedicated physical drills in order to meet the challenges of their mission to defend the United States of America. The AMEDD Museum has been fortunate to acquire a variety of artifacts related to the Army's long emphasis on physical fitness.

This World War I swimming suit is the oldest activity-related artifact in the museum collection. It belonged to ambulance driver SGT Charles Whiteman, who served with the 90th Division. It is made of green wool, a common fabric for bathing suits of that era, and is a sleeveless tunic with attached bathing trunks worn underneath.



Before mechanization, the Army encouraged mounted personnel to play polo, not only for physical activity but to improve riding skills. Army polo had its start at Fort Riley, Kansas, in 1896. Polo teams were assembled, schooled, and traveled to compete against other teams at Fort Benning, Fort Bliss and Kelly Field in Texas, and Fort Douglas, Utah. In 1902 the Army Polo Association became part of the U.S. Polo Association, and by 1914 there were 17 Army stations playing polo. By 1928, 47 Army posts scattered throughout the country

playing polo as well as Army teams in the Philippines, Hawaii, and Panama. In the 1930s, at the highpoint of polo's popularity in the United States there were an estimated 1,500 military polo players, including such famous Army officers as George S. Patton, Lucian Truscott, and Jonathan Wainwright. From the golden age of polo the AMEDD Museum is fortunate to have a polo ball and several horse and polo related trophies from COL Burlin C. Bridges, VC.

West Point graduate Abner Doubleday is given credit for developing the American game of baseball, which was popular as early as the 1850s. A Civil War soldier in the Army of the Potomac wrote, "The parade ground has been a busy place for a week or so past, ball-playing having become a mania in camp. Officers and men forget, for a time, the differences in rank and indulge in the invigorating sport with a schoolboy's ardor." This popularity continued throughout the 19th and 20th Centuries, with soldiers playing at most far-flung outposts. Play between companies and games with local civilian teams were common. Teams often purchased their own uniforms with company funds. At the end of WWII in Europe, the Army actually presented a "World Series" type championship played in the (former) Hitler Youth Stadium in Nurnberg. This game included several players from the "Negro Leagues" playing on integrated teams. The Museum is fortunate to have a Carlisle Barracks (Medical Field Service School) Baseball League trophy from 1930, won by the 2nd Ambulance Co. This trophy traveled to Fort Sam Houston when the Medical Field Service School relocated after World War II. The museum also preserves a softball glove from Thomas F. Plumley, who served with the 31st Field Hospital in Korat, Thailand, in 1966-1967 and a complete softball uniform donated by COL Roger Labat MSC, who played on the first softball team organized at Health Services Command.





The oldest uniforms in the collection that were designed for mandatory physical fitness training are from the WAC, the Women's Army Corps. The WAC was created in World War II due to the global need for manpower. Among the uniforms created for the WAC was an "exercise suit" that was worn for physical training, fatigue details and recreational sports. The WWII WAC exercise uniform was of brown and white striped seersucker. It consisted of a dress that buttoned down the front; worn underneath were a pair of Bermuda length shorts. In 1958 the dress was replaced by a more practical shirt and skirt ensemble, with shorts worn underneath, and the color was changed to taupe, the official color for women's uniforms. This design of skirt, shirt and shorts lasted into the 1970s. In 1969 a blue exercise suit was introduced and the AMEDD Museum has a blue WAC exercise suit issued to COL Bonita Pruitt, DC, in 1971, when she enlisted in the WAC. In 1972 the exercise suit was renamed the "training duty uniform" and the color changed to green. SSG Deborah Richards has donated her green training duty uniform from her enlistment in 1973.



## More than a full stomach: nutrition and the field ration

Sanders Marble, Office of Medical History

Rations are a never-failing source of conversation and complaint. The field ration has to balance nutrition and portability, and understanding and capabilities of those two have changed over the Army's history.

### Early rations

The Continental Congress legislated this ration:: One pound of beef, 18 ounces of flour, 1 pint of milk, 1 quart of spruce beer, 1.4 ounces of rice, and 6.8 ounces of peas.

Flour was often baked into hardtack to travel better; milk was a nice idea but it did not travel, and it is unlikely milk was regularly delivered anywhere, especially in those quantities. Spruce beer was a mild anti-scorbutic (scurvy-preventative) agent, but, again, impractical because a quart of spruce beer per man per day was too large to be manageable. This ration kept you full and had enough calories if the Commissary General could actually supply everything, but was vitamin-deficient. That should not be a surprise; vitamins were not discovered until the early 20th Century and even carbohydrates, protein, and fat (as subcomponents of food with differing nutritional effects) were unknown concepts. The main reason foods were chosen for the ration was because they shipped and stored well. Moreover, troops were *expected* to get food beyond the ration: by purchase, by foraging, by gifts from civilians, or by growing it themselves if camped long enough.

The ration changed little between 1775 and the 1890s, and some moves were backwards. Vegetables and spruce beer were dropped in 1790. Coffee was added, and rum removed in 1832. Aside from a small allowance of peas and beans, there was relatively little change. Joseph Lovell, the first Surgeon General, suggested replacing some of the meat with vegetables, but he was ignored. However, the army did not waste away from deficiency diseases. First, soldiers bought and/or grew ration supplements; most forts had land to grow vegetables, keep cows, and so forth. Troops also foraged, either hunting or gathering. In the desert southwest, surgeons found cactus juice an effective, if unpalatable, anti-scorbutic. To get the troops to drink it they added sugar, lemon extract, and – probably the key – whiskey. Furthermore, “commutation” was allowed. A unit could take the cash value of some of the authorized ration and buy other food. But these supplements stopped when troops went into the field. Then it was back to hardtack and salt meat.

### The Civil War

The ration was almost unchanged in the Civil War. Potatoes were added in 1861 and desiccated vegetables were available to U.S. forces, but troops hated them (calling them ‘desecrated vegetables’ or ‘compressed hay’) and over-cooked them. Thus, most of the vitamins that had survived the drying process were destroyed. To reduce bulk, “essence of coffee” was developed, but it looked – and tasted – like axle grease and was soon replaced with ground coffee. Eben Horsford, a pioneering civilian nutritionist, explored better rations, and the Army bought some to test. Horsford’s designed his Marching Ration to be more compact, with roast wheat instead of hardtack and 3 ounces of cooked-down beef he claimed was equivalent to 10 ounces of fresh lean beef. It may or may not have been nutritionally equivalent, but it was an utter disaster: the wheat molded and the meat spoiled – even dogs would not eat it.

In the Civil War there were thousands of troops on campaign for months and even years, and some nutritional problems arose. Scurvy developed over winters, and during the Atlanta Campaign around 20% of Sherman’s troops showed symptoms until fruits and berries were ripe. Elsewhere, there were occasional skirmishes for berry patches, the



Soldiers cooking, Civil War. Source: Library of Congress

prize being the berries with their Vitamin C, although the troops probably wanted the sugar and flavor. Some Confederate troops, living largely off cornbread and bacon, developed night blindness due to low Vitamin A levels.

After the Civil War, the modest improvement for the citizen-soldiers disappeared. There was still no official field ration, although an improving canning industry could produce tinned meat and vegetables. These were mainly used as a travel ration for railroad journeys where troops could not build fires for cooking, rather than in the field. By the 1890s there were glimmers of nutritional science. Foods were analyzed for carbohydrates, fat, and protein but the Army was still largely concerned with filling the stomach: 1882 regulations allowed the substitution of bread if no vegetables were available. In 1890 a pound of vegetables per day was authorized, but 70% had to be inexpensive potatoes.

### Early efforts at a field ration

In the mid-1890s the Army was seeking a field ration, confusingly called the emergency ration, reserve ration, haversack ration, or marching ration. There is no evidence medical advice was sought: the goals were a compact size, low weight, and use of normal foods. Compressed bread and cooked bacon were tried, but they upset the stomachs of all who tried them, presumably due to bad packaging. By default the Army ended up with uncooked bacon and hardtack. With half the calories coming from pork fat, which cooked out, "Its sole merit lay in its portability." In 1907 something like Horsford's ration was adopted: 3 ounces of powdered evaporated beef, 6 ounces parched wheat, 3 ounces of chocolate. This was canned together in a small, flat package that fit into a pocket. The Army was still not satisfied and kept tinkering. A 'chocolate ration' proved unsatisfactory during the Punitive Expedition into Mexico and was abandoned; it may have melted in the heat.

There was still little nutritional consideration. These rations were intended to tide troops over for a few days, and had 1200-2500 calories versus the roughly 4500 in the garrison ration. The goal seems to have been to keep energy levels up and hunger pangs down. Nutritional analyses were done on calories, protein, carbohydrates, and fat, but that was all that was done before WWI.

By the time the U.S. entered WWI, nutrition science had advanced by leaps and bounds. As already noted, foods were analyzed for calorie content and protein/fat/carbohydrates. The concept of accessory food-stuffs was propounded in 1906 and the label 'vitamines' applied in 1912. (It would become vitamins in the 1920s when scientists learned that not all were amino acids.)

In WWI trench warfare, hot food could often be brought forward to the front lines. Troops were issued a reserve ration (also known as an iron ration, or, from the meat-packing company, an Armour ration); it was hard bread, corned beef, coffee with sugar, and chocolate. Yet the Army suddenly began doing more. Surgeon General William Gorgas created a Division of Food and Nutrition to inspect food in camps, to improve mess conditions, and to study ration requirements. Given the short length of America's war, the Food and Nutrition Division barely got off the ground, but it tried. Vitamin research was started and Army nutritionists visited camps with advice on foods and cooking. As long as troops were getting cooked meals at least once daily (and twice daily was frequently possible, even in the trenches), better nutrition was being pushed into the field by teaching cooks. The leading nutritionist, LTC John Murlin, noted the basic ration had too many calories, was not well balanced, and was especially fatty.

In the 1920s, the Quartermaster Corps was still responsible for field rations. The Reserve Ration was slightly modified several times, with different quantities of beef, bread, and chocolate. Deficiencies were noted, but no action was taken because "its infrequent use precludes the necessity for a substitute" ration. Meanwhile, science was identifying more vitamins and minerals: Vitamin C in 1928, Vitamin K in 1934, Vitamins D and E in 1922. By 1940 fifteen vitamins were recognized, as well as a number of minerals. In the 1930s drug companies were profiting heavily from a public that wanted vitamins. This knowledge was taken into the Army, with the amounts of vitamins needed unknown but the subject of active research.

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## WWII rations

By the mid-1930s the Army was looking to overhaul the field rations. The first of the new rations was the D-ration, a fortified chocolate bar that really was not a ration (“food for the subsistence of one person for one day”) but a stand-in for a missed meal. It was so calorie-dense that it could make men nauseous if gobbled and had to be fortified with Vitamin B1 to help absorption of the calories. The D-ration was the first of a new family of rations that eventually had nineteen elements at least considered. Most were special purpose; the big three were supposed to be the A-ration (the garrison ration tweaked for training or field delivery “to meet existing field conditions”), the B-ration (the A-ration but without refrigeration and using canned foods to reduce bulk), and the famous C-ration.

Beginning in 1936, the Quartermaster Corps was researching and testing the early C-ration. Early batches were grossly low in some vitamins and, due to a math error, the original sample had half the expected calories. Standardized and adopted before field tests were completed, the C-ration had some basic problems. It was bulky, heavy, and awkward, so soldiers were not inclined to take a full load. To ease manufacturing, the Quartermaster Corps accepted a reduction in variety. Theoretically there were equal quantities of the three meat rations, but producers found the ‘meat and hash’ to be the easiest to make and it was over-produced. To the soldier chewing on the same ‘meat and hash’ for ten days or more, it was a problem – a problem that could lead to reduced consumption and thus reduced nutrient and calorie intake. The C-ration provides a lens to examine some nutritional problems. It was never tested for palatability, and the design parameters were only “as palatable as possible.” There were problems of Vitamin C consumption, since most Vitamin C came from the lemon juice powder. Troops considered it ‘bug juice’ and used it to bleach floors rather than drink, pointing to the risk of putting most of one nutrient in one food item. (The Vitamin C was eventually added to candies and the bug juice dropped.) By 1944 there were ten different types of C-ration meat or meat-vegetable menus instead of the original three, and two types had already been dropped. Responding to other troop complaints, the candies were varied with commercial types. By the winter of 1944-45, help was on the way. Troops had chewed their way through the mountains of 1942-43 C-rations and the supply chain had produced enough of the new versions. Positive, sometimes enthusiastic, reports began to arrive. AMEDD nutritionists had gotten their point across: the C-ration was adequate for nutrients as long as troops ate it, and The Quartermaster General had begun fixing the problem.

In contrast, the K-ration was morale-neutral. It was developed to be portable for high-mobility troops, and easily fit into paratroopers’ patch pockets. It proved more popular in testing partly for non-food reasons: the shape was handy. It also used commercial-style components (e.g. Spam and canned chicken) familiar to GIs. It had more calories and vitamins than the C-ration, and still more of Vitamins A and C was added.

The Surgeon General reestablished a Food and Nutrition unit on 26 August 1940 and received the authority to set Army diet and nutrition standards. Army and Navy Surgeons General also pushed the Office of Scientific Research and Development to organize civilian nutritionists in 1940. Research was largely done by conscientious objectors (who volunteered as test subjects) and looked at climatic variations on metabolism and eating, and also vitamin super-abundance. Studies also found no great loss of vitamins in sweat, that there was no need for salt tablets if meals were eaten (even at 10 liters sweating per day), and that a high-protein diet helped in cold environments. Scientists also tried to find ways to make food more attractive (e.g. keeping dried eggs from browning) that would increase consumption and reduce waste and shipping space. In 1944 a Medical Nutrition Laboratory was created directly under The Surgeon General, with approximately twenty-four personnel, replacing the four personnel crowded into the Army Medical School.



A K-ration supper menu. Signal Corps photo.

### Post-WWII developments

With millions of late-WWII C-rations still in depots, there was another lull in ration development after WWII. Not until 1958 did a new ration come about, the Meal, Combat, Individual (MCI). Learning from WWII, there was a greater variety of menus, and greater variety of candies, fruits, cigarettes, etc. This let troops personalize their meals and helped morale some. (Cigarettes were discontinued in 1972.) The MCI was often mistaken for the C-ration; both had canned elements and both were being used concurrently, so it hardly made a ripple on the soldier's consciousness. The next generation of ration made a bigger impact. Design work on the Meal, Ready to Eat (MRE) began in 1961 and it was adopted in 1975, finally coming into service in 1981. (While the C-ration had problems, it was developed in roughly three years on a project budget of \$300.) As an example of how multiple technologies interact in rations, the development of flat retort packaging (flexible foil/plastic pouches) meant lower heat levels rendered foods safe for storage; lower heat meant more menu choices were possible; more menu choices meant higher troop acceptance and better field nutrition. While MREs do not enthrall everyone, it shows the Army has learned something. Since the MRE is designed to be fed for up to ten days, there had to be a greater menu variety, and menus rotate every two years. Harking back to WWII, there is no use having food and nutrients in the ration if troops do not eat them. Adding hot sauce, developing pouch bread, the flameless heater, the desert chocolate bar, better coffee, and commercial candies are all ways to get nutrients where they matter – into the troops.

### Current research

The Army also continued its basic research. After WWII military nutrition research was transferred from Chicago (where it was convenient for the Quartermasters) to medical facilities; the Army Nutrition Laboratory was transferred to the USDA in 1979 on Congressional orders, but other research continues. As the science of nutrition has developed, so has military nutrition research, because military needs do not always match civilian ones. For instance, power bars for endurance athletes are not what combat troops need; soldiers' energy expenditure is much more episodic.

Where is the Army looking? In the continuing effort to get troops to eat all their MRE, labeling/graphics/logos are being studied. In today's consumer culture, we all react to marketing and it can affect how we eat. The military is also studying how the climate – both physical and command – affects food consumption. Sergeants may be trained to make positive comments about MREs if that helps troops eat them.

The Army also looked into whether it was possible to raise physical performance 10-15% through foods and/or food supplements. In line with the quasi-pharmaceutical claims for food supplements, research is ongoing about stocking rations with vaccines or vaccine-like drugs; on putting precursor chemicals into rations to increase body production of neurotransmitters or histamine; on blocking stress-related chemicals; on reducing sleep-deprivation effects; and on what nutrients snacks should have to sustain clear thinking.

As an example, the Army wants a cognitive stamina extender for tired soldiers, especially those performing repetitious duty – guards, drivers, etc. Amphetamines have been ruled out; amino acids as precursor chemicals are a possibility; serotonin is an option; Modfinil (a narcolepsy drug) is an option. But the best option, balancing all factors, is caffeine, and it has been in the ration since 1832. Overall, recent research has shown that it is not possible to boost troops above 100% of normal physical performance through food supplements but a better possibility is reducing the performance degradation of stress and fatigue.

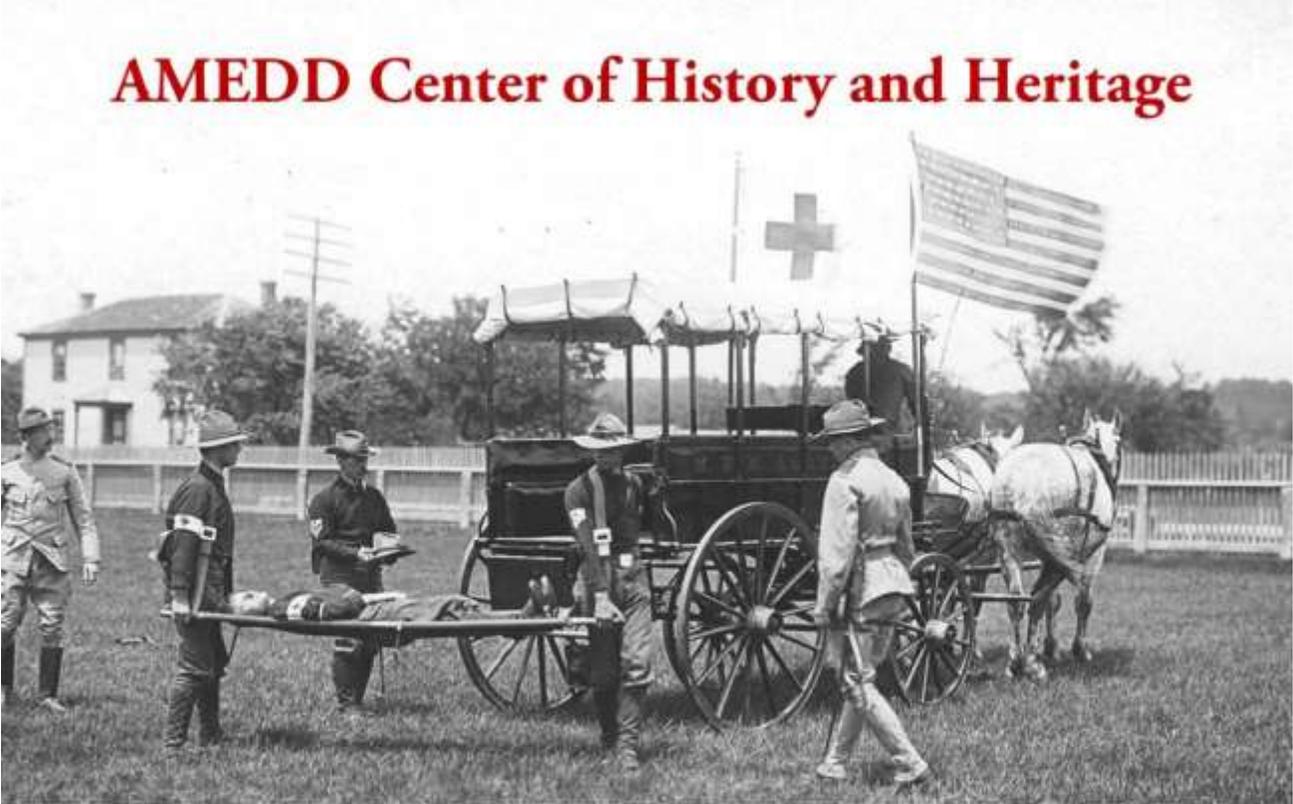


Soldiers eating MREs, 1980s. ACHH collection.

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## The 2015 Spurgeon Neel Award

The Army Medical Department Museum Foundation is pleased to announce the 2015 Spurgeon Neel Annual Award competition for a paper of 5,000 words or less that best exemplifies the history, legacy, and traditions of the Army Medical Department.

Named in honor of Major General (Retired) Spurgeon H. Neel, first Commanding General of Health Services Command (now U.S. Army Medical Command), the award competition is open to all federal employees, military and civilian, as well as nongovernmental civilian authors. More information about MG (Ret) Neel can be found at [http://en.wikipedia.org/wiki/Spurgeon\\_Neel](http://en.wikipedia.org/wiki/Spurgeon_Neel).

The AMEDD Museum Foundation will present a special medallion award and a \$500 monetary prize to the winner at a Foundation-sponsored event early in 2016. The winning submission will be published in the AMEDD Journal during 2016.

All manuscripts must be submitted to the AMEDD Museum Foundation by September 30, 2015. At the time of submission, a manuscript must be original work and not pending publication in any other periodical. It must conform to the Writing and Submission Guidance of the AMEDD Journal, and must relate to the history, legacy, and/or traditions of the Army Medical Department. Manuscripts will be reviewed and evaluated by a six-member board with representatives from the AMEDD Museum Foundation, the AMEDD Center of History and Heritage, and the AMEDD Journal. The winning manuscript will be selected and announced in December 2015.

Submit manuscripts to [amedd.foundation@att.net](mailto:amedd.foundation@att.net). Additional details concerning the Spurgeon Neel Annual Award may be obtained by contacting Mrs. Sue McMasters at the AMEDD Museum Foundation, 210-226-0265.



In World War I, occupational therapists and physical therapists served the Army as civilian employees, but wore RA (Reconstruction Aide) caduceus insignia. At the same time dietitians were also civilian employees, wearing HD (Hospital Dietitian) caduceus. In World War II, physical therapists (civilian employees until 1942) wore PT on their caduceus. On April 16, 1947 the Women's Army Specialist Corps was established, comprised of officers from those three professions and wore WS caduceus insignia. The law was amended in 1955 to allow commissioning of males and the corps was renamed the Army Medical Specialist Corps (AMSC). A fourth profession was added in 1992 when physician assistants were converted from warrant to commissioned officers.

## Writing for The AMEDD Historian

We are seeking contributions! We believe variety is the way to attract a variety of audiences, so we can use:

- Photos of historical interest, with an explanatory caption
- Photos of artifacts, with an explanation
- Documents (either scanned or transcribed), with an explanation to provide context
- Articles of varying length (initially we will try a 500 word minimum), which must have sources listed if not footnotes/endnotes
- Book reviews and news of books about AMEDD history

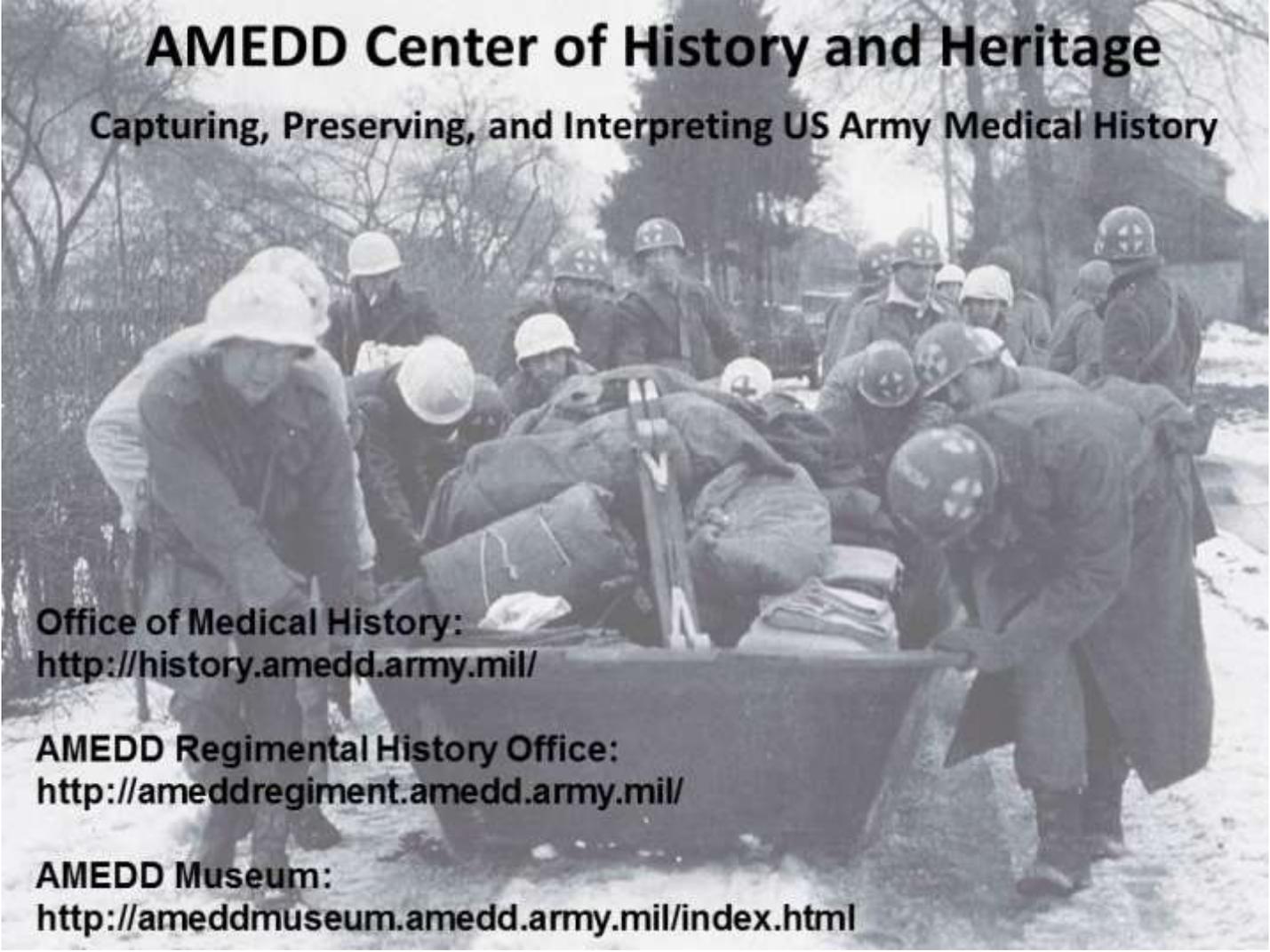
Technical requirements:

Photos will need to be at least 96dpi; contact us about file format. Text should be in Microsoft Word (.doc or .docx) format. Please do NOT send text with footnotes/endnotes in .pdf format.

Material can be submitted to [usarmy.jbsa.medcom.mbx.hq-medcom-office-of-medical-history@mail.mil](mailto:usarmy.jbsa.medcom.mbx.hq-medcom-office-of-medical-history@mail.mil)

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