

## **Army Women in Science, Technology, Engineering, and Mathematics (STEM) during World War II**

In 1942, President Roosevelt signed into law a bill creating the Women's Army Auxiliary Corps. The success of the Auxiliary and the work of WAACs, especially in North Africa under General Eisenhower, prompted the government to drop the Auxiliary status of these women and create a Women's Army Corps with all of the rank, privileges, and benefits of their male counterparts. From its inception, WACs have served in STEM-related positions. Many women were asked to join the WAC because they already had the skills necessary to complete the tasks. Many women were trained and educated in their STEM field prior to joining the WAC. A manpower shortage caused the Army to replace male soldiers with WACs in order to "free any able-bodied man to fight". The majority of these jobs were administrative, clerical, and supply. However, WACs were being utilized in other jobs under one of three Services; Army Ground Forces, Army Air Forces, and Army Service Forces.

### **Army Ground Forces (AGF)**

The smallest contingencies of WACs were in the Army Ground Forces. This was mostly because the AGF offered less desirable fields for employment of womanpower. The manpower shortage left the AGF short more than 160,000 male soldiers. Because of a debate in the use of WACs in the AGF, the total number of WACs who served with the AGT reached only about 2,000. WACs in AGF went through vigorous testing and those who passed were still easily reassignable should she not meet the standards for her position within AGF.

- In the Antiaircraft Artillery Command, WACs worked at firing ranges where trainees were taught the principles of antiaircraft defense. Some antiaircraft firing points were

all WACs with the exception of the technical supervisor (male officer); a WAC control tower operator kept the tow-target plane on course, while other WACs gave the fire signal over the field telephone, and WAC mathematicians computed the correct angle of fire and accuracy of fire.

- At Armored, Field Artillery, and Cavalry Schools, WACs were employed as radio mechanics. They repaired and installed radios in tanks, bantams and other vehicles.
- At Field Artillery School WACs trained men in code sending and receiving.

### **Army Air Forces (AAF)**

WACs were used heavily in the Army Air Forces. Instead of having two types of Tables of Allotment, one for men and one for WACs, the AAF adopted one system and that either a man or woman could be placed in any authorized job at the station's discretion, according to the qualifications and availability of personnel. The AAF also had an excellent recruiting campaign which allowed for 27,000 WACs to serve. Initially WACs went to specialized training, like Lowdry Air Field for photo laboratory training or Kansas City for radio communications but the AAF soon found it more useful to send the WACs directly to the airfield after basic and be placed into whatever job needed to be filled. It was at that point in time the WAC would receive on-the-job training. WACs served in multiple STEM jobs during WWII, to include; weather observers, weather forecasters, electrical specialists of several kinds, link trainer instructors, cryptographers, teletype operators (2%), radio mechanics, bombsight maintenance, and photo laboratory technicians (3%). The AAF's flexible system of assigning and training WACs made it possible to fill special needs to place unusual skills found in only a handful of women: topographers, sanitary inspectors, geodetic computers, chemists, secret bombsight maintenance, and dog trainer (California).

- Weather wing obtained a quota of 500 WACs, 5-6 at each weather station at air bases where they could be housed with a WAC company.
- Army Airways Communications System (radio and cryptographic work) had a quota of 1450 which competed for high-type personnel. AAF Navigation School at Hondo TX. Those with college or research backgrounds were trained as cryptographers for which women proved especially suitable because of the exacting and monotonous nature of the work.
- Business Machine Operators had a shortage in 1944 so 1000 jobs were given to WACs for statistical control work. Few women were trained and skilled in this work so they were sent to intensive training in Orlando FL.
- The AAF planned to train as many women as necessary to fill the role of mechanic. However, this job was not seen desirable by women so only a few hundred women served as mechanics. One station successfully set up an entire flight line staffed by some 60 WACs.
- 6% of Air WACs were medics and they held 12 different medical specialties.

### **Army Service Forces (ASF)**

The largest contingencies of WACs were serving with the Army Service Forces. 40% of WACs had been assigned to the ASF by mid-1944. However, most women in these units were not technical specialists, but clerical and other administrative work to aid in the running of the schools. WACs worked very well in the few STEM-related fields within ASF to include the Chemical Warfare Service, Corps of Engineers, Ordnance Department, and Medical Departments.

#### *Chemical Warfare Service*

Chemical Warfare Service employed about 700 WACs during WWII. WACs served as instructors on radio theory and decontamination experts. CWS looked for women who had previously trained in pharmacology, neurology, chemistry, and toxicology. WAC laboratory technicians were numerous at most installations and WAC draftsmen were employed to design protective equipment.

- These women were few and far between, but when found they were put to good use. For example, a detail of 60 WACs conducted a thousand hour experiment at Edgewood Arsenal, to determine to what extent WACS might be used in the work of impregnating protective clothing with chemicals, the results met with surprisingly good results.
- A WAC PFC with 12 years in public health work and an MA in bacteriology sought new therapeutical methods of handling infections of gas wounds.
- WAC PFC was the former director of the Neuropathology Laboratory at Yale and investigated the effect of war gases upon the blood.
- WACs at Johns Hopkins were directed by the staff in research concerning the use of penicillin spray in control of pneumonia which might be caused by chemical burns
- At Dugway Proving Ground, a WAC's research in heat radiation received a commendation from the US Weather Bureau. And Dugway boasted the only WAC glass blower extant, who devised special sampling apparatus for experiments. WACs at Dugway were trained to participate in field observations, noting wind direction, air temperature, air pressure and humidity, and mastering the principle of the balloon run. They set up and oriented an artillery aiming circle and noted ballistic characteristics during rocket or artillery tests.

### *Corps of Engineers*

WACs had been assigned to the Corps of Engineers since early 1943 but their work was unknown until August of 1945 because of the project they were working on: the atomic bomb. 422 WACs worked on the Manhattan project. “Little is known of the significance of the contribution to the Manhattan Project by hundreds of members of the Women’s Army Corps... Since you received no headline acclaim, no one outside the project will ever know how much depended upon you” – Letter, Assistant to District Engineer, US Engineer Office, Manhattan District, Oak Ridge TN to History Division WDSS 19 Apr 1946. Most were assigned as stenographers, clerks, teletype and cryptographic technicians; however a minority of these women were assigned as chemists and other scientific technicians. Some WACs became metallurgy technicians qualified through their work in ceramics, plastics, and powdered metals. Electronic technicians worked chiefly on the construction of needed electronics equipment. Photographers became specialists in photographic metals and metallurgical processes. Spectroscopic technicians were eventually qualified for advanced work with the spectroscope. The day the A-bomb news could be released, the WACs nicknamed “our day” because they were finally able to discuss their work. The WACs in the Engineering Corps were some of the proudest WACs in the Army because they believed they had done more than other WACs to shorten the war and save American soldiers lives.

### *Ordnance Department*

780 WACs were eventually employed at 10 ordnance installations in the United States. In ballistics testing labs WACs were employed in computing the velocity of bullets, measuring the weight of bomb fragments, mixing gunpowder, and loading shells.

They also worked as draftsmen, mechanics, and electricians, and received on-the-job training in ordnance engineering.

### *Medical Department*

The Medical Department had become the greatest used, employing some 20,000 WACs by the end of the war. The most successful WACs were generally those who performed the more technical duties, especially those jobs relating to patient care and reconditioning. Male combat returnees reacted positively to the feminine association and proved to be beneficial in combating negative attitudes of wounded overseas returnees. WACs within the Medical Department worked as psychiatric social workers, physical reconditioning personnel, therapy assistants, laboratory technicians, and medical/surgical technicians.