"It was a sunrise such as the world had never seen, a great green super sun climbing in a fraction of a second to a height of more than eight thousand feet [2,440 m], rising ever higher until it touched the clouds."

—Manhattan Project scientist, describing the explosion of the first atomic bomb, July 16, 1945

The test was a success—and many Americans were eager to use atomic bombs against the enemy. By July 1945, the war in Europe was over. Japan was being badly beaten, but it refused to surrender. Military commanders felt it was time to use the new superweapon that they had worked so hard on and spent more than $2 billion to create.

President Truman agreed. Although Oppenheimer and other physicists warned that nuclear warfare could potentially destroy the human race, U.S. commanders were determined to move ahead. The atomic bombs did their jobs as planned. Dropped on Hiroshima on August 6 and Nagasaki on August 9, two nuclear bombs devastated the cities and led to a Japanese surrender on August 14, 1945.

A DECADE OF LIFE AND DEATH

Throughout history, some of the most noteworthy scientific advances have resulted from warfare. That's because nations employ their brightest scientists to create new weapons, military vehicles, and other equipment during wartime. The most famous example from World War II was the nuclear bomb.

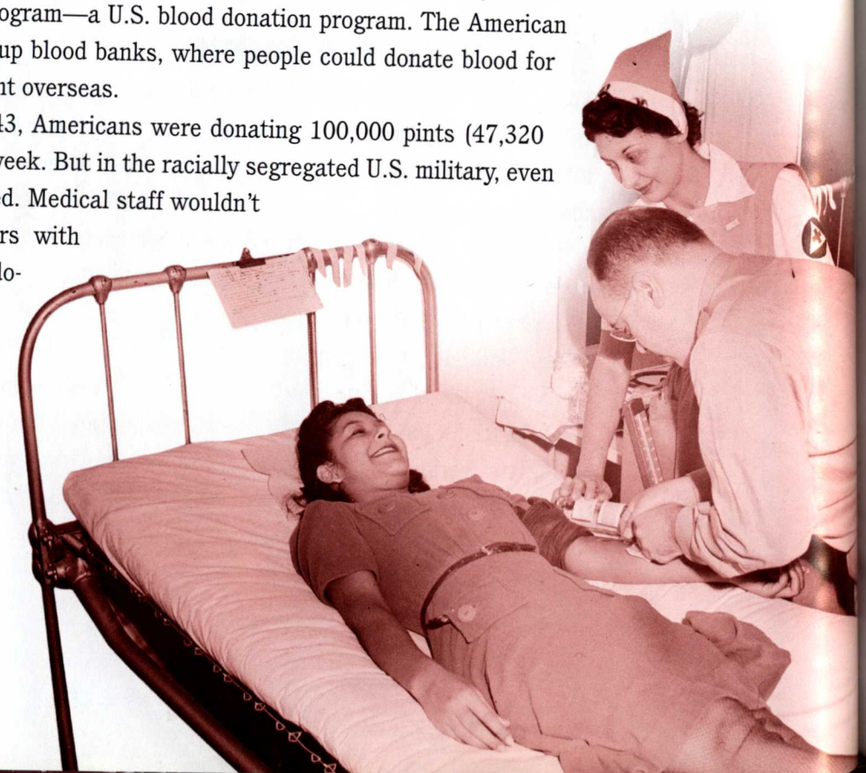
Scientists also created advanced radar during World War II. Radar is an electronic system that sends out radio waves. The waves bounce off objects and return to the sender. The returning waves show the objects' location. When World War II began, radar was very basic. The British built radar stations along the shoreline to detect enemy planes and ships. The Germans used radar systems too. After the United States entered the war, U.S. and British scientists worked together to make radar more precise and more effective. They developed mobile radar systems for individual planes and boats. The British and Americans also developed techniques to interfere with the enemy's radar systems.

Engineers also improved sonar during World War II. Sonar is similar to radar, only it uses sound waves instead of radio waves. Sonar helped the Allies detect underwater objects, such as enemy mines and submarines. U.S. engineers also designed more powerful and accurate artillery, faster and lighter planes, sturdier ships, and more efficient tanks during World War II.

Medicine took great leaps during World War II. By then doctors knew about penicillin, a lifesaving antibiotic, but they didn't know how to produce it in large quantities. That changed early in the war, when Pfizer, a U.S. pharmaceutical company, began large-scale production of penicillin. On the battlefields of Europe and the Pacific, penicillin saved countless lives.

Military doctors desperately needed blood to transfuse into wounded soldiers. But even when refrigerated, whole blood spoils quickly. At military and battlefield hospitals, supplies were constantly going bad. Around 1940, Charles Drew, a Washington, D.C.–based doctor, solved this problem by separating blood into two parts—blood plasma and blood cells. The separated parts could be frozen or dried and then shipped overseas. Separated blood lasts much longer than refrigerated whole blood. Early in the war, Drew organized the Blood for Britain program—a U.S. blood donation program. The American Red Cross also set up blood banks, where people could donate blood for storage and shipment overseas.

By the end of 1943, Americans were donating 100,000 pints (47,320 liters) of blood per week. But in the racially segregated U.S. military, even blood was segregated. Medical staff wouldn't infuse white soldiers with blood from black donors or black soldiers with blood from white donors. Interestingly, Charles Drew—the man who pioneered blood banking—was an African American.



A WOMAN DONATES BLOOD at a Red Cross donor center during the war.

The medical advances of the 1940s saved millions of lives. But it wasn't just soldiers who benefited. The large-scale production of penicillin and the separation and storage of blood also saved civilian lives. In 1943 a medical researcher named Selman Waksman discovered a new antibiotic, streptomycin. Doctors used it to treat and cure tuberculosis, a previously dreaded disease. Doctors also began routinely using the Pap smear in the 1940s. The test detects cervical cancer in women. It was named for a Greek American physician, George Papanicolaou.

PEACETIME PRODUCTS

Post–World War II Americans enjoyed a host of new products. Some of them had been developed for soldiers on the battlefield. Manufacturers quickly realized that civilians would want them too. For instance, General Foods made dried "instant" coffee for soldiers in the field. After the war, General Foods kept selling the coffee under the brand name Maxwell House. Frozen orange juice and frozen fried potatoes were other products developed for U.S. troops and popular with U.S. consumers after the war.

Other new foods of the 1940s included M&M chocolate candies, Cheerios cereal, Reddi-wip whipping cream (the first food product in an aerosol spray can), V-8 vegetable juice, and boxed cake mixes. Consumers could also buy new products for food storage: Tupperware resealable containers and Reynolds Wrap aluminum foil.

Dow Chemical Company invented Styrofoam in 1942. It was first used to make life rafts for the U.S. Coast Guard. After the war, people found dozens of uses for Styrofoam: as insulation, protective packaging, and crafts material.

Eastman Kodak introduced color film (called Kodacolor) to consumers in 1942. Polaroid introduced its Land Camera in 1948. This remarkable invention was a camera and a darkroom in one. After you snapped the picture, the camera developed the film and produced a finished photographic print. The whole process took just sixty seconds.

Other new products of the 1940s included the clock radio, the car air conditioner, and the car seat belt (optional on Nash automobiles, it fit over the laps

A boy plays with a **SLINKY**. While experimenting with springs, naval engineer Richard James created the toy during World War II.

of front-seat passengers only). For children, Slinky, Silly Putty, Scrabble, and Lego were the new toys and games of the 1940s.

GET UP AND GO

The 1940s was a decade of mobility. Jobs were plentiful in defense plants, located mainly in big cities. Many civilians moved to distant cities to take the jobs. Soldiers moved to bases across the United States for training and then shipped out to battlefields overseas. Vehicles—airplanes, tanks, jeeps, and boats—were just as important to the war effort as guns and bullets.

When the decade began, Americans usually traveled long distances by train. Many families owned cars, but gas was in limited supply, since the nation was saving gas for military vehicles. Limiting travel further, automakers stopped producing passenger cars in 1942 (switching instead to building military vehicles) and didn't start again until 1945. Even with wartime restrictions, Americans had many transportation options. In addition to trains, people commonly traveled on streetcars, buses, and subways. Servicemen traveled overseas in ships.

Before the 1940s, people used airplanes for military missions, delivering mail and cargo, exploration, and adventure. But other than pilots, few civilians traveled by airplane. At that time, planes could not fly very far or very fast. At high altitudes, where air pressure is low, it was difficult for airplane passengers to breathe. Air travel began to improve in the 1940s. Engineers devised pressurized cabins, which allowed passengers to breathe normally during high-altitude flight. The first pressurized commercial flight took off from New York City on July 8, 1940. After a stop in Kansas City, Missouri, the plane reached Los Angeles, California—twelve hours and eighteen minutes after leaving New York. The age of passenger flight had begun. Most airplanes of this era were equipped with sleeping berths for overnight travel.

"This summer *fly* 'the vacation route of the nation.'"

—United Airlines ad, 1947

Throughout the decade, planes got bigger and faster. They could fly at high altitudes—above clouds and storms. Still, most Americans didn't travel by airplane in the 1940s. For one thing, air travel was expensive. In 1946 TWA began flying commercial passengers from New York City across the Atlantic Ocean to Paris, France. The flight took about twenty hours and cost $675 round-trip. The average U.S. worker earned only about $2,500 a year at the time—so passenger flights were mainly for the wealthy in the 1940s.

Like passenger planes, military planes got faster and more powerful during the 1940s. The helicopter was a new invention during World War II. The military didn't use helicopters extensively, although the U.S. Coast Guard used them to carry gear and to rescue people at sea. After the war, engineers improved helicopters greatly—preparing to use them in future conflicts.

A number of other aviation firsts occurred in the 1940s. Most famously, in 1947 Chuck Yeager, a former U.S. military fighter pilot, was the first person to fly faster than the speed of sound.

PASSENGERS BOARD THE *FLYING CLOUD* IN 1949. It was one of the first planes to fly regularly between New York and London.