

“War and the Environment” by Richard P. Tucker

The Century of Total War

Contemporaries called this the Great War, in which the military-industrial complex finally matured. The industrial capacity for warfare had accelerated rapidly since 1870, and all combatant economies had forged close ties between military commanders and industrial designers and managers. By 1914 war in Europe could be pursued with railway and wheeled vehicles, and during the war the first air forces appeared. The consequences caught everyone strategically unprepared. As the war on the Western front bogged down in a three-year stalemate along hundreds of miles of trenches in Flanders and northern France, millions of bomb and shell craters left puddles, ponds, and mud where crop fields and woodlands had been before. On both sides of the war, improved long-distance food transport enabled mass armies to be sustained year-round, and battles to be fought almost endlessly. On occasion, armies deliberately deprived both enemy units and civilians of food, fiber, and fodder by ravaging land and destroying stored crops. In early 1917, as the German armies withdrew from the Somme battlefields, they systematically destroyed nearly every building, fence, well, bridge, and tree over an area sixty-five by twenty miles to deprive the advancing enemy of sustenance and cover. In eastern Europe the wide and constantly shifting battle zone between the German and Russian armies opened remote areas to development and pointed toward vast damage to forests, marshes and agricultural zones in World War II.

The war also saw the first large-scale use of chemical warfare. Germany, France and Britain all attempted to develop chemical weapons before 1914. Germany's chemical industry, the world's leader, forged close cooperation with her military, enabling the German army to use massive amounts of chlorine and mustard gas on Allied troops. By the war's end chemical warfare produced 1.3 million casualties, including ninety thousand deaths; mustard gas and other chemical agents temporarily poisoned lands on and near the battlefields. It is difficult to assess the immediate environmental impact, because no one measured it, but its carryover effect was massive. Chemical warfare increased the size of chemical industries, demonstrated the value of scientific research to chemists and governments, and helped inspire postwar pesticides. And military aircraft became the backbone of postwar crop dusting, increasing the scale on which pest control was economical. Throughout Europe and even overseas, forests came under unprecedented wartime pressures. Lengthy bombardments in battle zones shattered forests that had been carefully managed for centuries. For hundreds of miles behind the lines, massive emergency fellings of timber were carried out. Only the great forest zone of Russia escaped heavy exploitation, since imperial Russia's transport system was still rudimentary. The British, Canadians, and Americans organized large timber shipments from North America and even India's monsoon forests. But this war saw only the beginnings of tree cutting from tropical rainforests, since logging and transport facilities were still in their infancy, even in the colonial forests of British and French West Africa. Perhaps equally important for the longer run, government forestry agencies in many countries took greater control over forest resources during the war. The immediate postwar period saw reforestation programs in both Europe and North America, in which single-species tree plantations replaced the greater variety of species in the former natural forests.

Between the two world wars further acceleration of military industry enabled militarized states to mobilize far greater resources from around the world than a quarter century before, and impose new levels of destruction. When Japan attacked China in 1937 and then Hitler's armies invaded Poland in late 1939, they unleashed a war in which seventy million people would die, and his own country ultimately suffered some of the most total devastation, particularly at the hands of the Allied air forces. By the summer of 1945 British and American bombers, dropping incendiary bombs produced by the rapidly maturing chemical industry, leveled one hundred thirty German cities, killing some six hundred thousand civilians. The postwar reconstruction, physical as well as social, would be daunting.

In combat zones the forests of Europe were once again badly damaged by fighting. Behind the lines of combat, timber was cut at the most urgent rates that the limited available workforce could achieve, and great forests of Norway and Poland were looted of their timber wealth. This time, even more than in the previous war, the battle zones of Europe, North Africa, and the Middle East could call upon timber resources from other continents. Both harvesting machinery and transport networks (from forest roads to harbor facilities to oceanic shipping) were more highly developed than in the previous war, though the vast forest resources of Asian Russia were still largely inaccessible.

In the Far East, Japan had pre-empted Soviet interest in the industrial belt of Manchuria by occupying it as early as 1931. Six years later Japanese armies, supported by Japanese aerial bombing of Chinese cities, advanced westward across China. In the war's most notorious action, the retreating Chinese Nationalist leadership broke the Yellow River dikes, flooding vast areas of intensely cultivated lowlands, drowning over 800,000 people and turning 2 million others into refugees. Between them, the Nationalist and Japanese armies produced a scale of human and environmental damage by war's end that is still not fully measured.

In early 1942, immediately after the Pearl Harbor attack, Japan's war machine continued down the Pacific, quickly seizing the strategic forest and rubber resources of the Philippines, Indonesia and mainland Southeast Asia. For roughly three years, until they were beaten back, the occupying Japanese forces brutalized forests and plantations, leaving a seriously compromised environmental legacy.

The war in the Pacific had impacts on island biota, coastal coral ecosystems and the aquatic environment that had no previous parallel in that ocean's web of life. Small islands support limited varieties of plant and animal species. Coral atolls have thin, fragile soils; they are exceptionally vulnerable to the impacts of human conflict. On both steep volcanic islands and coral atolls the fighting produced fundamental ecological degradation of forests, watersheds, coastal swamplands, and coral reefs.

World War II marked another watershed in the history of warfare: for the first time more soldiers died in battle than of disease. Diseases, of both humans and livestock, had spread into the Pacific with traumatic impacts ever since the 1770s, but the Pacific War ended with a dramatic reverse. Until 1943 malaria caused nearly ten times as many casualties as battles. Thereafter DDT almost totally controlled the disease among the troops before the war's end. No one at the time foresaw the massive environmental damage that DDT would produce in peacetime.

For marine resources the war had paradoxical effects. Commercial fisheries and whaling fleets were largely destroyed, docked, or transformed into military uses until 1945, leaving fish stocks and marine mammal populations to recover somewhat, though submarine warfare killed some whales, and any increase in their numbers was very temporary.

In Japan itself the war had tragic ecological as well as human impacts. For Japan's forest resources the loss of import sources (especially the northwest coast of North America) meant intensive cutting of domestic forests, even ancient stands that had been preserved for centuries, for charcoal, firewood, and construction. In many locations the direct result was loss of soil and damage to water regimes. On Japan's farms food production expanded urgently, especially on marginal lands.

American incendiary bombing, following the attacks on German cities, almost totally destroyed Japan's urban areas, which had been built largely of wood. Finally, Japan suffered the ultimate environmental disaster, the impact of nuclear bombs, when Hiroshima and Nagasaki were leveled on August 6 and 9, 1945. The two cities were rapidly rebuilt after the war, and the local flora made a surprisingly rapid recovery from radioactive pollution, yet the human costs of the two bombs are still being counted.

By August 1945 the United States was triumphant, having suffered relatively little long-term damage to its domestic resources and ecosystems or to its additional source areas in Latin America. Its military industry had grown exponentially, and military-industrial coordination had reached high levels. Hence that war sowed the seeds of later disasters, which began to be evident as the Cold War deepened after 1948.

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