

Alesia Maltz (2015)

**“Plant a victory garden: our food is fighting”:
Lessons of food resilience from World War**

Journal of Environmental Studies and Sciences 5 (3): 392-403

DOI 10.1007/s13412-015-0293-1

The manuscript in this pdf file was published as part of a collection of 27 articles in the *Symposium on American Food Resilience*. See <http://foodresilience.org> for a description of the Symposium and a complete list of abstracts. The published version of this article may be purchased from Springer at <http://link.springer.com/article/10.1007/s13412-015-0293-1>.

Membership in the Association for Environmental Studies and Sciences (<http://aess.info>) is an inexpensive way to have complete access and free downloads for the published versions this article and all other articles in the Symposium on American Food Resilience. Membership can be obtained for \$60 (less for students) at the Association’s membership webpage: http://aess.info/content.aspx?page_id=22&club_id=939971&module_id=106623.

“Plant a Victory Garden: Our Food is Fighting:” Lessons of Food Resilience from World War

Alesia Maltz

Key words: resilience, local food systems, famine, World War

ABSTRACT. Today the high ideals of local food production reverberate as a model of self-sufficiency and food security. In the US and Great Britain during WWI, local food production was envisioned as ammunition to win the war. To what extent have the food policies and slogans of World Wars I and II influenced current ideas of the value of local strategies of food security in maintaining resilience, and what lessons does the history of war offer about food resilience? During World War I, German and British military strategists developed plans to win the war by leveraging actions to destroy their enemy’s civilian food system. This history triangulates the food resilience of a country that imported food (Great Britain) with one that grew its food locally (Germany), and one that exported surplus (the United States) to examine the strengths and limits of local food production. During World War I, Germany suffered over a million fatalities from famine, while the US and Great Britain raised their national nutritional status by the end of the war. The tragic German experience led directly to the rise of WWII, a war initiated with a “Hunger Plan.” Nineteen million civilians died, many of starvation. A long historical time frame is needed to construct lessons about resilient food systems. This brief sketch of the dismantling and reconstruction of food systems in WWI and WWII draws from secondary sources to suggest novel ideas about the interplay between local production, national co-ordination, and international networks for humanitarian aid. Using the food policies of three countries—Great Britain, the United States and Germany—this history provides an opportunity to consider the characteristics of resilient food systems, and to suggest what is required to reconstruct a large-scale food system following a crisis. War, a disrupter of food systems, also provides a model of how food systems can be reconstructed.

Introduction

War always threatens food security and leads to disruptions in food production, preservation, transport, and distribution systems. Even if a nation’s civilian food system is not dismantled outright through war, the flow of food can be curtailed in many ways: harvests and livestock get destroyed in battle or when the enemy plunders the countryside; raw materials for agricultural inputs, such as fertilizer and agricultural machinery, are diverted to military ends; the agricultural labor force faces dramatic declines when farmers are recruited to serve in the military; troop movement, military canteens, and the rations of soldiers take precedence over civilian food needs; policy-makers miscalculate civilian food needs; regions isolated under siege do not have access to sufficient food for civilians; or food supply ships are deliberately sunk.

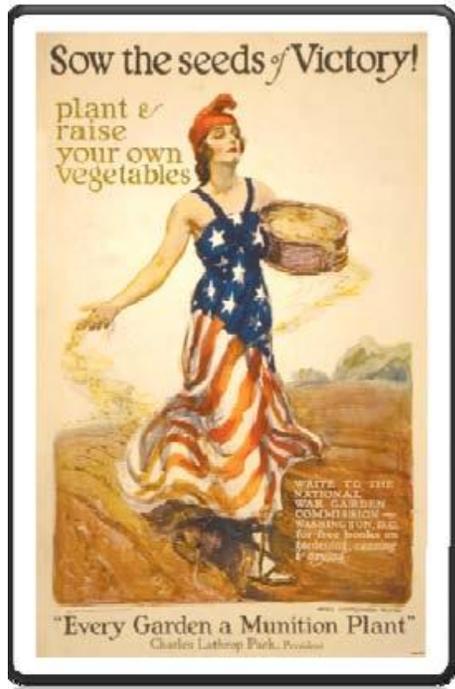


Figure 1: WWI USDA Poster on War Gardens
<http://www.rare-posters.com/usother.html> Accessed 1 June 2013

World War I was a war about food. Military leaders strategized about how to starve their enemies into submission. The British government organized a naval blockade to import food for its citizens and restrict food and supplies to Germany. The Germans survived on limited diets and by the end of the war there was widespread famine. The food blockade was maintained for eight months after the war. World War I ended when Germany lost the battle for food security. It is estimated that 750,000 German people died from malnutrition and starvation during the war, and 900,000 during the blockade before the Treaty of Versailles was signed.

Events surrounding World War I led directly to World War II, especially the food strategies of Germany. Historians like Lizzie Collingham (2012) have recently underscored the collapse of the German food system in WWI as a key impetus for WWII. Her history focuses on the role that the German famine of WWI, and lingering German fears of food insecurity, played in Hitler's plans to invade rural areas in Eastern Europe and the Soviet Union, and examines the role of food insecurity in triggering war throughout the world.

An unanticipated consequence of WWII was the emergence of dramatic changes in food systems all around the world. This article examines many lessons of scale in WWI, including what is needed to sustain local production, national coordination, and international networks. Based on this history, it lays out key characteristics of resilient food systems.

Food security in World War I

At the outbreak of the First World War, food availability and distribution was not playing a role in strategies to achieve victory because all countries believed that war would last for weeks or possibly months. It took two years before governments developed food plans as an important component of their war strategy.

To maintain food resilience in wartime, governments must address limiting factors in their national food system. When famine and deficiency diseases emerge in times of crisis, a great variety of limiting factors may contribute to this, including failure of transportation systems, a limited labor pool, a citizenry with limited local agricultural knowledge, and—as was the case in WWI—human compassion.

What is the role of local food production in times of crisis? In Germany, local resilience relied on local labor and knowledge of agricultural production, as well as a national transportation system and international fertilizer input. In Great Britain, local food production was an important adjunct to grain imports from the US, while in the US, local production and “Hooverizing” or frugality enabled food exports to Britain. While Great Britain faced deficiencies and Germany faced famine, the United States did not run into any limiting factors in food production or distribution, did not need to ration food, emerged with a better diet than it had before the war, and cultivated a new national image as breadbasket to the world. In Germany, the viability of local food production rested on the availability of agricultural inputs such as fertilizer, and a transportation system to provide food to urban areas. Britain, which routinely relied on food imports, needed to develop programs to mobilize citizens to produce a portion of the foods they consume, create an informed temporary agricultural labor force, and depend on allies like the US to share and transport the bounty.

Great Britain, which had established a long-term pattern of importing about half of its food, was not a self-sufficient agricultural nation (Oddy, 2003). British food resilience was based on a navy to help transport imports and protect the food supply ships that came from the US and the British colonies. After the war broke out, Britain solicited agreements with the US to provide food, especially grain, and the British government eventually established a set of food substitutions and a food distribution system. They also implemented a system to train novice gardeners and farmers in local food production. The gardeners created “war gardens,” later dubbed “victory gardens,” on “slacker land,” and by 1917, there were half a million garden allotments (Gowdy-Wygant 2013). Because so many men had gone off to fight, women were trained by the Women’s Land Army through two and four week classes to become “farmerettes.” By the end of the war, 23,000 “farmerettes” were placed on farms (Gowdy-Wygant 2013). The government eventually established a system of rationing, but decided not to ration bread (Barnett, 1985). The “Bread First” policy, which maintained the availability of bread, was based on the idea that the public would feel confident and secure if they had all the bread they could eat and all the food they could grow. By the end of the war, both skilled and unskilled laborers ate foods of higher nutritional quality than they had before the war (Drummond and Wilbraham 1939, Gazeley and Newell 2013).

Germany. The German food system before the war was characterized by local production, a heavily meat-based diet, and a robust transportation system that brought food from rural areas to urban centers and brought agricultural inputs, especially fertilizer, from abroad. The German food system relied heavily on 70—80 percent local production. Since many of the women who remained home during the war were

experienced with farm labor, Germany did not need to train farmers as they did in Great Britain and the United States. The limiting factors in Germany were animal fertilizer and transportation. Before the war, Germany was the world's largest importer of nitrogen and phosphates fertilizer, and during the war, synthetic ammonia was used exclusively for explosives. The robust rail system failed when war came to the country, and as the British blockade strengthened, food became scarce.

The United States. Because of its isolationist diplomatic policy, the US did not enter into the war immediately. Ethical dilemmas emerged about how to share the national surplus with countries in need. When Germany invaded Belgium, a US businessman named Herbert Hoover volunteered to lead the Committee for Relief of Belgium, feeding between 1 and 11 million Belgian citizens a day. The committee developed a high nutrient cookie, which was served with milk to protect at-risk children. These innovations framed US food aid programs throughout the century. When war broke out in Europe, the US agreed to supply Great Britain with food, primarily grains and protein. When the US eventually entered into the war, the Lever Act was passed, and Hoover became the US Food Administrator. He encouraged the establishment of over 5 million "war gardens," wheatless and meatless days, and food conservation, which was dubbed "Hooverizing" (Tunk 2012). As in England, farmerettes took up the slack on farm labor shortages. By 1918 war gardens, which engaged one out of every four US households in home food production, produced \$525 million worth of food (Gowdy-Wygant 2013). These efforts to promote behavior change would "sow the seeds of victory."

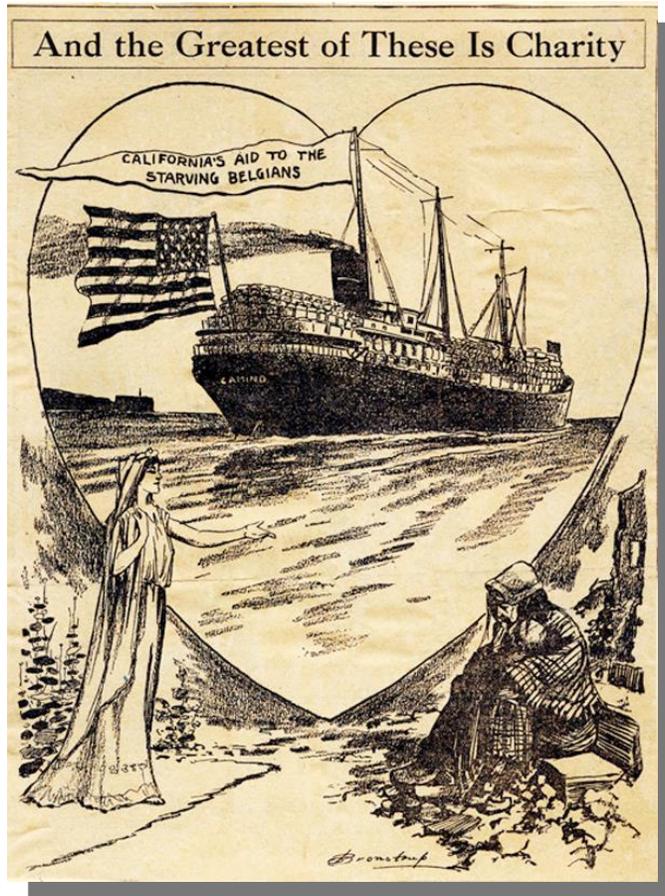


Figure 2: US WWI Government Poster of American Aid to Belgium
http://www.ecommcode.com/hover/hoveronline/hover_bio/archive/food/conserve.htm Accessed 1 June 2013

Leveraging the collapse of the food system

Typically, every effort is made to leverage food resilience; war, however, leverages the collapse of food systems. Food became a key military strategy for both the Germans and British, each leveraging strategies to take advantage of their strengths and underscore the weaknesses in the other country's food system. By 1916, the US and British Allied forces developed strategic plans to win the war with food at home and also on the battlefield. Germany increased its submarine U-boat warfare campaign, which was designed to sink food supply ships from the US and starve the British into surrender. The British Ministry of Food and the British Navy likewise worked together to fortify their naval blockade, import food, and restrict the transport of food and supplies to Germany. These military strategies, in conjunction with the recommendations of scientists and policy makers, led to a restricted flow of calories to the German military; it had even greater effects on German civilians.

From 1914 onward, the British blockade gradually and increasingly contributed to a 50 percent reduction in Germany's access to food. During the war, rural and urban systems for food production, storage and distribution proved insufficient. Food transport

was also severely disrupted. By 1916, German doctors reported that children were showing signs of retarded mental development and physical debility and documented a rise in rickets and tuberculosis. By the autumn of 1916, the nutritional needs of German soldiers were given precedence over the needs of civilians, who were barely surviving on diminished local agricultural production, foraging wild foods, and procuring foods on the black market. The rationing system favored rural people and the armed forces over citizens residing in urban areas. When the German potato crop failed in the drought of 1916, turnips became the staple food. In the “turnip winter” of 1916-17 alone, 750,000 of Germany’s 65 million people died of malnutrition. By 1918, the German civilian death rate from the British “Hunger Blockade” was beginning to compete with the death rate on the battlefield, and the German people barely survived on less than 1,200 calories a day (Howard 1993). The German food system had completely collapsed.

When the Armistice was declared, Herbert Hoover was placed in charge of food distribution in post-war Germany. Hoover’s initiatives with the Belgian Relief Committee showed that nutritional interventions that targeted the most vulnerable groups—the elderly, young mothers and infants—have the most significant impact on food resilience. Quick and decisive humanitarian action was the most effective approach to food resilience.

The blockade of Germany at the end of World War I was a travesty. In the eight months between the Armistice and the signing of the Treaty of Versailles, the Allies denied the German people basic humanitarian assistance. Hoover could not secure an Allied agreement to transport and distribute food in Germany, because the English, and especially the French, remained stubbornly concerned about reparation (Vincent 1986). During the eight months that the Allies argued about what the final peace treaty would look like, extensive famine raged in Germany. American food stocks, which were slated for Germany, rotted in Rotterdam. Germans were forced to deliver livestock to the Allies, further depriving German children of milk. Germany was required to hand over its remaining trains and ships, which were necessary to transport and distribute food. Fishing in the Baltic, which would have provided much needed protein, was severely curtailed. During this time, at least 900,000 Germans died of starvation before the Treaty of Versailles was signed.

World War I was ultimately a war about food security. Each country calculated their strengths and limits of their national food system, and that of their enemy, to develop policies leading to the collapse of their enemy’s food system. The military strategy of food blockades, which both Germany and Great Britain engaged in, was very effective. The most horrendous failure of international diplomacy occurred when the Allies refused to distribute food to the German people during the Armistice. Today the refusal to provide humanitarian aid would be considered a crime under international law. WWII was a direct outgrowth of the humiliating terms of the combination of the Treaty of Versailles, the devastation caused by the turnip winter, and the Armistice famine.

WWI food insecurity foments WWII

National food systems became a tool, and casualty, of war. The process of dismantling and rebuilding the German food system after WWI provides many lessons about food system collapse and reconstruction, and the nature of food resilience. Great

Britain, the US and Germany each had very different experiences of World War I, which led each country to draw different lessons about food security and to develop different strategies for food resilience as they moved into WWII. Each of these three countries created a wartime and post-war food system that was a direct reflection of the unique food security challenges they faced during and immediately after WWI.

Great Britain. World War I laid the foundation for much needed nutritional reform in England, and paved the way for more government involvement in the daily nutritional practices of its citizens. In the immediate post-war years, school milk programs were introduced to supplement the diets of children, industries became engaged in producing vitamin-rich foods—including fortifying foods such as chocolate and margarine—and the public readily adopted food supplementation measures. Because the eradication of rickets dominated public health initiatives, public consumption of cod liver oil became a fad in the US and Great Britain during the 1920s. When the Depression hit home in the 1930s, the people’s nutritional status slipped dramatically until it was again strengthened during WWII with the increased involvement of government in nutrition.

The United States. Changing domestic food habits strengthened the US food system during and after WWI. During wartime, people ate more nutritionally dense fresh foods. Recoiling from its compromised role in international diplomacy at the end of WWI, the US government readopted an isolationist role in the international sphere. In the future, it would not engage in international food policies that would restrict the flow of emergency food distribution internationally and would harm US farmers. The national nutritional status was weakened during the Great Depression, but bounced back during WWII.

Germany. The Ministry of Food, which was established in 1919 to replace the War Nutrition Office, attempted to quickly offset war losses and put them behind. In so doing, it perpetuated malnutrition. Influenced by pre-war scientific ideas of calorimetry and “Nutritional Physiology,” the Ministry of Food tried to strengthen nutritional efficiency at the lowest possible social and caloric cost (Milles 1995). Moreover, Germany’s attempts to regain economic stability led to more dramatic forms of economic collapse. In 1921, while the country was in perpetual turmoil and on the brink of revolution, Germany experienced the worst example of “wheel barrow inflation.” In November of 1918, a loaf of bread cost one mark; by November of 1923, a loaf cost a wheelbarrow full of money, and the price of a cup of coffee in a café could double in the time it took to drink it. By the end of October, money acquired at the beginning of the week lost nine-tenths of its value by the end of the week (Ahamed 2009). In these extreme economic circumstances, the German people were placed under tremendous nutritional pressures that challenged food resilience and cemented fears of starvation.

Food resilience in WWII

Historians have long interpreted WWII as an extension of WWI. By piecing together decades of archival work, the historian Lizzie Collingham (2012) has refined and explained the history of the rise of WWII in terms of the food security issues of WWI. She has written an extraordinary book, *The Taste of War*, which looks at the role of food in World War II around the world, especially how the agrarian policies of the Nazi regime became a driving force behind some of the worst atrocities of WWII.

Great Britain

When Great Britain became involved in WWII, the Victory Garden and “farmerette” programs were taken off the shelf and reinstated. Under the visionary leadership of Jack Drummond, a vitamin researcher and food policy advocate, food consumption of the British people improved dramatically. Drummond became the scientific advisor to the Minister of Food during WWII. He developed nutritional education programs and was responsible for food distribution. He stepped up home production of foodstuffs with a “Dig for Victory” campaign, and half of the British manual workers kept a garden. Gardens popped up in parks, home backyards, and even window boxes. Wheat, barley, oat, and potato crop production almost doubled.

Drummond organized the importation of cheese, skimmed dried milk, and canned fish and meats, and set up a system of food fortification. Under his guidance, food companies and nutritionists worked together to fortified foods with calcium, Vitamin A and Vitamin D. In response to the Blitzkrieg, he devised a “Blitz Broth,” which was said to be as satisfying as a three-course meal. He commissioned 5 million servings of “Blitz Broth” and had it distributed around the country, where it was served to survivors of the air bombings from mobile canteens. Toward the war’s end, Drummond took an active military role, sometimes going behind enemy lines to assess the nutritional issues of the occupied people and create effective nutritional interventions. He developed a “vitaminized” chocolate for the children of Malta. At the end of the war, he assessed the nutritional crisis in Holland and was instrumental in negotiating with the Germans to implement, “Operation Manna,” a mission that air dropped 7000 tons of food for the Dutch people in one week. This quick response is thought to have saved tens of thousands of lives. He also created an easily digestible porridge, “Drummond Mixture,” which was recommended as the first food for people being liberated from concentration camps (Fergusen 2007).

Drummond believed that nutrition education was central to Britain’s food security. A BBC show, *Kitchen Front*, tempted people to cook new foods like soyghetti, carrot fudge and other food substitute recipes, and promoted the National Wholemeal Bread campaign. He established special rations of orange juice, rosehip syrup, black current juice, and liquid milk to infants, small children, nursing mothers, and pregnant women. The school milk program that he established lasted until the austerity measures of the 1970s earned the Prime Minister the title, “Maggie Thatcher Milk Snatcher.” Children learned about nutrition from Dr. Carrot and Potato Pete, who sang the song, “Potatoes new, potatoes old/ potatoes (in a salad) cold/ Potatoes baked or mashed or fried/ Potatoes whole, potatoes pied / Enjoy them all, including chips /Remember spuds don’t come in ships!” (Fergusen, 2007).

Although pre-war Britain was largely self sufficient in milk, during the war the country’s agricultural system was restructured away from dairy toward potatoes and grains. Ten acres of dairy pasture could feed 12 people, but ten acres of potatoes could feed 400. England also mechanized its agriculture; by the end of the war, the number of tractors had quadrupled. British farms adopted hybrid seeds, pesticides and herbicides. As in the US, the number of farms decreased while farm size increased. The modern food

processing industry came into its heyday, largely as a means to create more efficient shipping space.

The British government imported half of its food, including fish from Iceland and grains from Canada. British demand for food imports pulled Iceland and Canada out of the economic slump of the Depression. The British government created a lend-lease agreement with FDR for the US to provide materials and food, effectively pulling the US out of the Depression as well. As part of the lend-lease, the US imposed a feeding hierarchy of US military, US civilians, and exports to Great Britain. The British also created a hierarchy in which the food needs of the British military trumped British civilians. All civilians were placed on an even playing field in an effort to create “war socialism,” a strategy to “level up” the working class by avoiding social rifts and closing the nutritional gap between the classes.

As effective as it was at home, war socialism left the rest of the British Empire at the bottom of the British food hierarchy. Before the war, the British colonies were expected to be self-sufficient. During the war, when conscripted colonial soldiers sent back remittances to their families, the large influx of cash into the colonial economies created inflation. The colonial governments did very little to address this issue. When the Bengal famine of 1943-1944 hit, the price of rice increased tenfold. Churchill did nothing, the colonial governments did nothing, merchants hoarded rice, trade was blocked from other Indian states, and in a short period of time over 1.5 million Bengalis died of starvation. The food shortages of Great Britain had been exported to its colonies, setting the scene for post-war decolonization in places like India.

The United States

During the Dust Bowl and the Great Depression, agricultural production throughout the US food system decreased and nutrition was compromised. Lend-lease agreements with Great Britain reversed that by tripling agricultural and other exports and by raising wages. These wage hikes were spent largely on family food consumption during the war, and housing after the war. During the war, farm incomes increased by 156 percent and, to keep the agricultural labor force strong, 3.5 million farmers were excused from the draft (Collingham 2012). Farmers conducted harvests alongside German POWs, schoolchildren, and migrant workers from Mexico. Between 1942 and 1964, the *bracero* international agreement introduced almost 5 million Mexican migrant workers to the US, and established a pattern of importing cheap, non-union and often exploited workers into the US agricultural system (Bracero History Project).

While active in food production, the US did not enter into the war directly until the bombing of Pearl Harbor. The US quickly reinstated programs, like the Land Army and War Gardens, which had been implemented in WWI. When war struck, the government was shocked to find that two out of five US men could not serve because of disabilities related to malnutrition, especially rickets. In light of this, American food policy erred on the side of abundance. Nutritional policy makers recommended very generous nutritional requirements that were 30 percent above the average nutritional needs. The rations of American soldiers were lavish, with hefty portions, and the envy of soldiers around the world. They created programs to fortify foods with iron, Vitamins A

and D and several B vitamins. They instituted school lunch programs, which provided generous portions for one in four American children.

This period also saw the rise of the “innocuous foods of democracy” (Collingham 2012). The Committee on Food Habits, headed by the anthropologist Margaret Mead, developed menus for foods that were healthy and likely to foster national unity. This meant homogenized foods that were not spicy, ethnic, or suggestive of regional cuisines. These foods were developed for both army rations and school programs. Hand in hand with these menus, innovations in food production encouraged highly processed and prepared foods for rations, such as dehydrated potatoes, soy-based foods, canned and frozen foods, and junk food. CocaCola, which was not as popular before the war, monopolized soft drinks at military PX stores. American soldiers, who saw food abundance as central to their self-image—and in some cases what they were fighting for—exported consumerism through American food products. They were happy to share Coke, ice cream, and other luxury foods with the people whose territories they occupied. The soldiers, who were seen as kind, generous and rich, unwittingly establishing food dependencies. This was especially true in Pacific Islands, where the US military could destroy the food sovereignty of an island within days by chopping down breadfruit and coconut trees to create airstrip runways, by plowing compost-rich gardens, and by cultivating a desire for western foods. When the American military pulled out, the Pacific Islanders found they were no longer self-sufficient. As the “innocuous” foods of American democracy were being freely shared around the world, the foundation of third-world food dependency was laid down.

Germany

The wartime and post-war collapse of the German food system in World War I had tragic physiological, psychological, and economic consequences. Germany’s lingering fears of food insecurity and famine played a major role in the rise of Nazism. Historians such as Collingham claim that Hitler was “born” at Versailles.

Many possible lessons might be derived from Germany’s hunger blockade in WWI, including a commitment to stop war crimes, the value of international trading networks, the urgency of humanitarian aid, scientific strategies to enhance food production at a time of crisis, or ways to integrate local, national and international strategies of food production. Hitler took one lesson from the hunger blockade: *Lebensraum*, which has been translated as habitat, living space, environment, or space. Hitler believed that Germany needed to go to war to expand *Lebensraum*. Specifically, Germany needed the Ukrainian land to keep Germany from starving. “It’s a battle for food,” Hitler said, “a battle for the basis for life, for the raw materials the earth offers, the natural resources that lie under the soil and the fruits that it offers to the one who cultivates it” (Collingham 2012).

Hitler intended to invade rural areas in Eastern Europe and Russia and use those countries to make Germany self-sufficient in food. During the 1930s, as the German standards of living rose, Hitler envisioned a food crisis unless large quantities could be imported, and he targeted food as the most important issue facing Germany. Hitler saw Eastern Europe as Germany’s equivalent region to the US breadbasket, and believed that access to land and natural resources would save Germany from famine, restore

Germany's independence from international trade, and assure its food security. His view of American history was inspired by Manifest Destiny, which he believed would be essential to reproduce in the creation of the German breadbasket. Germany planned to eliminate the "extra" farmers in Eastern Europe to make way for German farmers, just as many indigenous people in North America had been eliminated.

In the years before the war, Germany prepared its people for "nutritional freedom" by developing the idea of "autarchy," a type of local food sovereignty or local eating, implemented through substitutes such as margarine, fish, potatoes and bread. Oranges and bananas, which in England were treasured objects given at Christmas, were considered decadent in Germany. A self-imposed blockade was enforced through autarchy, which was supposed to create a nation of healthy people. Yet during this time, the working classes were spending 40-50 percent of their budget on food, and children were suffering from protein and micronutrient deficiencies. Like Great Britain, the German rations and substitutions initially "leveled up" the diet to provide more and better foods for the working class, but that situation had reversed by the end of the war. Hungry, but not starved, people were foraging for weeds and grasses. They bartered treasured household goods, like Persian rugs, for potatoes, milk and green vegetables. Fearing the turnip winter of WWI, the Germans systematically recreated it during WWII.

Resistance, Resilience, and the Hunger Plan

Some of the worst atrocities of WWII were committed because of Nazi agrarian and food policies. As is often the case, these experiments began at home first. Within Germany, citizens who were institutionalized were placed on "special diets" that produced starvation and death within three months. When Germany occupied a country, they routinely sent crops and animals back to Germany, leaving people in the occupied lands primed for starvation. In the occupied countries, such as France and the Netherlands, people suffered terribly, especially the Greeks, who experienced a 50 percent infant mortality and lost 14 percent of their people.

Herbert Backe, Germany's Minister of Food, implemented a plan for the deliberate extermination of people through starvation. Backe saw the agricultural riches of the Eastern European countries as the way to win the war, coldly calculating that 7 or 8 million more hectares of land were needed for Germany's nutritional freedom. He hatched a "Hunger Plan" to deliberately starve 100 million Russians, Jews, and Eastern Europeans—people he referred to as "useless eaters." The Hunger Plan was designed to enable German farmers to create *Lebensraum* and establish the Reich's "nutritional freedom" by creating a blank agricultural canvas in depopulated areas (Collingham 2012).

Although the Germans intended to export hunger to the countries they conquered, things did not go entirely as planned. German farmers went east to take over Ukrainian farms, and at the same time Eastern European POWs were sent to Germany to serve as farmhands. The resulting lack of essential local agricultural knowledge in both places reduced yield and created disruptions in both food systems. Germany saw reduced potato and pork production from 1941 onward, and suffered a poor potato harvest in 1943. By 1944, agricultural equipment production fell by 40 percent and artificial fertilizers fell by 60 percent. As men were called to war, a farm labor shortage was created, and women

became 60 percent of the farm labor force. In 1939, 100,000 Polish prisoners of war were called in to help with the Prussian potato harvest. By 1941, German farm workers consisted of 1.3 million forced laborers—mostly women—from Poland and the Ukraine and 1.2 million French and Soviet POWs. The POWs were producing 20 percent of German food. Because of the preponderance of small farms in Germany, the government couldn't control the behaviors of the German farmers, who sometimes were kinder to the prisoners and forced laborers than the German government wanted them to be. Many farmers participated in black market activities, or chose to become self-sufficient and did not produce a food surplus (Collingham 2012).

One of the most striking atrocities of the Hunger Plan was the siege of Leningrad, where over 1.2 million people died of starvation. When Germany invaded Russia, the military phase, which involved food plunder, lasted longer than expected, so it became impossible for the military to both plunder and close off areas to starve people. The Hunger Plan was met with extraordinary acts of resilience that demonstrated the strength of the human spirit. At the Povolok Experimental Station in Leningrad, a dozen scientists died of starvation protecting the seed and tuber collection, because they took a vow to Vavilov to protect the biological diversity needed to create food security after the war. One scientist died of starvation at his desk, surrounded by bags of rice. One year into the siege, in August of 1942, the week that Hitler had proclaimed he would dine in Leningrad to celebrate his victory, he was not able to do so because the Russian people were still holding out. That week, a group of over 100 literally starving musicians, some too weak to play during the practice session, gathered to perform Shostakovich's 7th Symphony. It was written to honor the people of the beloved city of Leningrad. The score was airdropped over the city, and was performed to boost the Russian morale and provide many residents with the opportunity to hear one last concert. The passionate performance of the symphony was an inspiration for people all around the world (Moynahan 2013).

People throughout Europe and the Soviet Union responded to the war of annihilation with tremendous strength of spirit. Throughout Europe, people developed an alternative economy, an extensive black market that the Germans referred to as "hamstering." A flood of people streamed out of the cities in the morning, walking to farms to get supplies; they were counterbalanced by a convoy of farmers with carts and wagons who flowed into the cities in the afternoon to collect rugs, furniture and other household items that had been traded for food.

The everyday resistance of the intended victims of the Hunger Plan was ingenious and courageous. In occupied countries like the Netherlands, children who appeared to be playing were the creators of a resilient underground food system. These children were mapping where grenades were being buried so they could safely get out of the city, setting fire as a distraction to steal military food supplies, monitoring cattle cars coming into the city to protect people from being rounded up, serving as message runners, and courageously pilfering food from the German troops and distributing it among the members of their community (Veiling 2014).

Rural Ukrainians, already experienced in survival tactics from the Stalin's Soviet collective years, ate the foods that could not be traded to urban areas. During the *Holodomor*, or hunger plague of the 1932-3, the Ukraine had lost between 1.8 and 12 million people (McVay and Luciuk 2011). The *holdomor* has been identified as an act of genocide by many governments and a crime against humanity. Using tactics they

developed during the *holodomor*, rural Ukrainians deprived the Germans of surplus and many farmers survived by withdrawing into self-sufficiency. Ukrainian people hid bumper crops in the attics, kept double sets of books on farm collectives, and weighed livestock without the heads so as to take the extra pounds for local distribution.

The German government, concerned that German soldiers purportedly were being kind to civilians in the occupied territories, repeatedly warned their soldiers that every gram of bread given in generosity was taken from their own families (Collingham 2012). The more exploitative the German military became, the less effective they were. Overall, European countries delivered 40 percent less food during war than they had produced in peacetime.

When Backe's "Hunger Plan" proved impractical, because the strength of the resistance and because starvation took "too long," the German government implemented a more expedient extermination plan, the concentration camps. They exterminated sectors of the population and also allowed prisoners to starve. Depending on the camp, 60-80 percent of POWs died. Lizzie Collingham comments: "The deliberate extermination by starvation of targeted groups became the defining feature of the National Socialist food system. The regime's agrarian vision for Eastern Europe generated plans to murder up 200 million people, led to the siege of Leningrad, as well as the blockades of the Ukrainian cities of Kiev and Kharkov." Germany did not suffer starvation during WWII, but during the Second World War, at least 20 million people died from starvation and malnutrition, a number roughly equal to the 19.5 million military deaths (Collingham 2012).



Figure 3: WWII German Starvation Poster.

http://media.liveauctiongroup.net/i/8477/9864443_1.jpg?v=8CD2A0A70E567B0
 Accessed 1 June 2013 The WWI German poster (Figure 3, below) is translated as:

FAMINE is what the loss of the eastern provinces means!
 Half of your bread ration is from the eastern provinces.
 Half of your potato ration is from the eastern provinces.
 Do you want to let the Polish steal them from you?
 Oberschlesien produces half of our coal.
 Without coal there is no heat, no light, no work, no life!
 Germans! Save the East!
 Volunteers forward!
 Sign up with your District Command!
 Pay is 5 Deutsche marks per day plus free room and board.

The legacy of food resilience

Food was central in creating resilience in the aftermath of WWII. Throughout Europe and Asia, the post-war food shortages were even more catastrophic in WWII than in WWI, in part because food systems had broken down and in part because of the drought of 1946. Most cities had little access to food or housing and in the winter of 1946-1947, in the Soviet Union alone, two million died of malnutrition. One third of the world's population, over 800 million people, was facing starvation (Collingham 2012). During the war, each of these countries "exported" its food insecurity: Germany to its occupied countries in Eastern and Central Europe; Great Britain to its colonies; and the US to the developing world.

The US was an anomaly, because it did not experience fighting on its land. It was the only country to end World War II with a healthy economy and surplus food, and US farmers were producing the highest yields in history. Faced with a conflict between self-interest and altruism, and haunted by failed attempts to intervene in the aftermath of WWI, the US government withdrew lend-lease immediately after the war. The USDA, fearing a return to the Great Depression, cut agricultural production in 1945, and adopted a "bare shelves" policy. Stockpiles were kept to a minimum. The government fell short on its international food aid promises, and grain earmarked for Europe was diverted to become fodder for American pigs and chickens (Collingham, 2012). The American people were encouraged to open their hearts and send CARE packages. They did so generously, while they unwittingly and dramatically increasing their own meat consumption.

Unbeknownst to its citizens, American food policy makers were supporting agribusiness while sabotaging UNFAO efforts to coordinate policy to address a global crisis of food distribution. Food protests in Europe eventually persuaded the US Congress to pass the Marshall Plan, which provided Europe with \$3.2 billion for food, feed, and fertilizer. The Marshall Plan revitalized European agriculture, modernizing it, and at the same time exposed Europe to American consumerism.

Food was key to the post WWII American consumerism. Soldiers in WWII, claiming they were fighting for "the American way of life," expressed a self-identity that involved having plenty of food to consume. The US military rations, illustrative of a culture of overeating, became a model of all that was to emerge in the affluence of American society in the coming decades. The revolution in American agriculture was accompanied by a revolution in food engineering, characterized by substances like dehydrated potatoes, Tang, salad dressings, soy and whey-based processed foods, soy substitutes, frozen vegetables, powdered mixes, dried soups, junk food, CocaCola, and the old stand-by of WWII rations—Spam.

Once the war ended, England underwent a process of decolonization, losing its empire, and creating the Commonwealth. This process enhanced trade relations and further reduced the agricultural self-sufficiency of England. As the torch passed from England to the US as the world's most powerful country, the US harkened back to its WWI role as breadbasket to the world. Grain diplomacy cemented its role as the world superpower. Soon thereafter, the US exported the "Green Revolution" and a form of agriculture that became increasingly more efficient but less resilient. American agricultural policies have been criticized for repeatedly flooding markets in Third World countries with cheap grain, thereby destroying local agricultural production. Recently the US agricultural trade policy set off the Tortilla Riots in Mexico, a consequence of food

dumping and ethanol production in the US (McAfee 2008). In the Third World, surpluses, in the form of aid, created food dependency. Lessons of food imperialism are deeply hidden in the furrows of post-war American agricultural policy.

Just as Germany had to reassess its belief in autarchy or local food production, and Great Britain had to reassess colonialism, the US could benefit by reassessing the history of its food diplomacy. For all its problems, world trade in food has certainly proven less disruptive than the path taken by Germany and Japan, to promote autarchy and invade other countries to achieve *Lebensraum*. Nevertheless, much still needs to be done to coordinate ways to reduce the world's food dependency, maintain the livelihoods of farmers in the US and abroad, and provide effective humanitarian aid. The US needs to update its self-image, created during World War I, as the world's breadbasket, generously offering food to all in need. Surveys show that Americans routinely overestimate that 25 percent of the federal budget goes to foreign aid, and should be reduced to 10 percent, while the actual number is closer to 0.7 percent, near or slightly below national averages.

In addition to Hoover and Drummond's innovations, one key chapter in this reassessment should include the post-war proposals of the UNFAO, and a review of the vision of 1949 Nobel Peace Prize winner, Boyd Orr, to promote food security worldwide. Orr produced a film, *World of Plenty*, and soon became the first director-general of the FAO. Orr argued that the food lessons and agricultural practices learned during WWII should be used to increase yield and promote the consumption of protective foods, increase international co-operation and world-government, and maintain the implementation of just strategies of distribution. Orr believed that science, not profit, was necessary to create food justice. His ideas, which were rejected by the USDA at the time, could still provide new opportunities for creating food resilience worldwide, without hampering the livelihood of American farmers.

Agriculture changed dramatically at the end of WWII. Many of the qualities of US agriculture, which we now identify as being unsustainable, had their roots in the immediate post-war period. As swords were melted into plowshares, the US agricultural system was transformed into a petroleum-based system requiring high inputs. Wartime machinery was transformed into highly mechanized agricultural machinery, while chemical weapons in munitions factories were transformed into pesticide and fertilizer inputs. This led to a "war model" for food and agriculture, a war now fought against insects and weeds. Industrial agriculture has led to a host of environmental problems that reduce resilience, including the destruction of soils, reduction of water quality, loss of pollinators, and loss of genetic diversity. The revolution in agricultural production, food processing and distribution has amply achieved the goals set by the Greatest Generation by providing plenty of inexpensive processed food, but has created new social and environmental challenges for food resilience.

Implications for small-scale food resilience today

The take-home message of American and British citizens in WWI and WWII was that, on the domestic side, the wars were won through home food production. The "War Gardens" of WWI and "Victory Gardens" of WWII changed national food systems for the duration of the wars and created a lasting model of food resilience. The beautiful posters that encouraged food production are today still inspiring to people interested in

revitalizing the urban food movement and enhancing local food production. The posters, which at the time were associated with the values of self-sufficiency and patriotism, now resonate as exemplars of the values of food justice and resilience. Americans are so enamored by home food production, or so influenced by WWI propaganda, that many people still believe that small-scale gardening is the primary component of a resilient food system. Effective as it was, the individualistic initiative associated with the War and Victory Garden movement is not the only strategy for reconstructing resilient food systems. In this conclusion, I discuss how local, national, and international policies, and the interactions between these different levels of scale, all play a key role in leveraging resilience.

Local Production. The historian, James McWilliams, in his careful environmental analysis of local food production, is raising counterintuitive questions about whether “local food” is an environmental fashion, like “native plants” (McWilliams 2009). In this paper, locally based food production has proven to be a two-edged sword on the domestic front. A historical analysis of German family farm sufficiency in WWI Germany and the German idea of autarchy around WWII suggest that these ideas hold many hidden traps. Small-scale farming and gardening cannot necessarily be relied upon to provide a resilient food system because local production could not function without international inputs like fertilizer, and because people who are isolated do not have ready access to larger networks during times when something goes wrong.

However, local production can play an important role in a crisis time: a thriving informal or black market of locally produced foods enabled some Ukrainian people to survive World War II. Food consumption patterns in Great Britain and the US were strengthened during the wars. Citizens were encouraged to radically alter their eating habits by eating low on the food chain, “Hooverizing,” including more vegetables and bread in their diet, and consuming less meat. Great Britain and the US leveraged the pockets of abundance created by community garden initiatives to improve their nation’s micronutrient consumption. The production and consumption of nutritionally dense foods reduced waste, encouraged local knowledge and promoted knowledge of nutritional substitutes. Nevertheless, the local gardens were short-lived and quickly abandoned after both wars, and the improvements in nutrition associated with them were lost.

National Co-ordination. Local self-sufficiency in food production might stave off food system collapse in the short term, but for the longer term, local production, preservation, and distribution must be coordinated at a national level to integrate rural and urban food needs and seasonal differences in crop yield. During wartime, Great Britain and the US developed alternative labor sources—including farmerettes--and alternative food distribution systems that provided solid models of the role of national government in creating a coherent food system. Educational programs to promote the public’s knowledge of food production and nutrition, like those organized by Drummond and Hoover, were essential components of a functioning national food system. Scientific advisors to government provided critical information to the public about the home production of nutritionally dense foods, the reduction of food waste, rationing, and dietary diversity. Government agencies and organizations effectively reassured the public that the government would provide generous quantities of basic foods, such as bread, and promoted food security for vulnerable groups within the population. However, without

national food schemes for vitamin and mineral food fortification, these countries would have suffered from nutritional deficiencies.

International Networks. In both wars, international trade networks prevented death and famine. Before WWI, Germany isolated itself from international markets through high protectionist tariffs. During the war, Germany's main international strategy was to destroy food distribution networks by bombing supply ships. Great Britain leveraged its trade relations with the US, which served as its breadbasket, and also imported food from its colonies. When the Belgian food system became severely stressed in WWI, international aid saved lives and created an opportunity for the United States to emerge from an isolationist position to become a leader in international co-operation and humanitarian food aid. The rise of effective humanitarian aid, and programs by Hoover and Drummond to target families in need, raised the bar on international food security. The lessons of the German hunger blockade of WWI were distorted into the "Hunger Plan" which brought horrendous suffering to millions. None of these three countries faced starvation during WWII, but the unique wartime food policies they developed exported starvation to other parts of the world, with devastating global implications.

Conclusion

A long-term historical perspective is essential to understand what constitutes a resilient food system. The lessons of food resilience need not be derived only from times of atrocity, economic crisis and looming environmental trends like climate change. They can also focus on best practices of individuals, communities, nations, and the international community to address pressure on the food system. This article has shown that coordination of efforts among local, national, and international food systems is essential, since each level of scale provides a unique set of contributions to promote food resilience. The lessons of many different episodes in food history, including times of peace and war, will need to be compiled and compared to understand the key components and characteristics of a resilient food system. The history of food resilience in WWI and WWII is a small window on that larger question.

An event like war or famine comes along rarely, yet its effects can last for many generations. Scientists are now discovering the intergenerational consequences of famine on physiology: the grandchildren of people who suffer from famine are more likely to suffer from obesity, diabetes, hypertension and other diseases. In a social and political context, as Hoover had warned Lloyd George, memories of famine have long-term consequences involving an intergenerational time scale. It may take generations for the fear or complacency associated with a food system failure to be transmuted into compassion. Rebecca Solnit's comment on the Irish famine applies to all food system failures: "Trauma is inherited as silence, a silence it may take generations to learn to hear" (Solnit 1997). It is my hope that by hearing about the food resilience issues around two world wars, we may be less complacent about food self-sufficiency and more motivated to prevent and alleviate suffering.

What, then, are the key components and characteristics of a resilient food system?

Local Resilience:

- individual access to nutritionally density food, rich in micronutrients, complemented with a base of inexpensive carbohydrates and proteins
- family commitments to the reduction of consumerism and waste (“Hooverizing”), coupled with a rise in local food production
- a labor pool of farmers with diverse and flexible approaches to food production
- a rich system of local knowledge of food and agriculture that is passed between generations to maintain local cultural and agricultural biodiversity, or a system of agricultural training
- local social networks that uphold food justice, and individuals who have the courage and determination to secure the food needed for their community
- reliable, abundant, low cost, and locally available agricultural inputs to promote soil fertility and reduce pesticides, weed, and water use

National Resilience:

- a national commitment to food justice, so that the people will trust they can rely on a base-line of supplies and an equitable and just distribution plan
- a well coordinated regional or national food strategy that supports local engagement of small scale gardeners who are growing, preserving, and distributing foods rich in micronutrients
- national support for farmers, including farm hands, and programs to support and retain farmers on the land
- nutritional supplementation and fortification
- a long term national vision for building the food system, based on a cultural and scientific understanding of agriculture and nutrition

International Resilience:

- timely humanitarian aid and decisive interventions that target the most vulnerable groups, such as children, the elderly, and those suffering from illness
- international trade that puts people before profits
- economic systems that encourage generous humanitarian aid without creating either dependency for the recipients or economic hardships for the producers

Today food insecurity is found in the lowest income groups in both the developed world and in the developing world. In the US, one in five households with children experiences food insecurity. However, a rich diversity of physiological, ecological, and social factors have upheld local, national and international food resilience over the long term. Today, a wide range of efforts are being created to uphold food resilience, from rebuilding the foodshed at the local level (Ackerman-Leist, 2013) through creating national research and policy frameworks for assessing and strengthening the relationship between nutrition and the environment (Malden et al. 2015), through international WHO efforts in reducing vitamin A deficiency and low growth rate in children.

This history provides multiple models of how food systems are reconfigured or reconstructed in times of crisis. As we enter a period when food is forecasted to become more expensive due to the environmental consequences of industrial agriculture, climate

change, rising population, and growing consumer expectations resulting from globalization and changing standards of living, the question of how to reconstruct and maintain just and resilient food systems becomes more urgent. Many of the food policies and initiatives of WWI and WWII may inspire our capacity to provide ample foods of sufficient nutritional density. The relationship between local production, national coordination, and international trade (and aid) are key components of resilience that can be adapted and implemented to provide food security for everyone.

Acknowledgements: I am indebted to Ted Veiling of Norfolk, CT, for sharing his story of hunger in The Netherlands during WWII, and his message of courage and forgiveness.

References

Ackerman-Leist W (2013) *Rebuilding the Foodshed: How to Create Local, Sustainable, and Secure Food Systems*. Chelsea Green White River Junction, VT

Ahamed L (2009) *Lords of Finance*. Penguin, New York

Barnett LM (1985) *British Food Policy During the First World War*. Routledge Press, New York

Bracero History Archive. <http://braceroarchive.org/teaching>. Accessed June 2015.

Clapp H (1900) Report of the Committee on School Gardens and Children's Herbariums. Massachusetts Horticulture Society Transcripts. 248-261

Collingham L (2012) *The Taste of War: World War II and the Battle for Food*. Penguin, New York

Drummond JC and Wilbraham A (1939) *The Englishman's Food: A History of Five Centuries of English Diet*. Pimlico, London

Feeding America (2013) *Hunger and Poverty Fact Sheet*.
http://www.feedingamerica.org/hunger-in-america/impact-of-hunger/hunger-and-poverty/hunger-and-poverty-fact-sheet.html?gclid=CJ7vtJ2_hcUCFTIQ7Aod0mYAVg. Accessed 1 April 2015

Ferguson J (2007) *The Vitamin Murders: Who Killed Healthy Eating in Britain?* Portabello Books, London

Gazzeley I, Newell A (2013) The First World War and Working Class Food Consumption in Britain. *Eur Rev of Econ Hist* 17:71-94

Gowdy-Wygant C (2013) *Cultivating Victory: The Women's Land Army and the Victory Garden Movement*. University of Pittsburgh Press, Pittsburgh

- Howard NP (1993) The Social and Political Consequences of the Allied Food Blockade of Germany, 1918-19. *German History* 11(2): 161-188
- McAfee, Kathleen. "Beyond Techno-science: Transgenic Maize in the Fight Over Mexico's Future." *Geoforum* 39 (2008): 148-160
- McVay AD and Luciuk LY (eds) (2011) *The Holy See and the Holodomor: Documents from the Vatican Secret Archives on the Great Famine of 1932 – 1933 in Soviet Ukraine*. The Kashtan Press, Kingston
- McWilliams, James (2009) *Just Food: Where Locavores Get it Wrong and How We Can Truly Eat Responsibly*. Back Bay Books, Boston
- Milles D (1995) Working Capacity and Calorie Consumption: The History of Rational Physical Economy. In: Kamminga H and Cunningham A. (eds) *The Science and Culture of Nutrition 1840-1940*. Rodopi, Atlanta, pp 75-96
- Moynahan B (2013) *Leningrad: Siege and Symphony*. Quercus, London
- Malden C. Nesheim, Maria Oria, and Peggy Tsai Yih (eds) (Committee on a Framework for Assessing the Health, Environmental, and Social Effects of the Food System) (2015) *A Framework for Assessing Effects of the Food System*. National Academies Press
<http://www.nap.edu/catalog/18846/a-framework-for-assessing-effects-of-the-food-system>
Accessed 1 April 2015
- Oddy DJ (2003) *From Plain Fare to Fusion Foods: British Diet from the 1890s to the 1990s*. Boydell Press, Syracuse NY
- Solnit R (1997) *A Book of Migrations*. Verso, Brooklyn, NY
- Teich M (1995) Science and Food during the Great War: Britain and Germany. In: Kamminga H and Cunningham A. (eds) *The Science and Culture of Nutrition 1840-1940*. Rodopi, Atlanta, pp. 213-234
- Tunk TE (2012) Less Sugar, More Warships: Food as American Propaganda in the First World War. *War in History* 19(2): 193-226
- Veiling T (2014) *Survival and Resistance: The Netherlands under Nazi Occupation*. Talk given at Immaculate Conception Church, 14 October 2014
- Vincent CP (1986) *The Politics of Hunger: The Allied Blockade of Germany 1915-1919*. Ohio University Press, Athens, Ohio