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Jordan Michelle Naftalis April 1, 2014

A Normal Agency in Abnormal Times:
The Forest Service in the World Wars

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Abstract

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This paper examines how the United States Forest Service grew and strengthened its position within the American bureaucracy in the first half of the twentieth century. After being founded in 1905 the agency underwent a period of consistent growth derived not only from its work maintaining the system of National Forests, but also from its participation in two special projects designed to aid the American effort in each of the two World Wars. In the First World War the Forest Service assembled a regiment of foresters and lumbermen, the 20th Engineers (Forestry) Regiment, that went to France and produced from the French forests the wood products necessary for use by the American troops. During the Second World War the bureau was responsible for the facilitation of the Emergency Rubber Project in Salinas, California; this measure was implemented in March 1942 with the goal of producing a domestic supply of natural rubber derived from the guayule shrub. These two efforts resulted in opposing outcomes: the Twentieth Engineers were successful in rapidly producing ample wood for use by the American Army in France, while the Emergency Rubber Project and its guayule crop were ultimately liquidated after having been overshadowed by the explosive emergence of synthetic rubber. Both projects came as a result of abnormal wartime circumstances and allowed the Forest Service the opportunity to use its expertise in order to contribute to the national war effort. While completing both projects the agency attracted attention from the federal government and from the public, and its response in these times of crisis helped it prove its importance to itself, to the federal government, and to the nation.

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Jordan Naftalis
Atlanta, Georgia
April 10, 2014

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Introduction: The Forest Service in the American Bureaucracy

Often the most important munitions in a war are those that are so omnipresent, so taken for granted, that they go easily unnoticed until they are direly needed. Historian John Tully notes how "war sharpens our wits in many ways, makes us realize what is essential and what isn't." The essential natural resources of peacetime society become the strategic materials of a nation at war. The story to be told here is one concerning two specific strategic materials, of two resources upon which "modern mechanized warfare is absolutely dependent:" wood and rubber.[1] It is the story of how one federal agency, the United States Forest Service, became responsible for securing the nation's supplies of these natural resources during the First and Second World Wars. The bureau extended its reach in these times of national crisis in order to meet wartime needs by diverting some of its personnel to special projects created with the express purposes of producing wood during World War I and rubber during World War II. Its participation in these two wartime projects demonstrated its flexibility under extraordinary circumstances. In times of crisis bureaucratic agencies expand their reach in order to remain strong and to protect the nation. While it is true that "the state often takes [a]…shortsighted view" when at war, asking its various branches to make rapid adjustments that sometimes prove unsuccessful, the resulting wartime projects create opportunities for individual bureaus to prove their importance to the nation and to themselves.[2] The two projects discussed here allowed the United States Forest Service the opportunity to do just that in the first half of the twentieth century.

With American involvement in each of the world wars came a call upon the Forest Service to utilize its particular skills and personnel to make a contribution to the government's

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[1] John Tully, *The Devil's Milk: A Social History of Rubber* (New York: Monthly Review Press, 2011), 17.

[2] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 360.

war effort. This challenge manifested itself in two different ways. In World War I the Forest Service, at the request of the War Department, was asked to prepare "a 'forestry regiment' made up of foresters, practical woodsmen, portable sawmill operators, and others experienced in lumbering operations, for service in France."[3] The allied forces fighting in the trenches required a variety of timber products, from "railroad ties" to "bridge timbers," and the War Department reasoned that the Forest Service would be the organization best able to recruit the experienced personnel who would become responsible for providing them from French forests.[4] By the war's end what had initially been two regiments of foresters, the 10th and 20th Engineer Regiments, had been consolidated into the 20th Engineers, the largest American regiment serving in France.

The Forest Service's stint across the Atlantic did not resume during World War II. Rather, the agency found itself tasked with battling "one of the gravest perils facing the country today" on the home front: the discontinuation of a supply of natural rubber coming from the Far East.[5] The fear of an imminent rubber shortage after Pearl Harbor galvanized Congress to authorize the government's purchase of 600 acres of guayule fields and processing facilities owned by the Intercontinental Rubber Company in Salinas, California on March 5, 1942. Guayule is a rubber-producing desert shrub that can be grown in the United States and provides a substitute for the latex rubber tapped from the tropical *Hevea* rubber tree. Immediately the Secretary of Agriculture placed the facilitation of the guayule program, officially named the Emergency Rubber Project, in the hands of the Forest Service "because of its experience in

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[3] United States Department of Agriculture (hereafter USDA), Forest Service (hereafter FS), "Forestry Regiment to be organized," May 1917, 1, Record Group 95 (hereafter RG 95), National Archives and Records Administration (hereafter NARA), College Park, Maryland.

[4] The Allies needed "…railroad ties, trench timbers, mine props, bridge timbers, lumber, and cordwood." See Henry S. Graves, "The Forest Regiment and How to Join It," June 1, 1917, 2, RG 95, NARA.

[5] "Material for Circular Letter to Farmers by County AAA Committees," 1, RG 95, NARA.

operating large-scale nurseries and tree-planting jobs."[6] The agency thus became responsible for attempting to secure a constant American-grown supply of natural rubber for the first time in the nation's history. An examination of these two projects as moments of particular importance in the overall trajectory of the Forest Service's development in its first forty years, moreover, allows for an analysis of how the agency attempted to secure its place within the federal bureaucratic system. The differences in these projects—man power versus plant power, one devoted to cutting living trees down and the other to trying to grow guayule—speak to the fact that the Forest Service took on a variety of additional responsibilities during the wars.

The Forest Service, a bureau designed to protect the nation's forests and the resources in them, had come into being as a result of the vast deforestation that had occurred in the United States from the colonial period into the late nineteenth century. It is estimated that before the arrival of European settlers in North America anywhere from 822 to 850 million of the contemporary nation's 1903 million acres, a whopping forty-five percent of the land, had once been covered by pristine old-growth forests. In the seventeenth, eighteenth, and nineteenth centuries timber resources had been used as though they were inexhaustible. Much of this drain had been justified by "the sacred name of national development," and by the late nineteenth century its consequences had become severe. Americans and their colonial predecessors had not had any qualms about cutting down the forests—they had found them to be "repugnant, forbidding, and repulsive," true obstacles to the development of modern civilization.[7]

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[6] USDA, FS, Emergency Rubber Project (hereafter ERP), *Rubber from Guayule*, April 15, 1943, 4, RG 95, NARA.

[7] Michael Williams, *Americans and Their Forests: A Historical Geography* (New York: Cambridge University Press, 1989), 3 & 10; Harold T. Pinkett, *Gifford Pinchot: Private and Public Forester* (Chicago: University of Illinois Press, 1970), 7.

It was not until the final thirty years of the nineteenth century that the idea of forest conservation drew national attention. During this period more than 200 bills concerned with forestry and tree planting were introduced to Congress. Though many of these bills did not produce any effect on the development of a national forestry policy their existence points to a previously unseen degree of attention given by the federal government to the question of the forests.[8] Some of these bills had the desired effect; the federal government created the Forestry Division, a bureau within the Department of Agriculture devoted to regular forestry investigations, in 1880.[9] Federal support for the implementation of a forestry policy continued to grow over the following decade as the knowledge that managed forests would, over time, be economically advantageous to the federal government became more widespread. Though initially many felt that limiting cutting in the present would be an economic blunder the proponents of forestry convinced a growing number of Americans that "forests can be judiciously thinned, not only without hurting them, but with positive advantage to their productive powers." They argued that timber sales would provide the federal government with a renewable "liberal income" over the course of time so long as the forests remained under careful

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[8] Williams, *Americans and Their Forests*, 409.

[9] In the mid-nineteenth century early conservationists including George Perkins Marsh and Reverend Frederick Starr put forth the argument that "it [was] prudent, not to say a duty, of government…to make some effort in providing against the undue waste of our timber supply as also in providing for its reproduction;" such men believed, moreover, that the federal government was the *only* organization that would be able to "achieve a national view to [the] truly national problem" of deforestation. See Dr. Reginald A.D. King, *Individual effort in preserving and propagating our trees*, 21, RG 95, NARA; George Perkins Marsh, *Man and Nature* (New York: Charles Scribner, 1846), 45-46, quoted in James G. Lewis, *The Forest Service and The Greatest Good: A Centennial History* (Durham: Forest History Society, 2005), 9; Williams, *Americans and Their Forests*, 372 & 400.

management. They also emphasized the fact that "the direction of such work must be, however, in the hands of an expert."[10]

With all of this knowledge in mind Congress passed The Forest Reserve Act in 1891, legislation that "granted the president authority 'from time to time' to set aside as 'public reservations' any public lands forested or with undergrowth."[11] A series of forest reserves were thus created and placed under the control of the General Land Office, a branch of the Department of the Interior. This move ushered in a heretofore-unseen style of public land administration in the United States, one linked to the rising of a powerful bureaucratic nation state.[12] Yet it also created tension between two Executive Departments as "one department, [the Department of] Agriculture, was placed in charge of forestry without forests, while another, [the Department of the] Interior, remained in charge of forests without forestry."[13] Little work toward conserving the forest reserves could be completed so long as they remained under the control of the General Land Office, an agency with no trained foresters on its payroll, rather than in the hands of the Forestry Division.

This separation of forestry from the nation's physical forests was not rectified until President Theodore Roosevelt authorized the transfer of the 63 million acres of forest reserves

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[10] *The Evening Star* (Washington), September 10, 1887.

[11] The Forest Reserve Act of March 3, 1891, Section 24 of the General Land Law Revision Act of 1891, otherwise known as the Creative Act, 26 Stat. 1103; 16 U.S.C. §§ 471. See USDA, FS, *The U.S. Forest Service – An Overview*, 33, http://www.fs.fed.us/documents/USFS_An_Overview_0106MJS.pdf; Lewis, *The Greatest Good*, 18.

[12] Char Miller, foreword to *The Forest Service and The Greatest Good: A Centennial History*, by James G. Lewis (Durham: Forest History Society, 2005), ix.

[13] Federal Executive Branch, United States Government, last modified February 3, 2014, http://www.usa.gov/Agencies/Federal/Executive.shtml#Executive_Departments; Pinkett, *Gifford Pinchot*, 13 & 9.

from the General Land Office to the Division of Forestry on February 1, 1905.[14] Roosevelt acted at the behest of his close personal friend Gifford Pinchot, America's first professionally trained forester, whom he made the first Chief Forester of the newfound agency. Pinchot's understanding of the fact that governmental power within a bureaucratic system often "operate[s] through a chain of personal orders and interconnected prerogatives" served his cause particularly well, especially considering the fact that Roosevelt, with the weight of presidential authority behind him, staunchly supported his friend's efforts to promote practical forestry and forest conservation.[15] The President understood, moreover, that "the forest can only be protected by the State…and the liberty of action of individuals must be conditioned upon what the State…determines to be necessary for the common safety."[16]

While some Americans supported this advent of federal forest regulation others bitterly resented what they viewed as an infringement on their rights. Westerners, still caught in the fury of development at the turn of the twentieth century, felt this exertion of federal power particularly strongly though it reached all across the nation. In the years following the 1803 Louisiana Purchase and the 1848 signing of the Treaty of Guadalupe Hidalgo, which had ended the Mexican-American War, the size of the Untied States had tripled. Millions of Americans had moved westward into these newly acquired territories in pursuit of economic opportunity.[17] As the population of the far west, including states such as California, Oregon, and Nevada, had

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[14] Transfer Act of February 1, 1905, P.L. 58-33, Ch. 288, 33 Stat. 628; 16 §§ U.S.C. 472, 554. See USDA, FS, *The U.S. Forest Service,* 33.

[15] Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002), 58.

[16] Theodore Roosevelt's President's Annual Address to Congress, 1908, quoted in James G. Lewis, **"**Theodore Roosevelt's Cautionary Tale," *Forest History Today* (Spring/Fall 2005): 56.

[17] Westward Expansion, The History Channel, accessed April 3, 2014, http://www.history.com/topics/westward-expansion.

grown the federal government, still based on the east coast, had extended its reach. It had retained control of the vast majority of the land—the public domain—despite the fact that it remained thousands of miles away. This high level of control had proved deeply upsetting to many Westerners who felt that the Washington, D.C. bureaucrats were creating and implementing policies that they were, literally, too far removed from. Tensions had remained high into the late nineteenth century and, upon President Cleveland's surprise doubling of the forest reserves in February 1897, Senator Clarence Clark of Wyoming had expressed the fears many Westerners felt about losing access to forest resources. He had commented to the Senate that the Washington bureaucrats who supported this measure "belong to that class of scientific gentlemen who think more of the forest tree than they do of the roof tree, and we have a whole lot of people in the West who think as much of their roof tree as the people of any other part of this Nation."[18]

Though by 1905 politicians from the West continued to push back against conservation efforts at the request of their constituents Pinchot, with his persuasive nature and ability to make forestry seem like the sensible thing to do, garnered the support of a growing number of legislators. He did this largely by befriending the right people, which he often did from the comfort of his own dining table. Guests, including congressmen, administrators, Supreme Court justices, and other influential individuals from around the world, continuously streamed in and out of the home Pinchot shared with his parents at 1615 Rhode Island Avenue. He also paid frequent visits to Capitol Hill either with the purpose of sharing his views with senators and representatives or in order to testify before numerous committees in the hopes of fostering the

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[18] Senator Clark to the Senate, 1897, quoted in Gifford Pinchot, *Breaking New Ground* (New York: Harcourt, Brace and Company, 1947), 109.

development of his bureau.[19] Pinchot also understood the importance of public opinion in creating change and worked to build the agency's reputation outside of the federal government. He found himself continuously reminded of a piece of advice given to him by his mother in 1890: "help make a public opinion which will force the Government to do what ought to be done."[20] In its early years the Forest Service pursued a strategy of self-promotion via the distribution of millions of circulars annually. This measure helped the agency conjure a favorable image for itself in the mind of the American public.[21] All of this hard work paid off, quite literally: in 1898, before the Division of Forestry became the Forest Service, its annual budget was $29,000, a figure that Pinchot expanded at an impressive rate when he won budget "percentage increases of 70, 82.4, 109.4, and 57.3" in his first four years of service.[22]

Pinchot's Forest Service in 1905 was "a completely new and independent body that transcended the interbureau rivalry," and through this new body he was finally able to put the principles of scientific forestry into practice on federal lands.[23] He and Roosevelt together brought the issue of a "coming timber famine," resulting from the previous three centuries of systematic deforestation, to the nation's attention. The president had outlined this threat in an address to the delegates at the American Forestry Congress, a January 1905 gathering designed by Pinchot to convince Congress to transfer the forest reserves to the Division of Forestry:

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[19] M. Nelson McGeary, *Gifford Pinchot: Forester-Politician* (Princeton: Princeton University Press, 1960), 51-52 & 6.

[20] Mary Eno Pinchot to Gifford Pinchot, 27 August 1890, quoted in McGeary, *Gifford Pinchot: Forester-Politician*, 43.

[21] Daniel P. Carpenter, *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovation in Executive Agencies, 1862-1928*, quoted in Steven J. Balla and William T. Gormley Jr., *Bureaucracy and Democracy: Accountability and Performance* (Washington, D.C.: CQ Press, 2004), 20.

[22] Gifford Pinchot to Mary Eno Pinchot, 7 August 1899, quoted in McGeary, *Gifford Pinchot: Forester-Politician*, 52; McGeary, *Gifford Pinchot: Forester-Politician*, 52.

[23] Williams, *Americans and Their Forests*, 418 & 413; USDA, FS, *The U.S. Forest Service*, 2.

> "Our country…is only at the beginning of its growth. Unless the forests of the United States can be made ready to meet the vast demands which this growth will inevitably bring, commercial disaster, that means disaster to the whole country, is inevitable. The railroads must have ties…the miner must have timber…the farmer…must have timber…the stockman must have fence posts. If the present rate of forest destruction is allowed to continue, with nothing to offset it, a timber famine in the future is inevitable."[24]

Pinchot's plan to slow the rate of forest destruction was to employ, on the public forest lands, the system of scientific forestry he had learned while studying the profession in France from late 1889 through the end of 1890. According to this system trained foresters, "through careful seeding, planting, and cutting," could "transform the real, diverse, and chaotic old-growth forest into a new, more uniform forest" that was easier to administer.[25] Such careful attention would allow for both conservation and propagation. Selective cutting rather than clear cutting would ensure that the forests did not become denuded and that standing trees would not be damaged through the felling of others. Replacing cut trees via the continuous planting of new seedlings that would be protected and allowed to reach maturity would guarantee future timber resources. Forests and the trees within them were conceptualized as a renewable resource that, if properly managed, would remain productive so long as they remained cared for. Pinchot believed that it was only through the federal administration of such a system by experts that the United States would be able to avoid a timber famine in the twentieth century.

The implementation of scientific forestry, a measure dedicated specifically to securing timber resources, fit well into the new agency's wider goal of enacting a utilitarian multiple-use philosophy when managing the National Forests. It is reasonable to believe that Pinchot favored such a policy in order to win support for the agency and its mission from as many groups as

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[24] Theodore Roosevelt, "The Forest in the Life of the Nation," 8-9, quoted in *Williams, Americans and Their Forests*, 441.

[25] Scott, *Seeing Like a State*, 15.

possible, yet from the beginning it caused conflicts as a result of the fact that "no user could be wholly satisfied."[26] Despite its inability to serve all interests the Forest Service has continued to follow a multiple-use policy since its inception. The following explanation of the multiple-use policy appeared in a 1960s publication designed to explain the differences between the Forest Service and the National Park Service: "The National Forests are lands of many uses. In them, the lands are managed to produce water for towns and cities, cattle are grazed, timber is cut for market, hunters and fishermen are welcome, skiing and camping are encouraged."[27] Though simplistic this statement of the many uses of national forestlands highlights the importance of water resource management, grazing, and recreation in addition to timber production.

When Pinchot was removed from office on charges of insubordination in 1910 bureau morale plummeted. The complexity of his dismissal need not be discussed at length, though it had much to do with his stubborn nature and his inability to cooperate with President Taft's new Secretary of the Interior, Richard Ballinger.[28] He urged his men to remain loyal to the agency and to continue their work under his handpicked successor, Henry S. Graves. Graves, who had received training in professional forestry in Germany at the behest of his Yale classmate Pinchot, had been the agency's associate forester when it was still the Division of Forestry, before leaving Washington to become the dean of the Yale Forest School in 1900. Upon President Taft's request he had reluctantly left Yale and taken over the post of Chief Forester in February 1910.[29] Though Graves lacked the political facility that had afforded Pinchot success in the position his more reserved demeanor served him and the bureau well as he repaired agency relations with

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[26] Williams, *Americans and Their Forests*, 420.

[27] *The Forest Ranger Handbook with Corey Stuart and Lassie*, image in Lewis, *The Greatest Good*, 171.

[28] According to Williams, "the intricacies of the Ballinger-Pinchot affair are complex and still hotly debated." See Williams, *Americans and Their Forests*, 423.

[29] Pinkett, *Gifford Pinchot*, 150; Lewis, *The Greatest Good*, 66.

Secretary of Agriculture James Wilson and with the Department of the Interior. In the years before the war he successfully fought numerous attempts by Western congressmen to transfer the National Forests either to the states or back to the Department of the Interior. This challenge required Graves to demonstrate to the government that the Forest Service had managed its funds well from the beginning and that the agency remained the organization best suited to managing the nation's public forestlands.[30]

From its inception the Forest Service, in regulating millions of acres of public forestlands under the multiple-use philosophy, strengthened the federal government's power by making the millions of acres of forested federal lands, and the products derived from them, more manipulable and profitable for the federal government. As James C. Scott notes in *Seeing Like a State* bureaucratic governments, which are "powerful institutions with sharply defined interests," often employ techniques such as scientific forestry as "forms of knowledge and manipulation" with the express purpose of acquiring more power. The emergence of scientific forestry as a responsibility of the federal government, moreover, "cannot be understood outside the larger context of the centralized state-making initiatives."[31] The utilitarian nature of these practices translated actual trees into abstract ones that could provide a specific amount of a particular resource, such as lumber or firewood, to the people of the present or those of the future. These resources could even at times turn a direct profit for the federal government when sold, though timber sales were rare in the agency's early years.[32]

Considering the process by which the agency came into being and its dedication of financial and human capital during times of war raises the question of whether the Forest Service

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[30] Lewis, *The Greatest Good*, 67-68.
[31] Scott, *Seeing Like a State*, 2, 11, 14.
[32] Ibid, 12.

can be viewed as a successful agency within the American bureaucracy of the twentieth century. As a means of answering this question I propose three other questions, each of which will be explored in the coming pages: Would the organizational structure of the agency align with that of the bureaucracy as a whole? In what ways would the agency's responsibilities be carried through? In what *unique* way would the agency contribute to the overall power of the government over its constituents?

By the time the Forest Service was founded in 1905 the American federal bureaucracy was already well established. Throughout the nineteenth century and into the twentieth it had expanded as the number of administrative agencies within it had gradually increased.[33] This expansion had accompanied the literal growth of the nation in the nineteenth century; with the acquisition of more and more land in the far west and continued population growth, resulting from both immigration and higher birth rates, had come an increased need for federal regulation of land and resources. When the activities of the federal government increase, as they did in the nineteenth century, the role of the bureaucracy grows at a disproportionately rapid rate as a result of the fact that bureaucratic agencies enjoy a higher degree of flexibility in numbers than branches such as the legislature do.[34] Many of the federal bureaucracy's new organizations, including the Department of Agriculture, were born as a result of particular economic interests.[35] Upon its founding in the early twentieth century Pinchot's Forest Service, and his plan to manage the nation's forests in order to conserve their resources and thus foster the development of a long-term renewable source of federal revenue, fit this paradigm well.

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[33] James Q. Wilson, "The Rise of the Bureaucratic State," in *American Government: Readings and Cases*, ed. Peter Woll, 13th ed. (New York: Longman, 1999), 324 & 327.

[34] Steven Kelman, *Making Public Policy: A Hopeful View of American Government* (New York: Basic Books, Inc., 1987), 90.

[35] Richard L. Schott quoted in Wilson, "The Rise of the Bureaucratic State," 324 & 327.

In order to fulfill its mission in the most efficient way possible the Forest Service adopted a hierarchical organizational structure that mirrored that of the bureaucracy as a whole. As the agency grew and evolved over the course of the century its structure underwent noticeable changes, yet what remained consistent with both internal and bureaucratic tradition was the movement of power from the top down. The Forester, later known as the Chief, functioned within the agency as the president did in the context of the entire federal government. By 1915 he commanded 3,875 people in both Washington, D.C. and in forests across the country. In the twenty-first century this number has escalated to 45,587 people employed by the Forest Service in both full-time and part-time positions.[36] This alignment between the agency and its superiors also facilitated an understanding of organization and its function that allowed the bureau to work as effectively as possibly during times of peace and war.

The methods though which the agency carried out its actions and policies also remained consistent with overarching government aims. Of particular note, resulting from the fact that the Forest Service is a bureau dedicated to applying human-formulated initiatives when managing land and resources, are the concepts of high modernism and techno-politics. The former, as discussed in James Scott's *Seeing Like a State*, was concerned with "continued linear progress, the development of scientific and technical knowledge, the expansion of production…the growing satisfaction of human needs and, not least, an increasing control over nature."[37] For the Forest Service in the years leading up to World War I progress meant turning forests into "timber farms" organized by the federal government through the use of scientific forestry with the express purpose of conserving natural resources to ensure their longevity and to make them

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[36] USDA, FS, *Government Forest Work* (Washington, D.C.: Government Printing Office, 1915), 18, RG 95, NARA; USDA, FS, *The U.S. Forest Service*, 9.

[37] Scott, *Seeing Like a State*, 89-90.

available for use by future generations. It was precisely in this way that the agency began to exert an increased control over nature at the beginning of the twentieth century, an accomplishment it proudly touted in a 1915 publication:

> "Thus in the space of less than 25 years the forests on the public domain have passed from a condition in which the timber was always in imminent danger of being destroyed to one in which it is everywhere being protected; from a state in which, as a result of repeated fires and wasteful lumbering, the annual growth was steadily decreasing, to one in which scientific management insures a steady increase in annual growth and a good supply of timber for the people for an indefinite period."[38]

The "powerful aesthetic" of the nation's well-managed public forests also provided a visual example of the agency's, and thus the government's, power.[39]

Techno-politics, as discussed in Timothy Mitchell's *Rule of Experts*, emerged in the twentieth century from a combination of human and nonhuman elements. It stipulated that when organizing these human and nonhuman components, a goal and necessity of any system of governance, human intentionality and ingenuity were to be used in order to control nonhuman entities. The work of the Forest Service exemplified this division between human expertise and nature.[40] Even before the founding of the bureau proponents of scientific forestry recognized that an attempt to manipulate and overrule nature would have to be left "in the hands of an expert" in order to produce the most beneficial outcome for the government and for the nation as a whole.[41] When the Forest Service introduced a management system grounded in the principles of scientific forestry just after the turn of the century it effectively "manufactured nature" on a national scale. Cutting and planting trees and guaranteeing the "continued prosperity of the agricultural, lumbering, mining, and livestock interests" through other management techniques

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[38] USDA, FS, *Government Forest Work*, 6.
[39] Scott, *Seeing Like a State*, 263 & 18.
[40] Mitchell, *Rule of Experts*, 42-43 & 35.
[41] *The Evening Star* (Washington), September 10, 1887.

on federal lands undoubtedly caused a rearrangement of nature. Through this change, moreover, the bureau asserted the federal government's power.[42]

As previously mentioned some Westerners in states such as Wyoming, Idaho, Washington, South Dakota, California, Utah, and Montana (where President Cleveland had established over 21 million acres of new forest reserves in February 1897) were concerned with the limits imposed by the system of National Forests. They felt as though this regulation created a situation where the citizenry was actively being denied access to resources as a result of federal government rule. This conviction was not inaccurate as at that time

> "under existing interpretations of law no use whatever could be made of the resources of the…Reserves…since even to set foot upon them was illegal, the only possible conclusion was that this vast area was to be locked up, settlers were to be kept out, and all development permanently prevented."[43]

These Westerners' perception of the level of power held by the agency touches on the fact that a "knowledge and command of space" exercises power not only over that space, but also over the people living in and around it. Commanding power over the land, even when managing it for the public, gave the federal government an elevated degree of authority over its people.[44] The mission of the Forest Service, therefore, fit well into the bureaucracy's fundamental duty of governing the people of the United States. This fact, when coupled with the agency's willingness and ability to make particular contributions to the nation's war efforts in World War I and World War II, confirms my belief that the Forest Service found success as a federal agency within the American bureaucracy during the first half of the twentieth century. Exploring the bureau's

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[42] "…this ability to rearrange the natural…environment became a means to demonstrate the strength of the modern state…" See Mitchell, *Rule of Experts*, 35 & 21; Letter from Secretary Wilson, 1905, quoted in Gifford Pinchot, *Breaking New Ground* (New York: Harcourt, Brace and Company, 1947), 261.

[43] Pinchot, *Breaking New Ground*, 107-109.

[44] Mitchell, *Rule of Experts*, 90.

special wartime projects will help further an understanding of how the Forest Service reinforced its position within the government while continuing its growth and pursuit of its mission during this period.

"We're not much on drill, but we're hell on cutting down trees:"[45] The Forest Service Goes to France in World War I

From the declaration of war in Europe in the early days of August 1914, to the entrance of the United States into the conflict on April 6, 1917, to the announcement of the armistice on November 11, 1918, it remained clear that modern warfare in the early twentieth century rested on a material that was, ironically enough, decidedly primitive: wood.[46] The extensive system of trenches that came to traverse the French countryside required duckboard floors, revetments (reinforcement of walls by planks or bundled sticks), firing stands, steps, and signposts all made from wood. Wooden stakes to hold barbwire entanglements were in high demand. Docks, hospitals, barracks, warehouses, and power plants all needed to be constructed from wood to help facilitate the allied war effort.[47] According to W.B. Greeley, the Assistant Forester of the United States sent to France during the war, wood, like machine gun rounds, food stores, and vehicles, was a "munition of war."[48]

There was no American organization, governmental or otherwise, better suited to contribute to the allied war effort when it came to wood than the Forest Service. It was well-known in the early twentieth century that the coming of a war would necessitate "vast quantities" of wood, and the Forest Service, having only been in operation for twelve years by the time the

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[45] Percival Sheldon Ridsdale, "How the American Army Got Its Wood," *American Forestry* XXV, no. 306 (June 1919): 1140, http://www.foresthistory.org/research/DigitalCollections/WWI/Ridsdale.pdf.

[46] For a well-written synopsis of World War I see R.R. Palmer et al., *A History of the Modern World*, 10th ed., (New York: McGraw Hill, 2007), 677-718.

[47] Frank N. Schubert, "All Wooden on the Western Front," *Journal of Forest History* (October, 1978): 180-181, http://www.foresthistory.org/Publications/JofFH/Schubert.pdf; Howard Y. Williams, foreward to *Twentieth Engineers, France, 1917-1918-1919*, by Alfred H. Davies and Pérez Simmons (Portland: Twentieth Engineers Publishing Association, 1920), 6.

[48] Lieutenant Colonel W.B. Greeley, "The American Lumberjack in France," *American Forestry* XXV, no. 306 (June, 1919): 1093, http://www.foresthistory.org/research/DigitalCollections/WWI/Greeley.pdf.

United States entered World War I, was both willing and able to provide its "expert knowledge" concerning this issue. As early as 1915, a time when President Wilson still clung steadfastly to an isolationist policy, there was talk of organizing members of the bureau into some sort of military group that could provide a unique service within the Army.[49] The men working for the agency were the nation's experts on forestry and on its primary product, wood, and were well-versed in the most effective ways to fell trees and process them for multiple uses. Their work on the National Forests mandated an extensive outdoor skill set and required them not only to be woodsmen, but also to be "telephone engineers, topographic surveyors, draftsmen, and so on."[50]

Considering all of this there was no question that the men of the United States Forest Service were "men whose services could be used to great advantage in case of need" during the war. They offered the "ideal raw material" and needed only to be put into regiments and shipped off to France in order to complete their patriotic duty when the United States entered the conflict in 1917. Such a transition was not far fetched as from its inception the Forest Service had mimicked a military unit. When creating the agency Pinchot had used the structure and organization of the Prussian forest service, including its paramilitary nature, as a template. Discipline and training were paramount, and the early ranger uniforms were designed to look like those worn by the members of the U.S. Army.[51] The practice of incorporating trained foresters into the national military, furthermore, was one that had been implemented in Europe in

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[49] USDA, FS, Un-labeled document from the 10th and 20th Engineer Regiments files, 2, RG 95, NARA); District Forester, "Suggested draft of a personal letter to Captain McCoy," February 22, 1915, 1, RG 95, NARA.

[50] "All…have had broad experience in outdoor training, camping, cooking, packing, riding, walking, topographic sketching, road, trail, and bridge building, telephone construction, use of heliograph, use of arms, first aid treatment, etc." See "Suggested draft of a personal letter to Captain McCoy," 2; USFS, Un-labeled document from the 10th and 20th Engineer Regiments files, 3.

[51] Lewis, *The Greatest Good*, 166.

the late nineteenth century. After the close of the Franco-Prussian war an 1872 law had required all foresters in the French service to participate in military activities, thus creating the "Forest Light Infantry (Chasseurs Forestiers)." Such activities continued on a grander scale as WWI took Europe by storm—a United States Forest Service employee traveling abroad there when the Great War began reported "some forty thousand foresters in organized bodies fighting in the armies of Russia, Germany, Austria, and France."[52] This tradition set a precedent for the use of American Forest Service personnel in the military if the United States was to become embroiled in the conflict.

The nation's 156 million acres of forested lands administered by the Forest Service offered a multitude of natural resources, from wood to grazing lands and others, thus providing another type of ideal raw material for use when the United States became involved in the war. Part of the agency's job in administrating these public lands, as directed by the president, was obtaining a working knowledge of where particular resources were located and using that knowledge to assist in making them available to the branches of the military.[53] On the home front forest products could be used to supply the army and navy with necessary materials, such as the rosin from pine trees that was used in the manufacture of shrapnel. National Forests contained waterpower that could be utilized in the industrial processes necessary to produce

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[52] "Suggested draft of a personal letter to Captain McCoy," 2.

[53] "…the President directs the Secretary of Agriculture, through the Forest Service, to cooperate with and assist the Departments of War and Navy 1. In conducting investigations in forest products useful to the military branches; 2. In furnishing information regarding (a) the location, supplies, qualifications, specifications of and means of obtaining timber and other resources from forests and forest regions, and such aid as may be necessary in the inspection and purchase thereof." See Woodrow Wilson, President's Order, RG 95, NARA; Letter from the Secretary of War concerning "…the cooperation of the Forest Service in surveillance and protection duty and legislation giving authority to make arrest without warrant of suspicious characters," 2, RG 95, NARA.

manufactured munitions.[54] Wartime timber production within the United States increased seventeen percent as compared to 1913 levels. The wood produced was used mostly to build shipping crates and other mundane items, though spruce and Douglas-fir were harvested by the 30,000 troops deployed in the U.S. Army Spruce Production Division to build airplanes and ships, respectively.[55]

There was also ample wood available in the National Forests for military use overseas, but getting the wood across to France was problematic for a number of reasons. To begin, wood was simply too bulky and required far too much cargo space to ship across the Atlantic. Lack of trans-Atlantic transportation in general proved deeply troublesome to the War Department when American forces entered the war, and room on transports simply could not be allocated to materials such as wood.[56] This was coupled with the fact that Germany began a relentless new submarine campaign early in 1917, making all transports difficult and dangerous and necessitating that only troops and materials and equipment which could not be procured in France be sent overseas. It quickly became clear that any lumber needed would have to be produced in France.[57] This remained the case over the course of the year, and at the end of 1917

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[54] USFS, Un-labeled document from the 10th and 20th Engineer Regiments files, 2; "Statement in regard to the technical men and the resources of the Forest Service available under the plan of national preparedness as proposed by the National Academy of Sciences," June 6, 1916, 4, RG 95, NARA.

[55] *Historical Statistics of the U.S.*, 541, quoted in A. Joshua West, "Forests and National Security: British and American Forestry Policy in the Wake of World War I," *Environmental History* 8, no. 2 (April 2003): 279-280, http://www.jstor.org/stable/3985712; Lewis, *The Greatest Good*, 92.

[56] Major Barrington Moore, "French Forests in the War," *American Forestry* XXV, no. 306 (June, 1919): 1113, http://www.foresthistory.org/research/DigitalCollections/WWI/Moore.pdf; "Forestry Regiment Needs Recruits," advertisement in *Southern Lumberman* (November 3, 1917), http://www.foresthistory.org/research/DigitalCollections/WWI/Recruits.pdf.

[57] Ridsdale, "How the American Army Got Its Wood," 1137; Alfred H. Davies and Pérez Simmons, *Twentieth Engineers, France, 1917-1918-1919* (Portland: Twentieth Engineers

the French Minister of Agriculture and Supplies echoed this sentiment in a letter to the United States Minister of Foreign Affairs:

> "the scarcity of available shipping at the present time has rendered it necessary to decide that the timber needed by the American Army should all be taken from our [French] national territory. It has been agreed that this timber, delivered theoretically standing and to be cut by American troops, should be furnished by the French government and granted to the American government."[58]

Fortunately for the allied cause there was plenty of available timber within France's borders. This can and must be attributed to the fact that prior to the outbreak of the Great War the French had been practicing scientific forestry for years. According to Pinchot the French had employed forestry as early as the late seventeenth century under the direction of King Louis XIV's Minister of Finances Jean-Baptiste Colbert. Abundant forests supplying huge quantities of hardwoods including oak, beech, and hornbeam "[had] for many years been managed with great care and skill," making them a readily available resource just beyond the front lines.[59] The French, by virtue of necessity, had no choice but to begrudgingly share their timber with the American Army, just as they had with the British and Canadian forces since earlier in the war, yet doing this "simply meant they would furnish…the trees standing in the forests," not processed lumber ready for military use.[60] By 1917 the French simply lacked an adequate amount of personnel equipped to turn the forests into useable boards, stakes, poles, and fuelwood. The work of the French Forest Service had been disrupted by demands made on the

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Publishing Association, 1920), 27, https://archive.org/stream/twentiethenginee00davirich#page/n0/mode/2up.

[58] French Minister of Agriculture to the U.S. Minister of Foreign Affairs, 4 December 1917, quoted in West, "Forests and National Security," 280-281.

[59] Pinchot, *Breaking New Ground*, 2; Moore, "French Forests in the War," 1114; Graves, "The Forest Regiment and How to Join It," 2.

[60] Moore, "French Forests in the War," 1114.

organization as a result of the war. Men available to cut and process timber for the French army, moreover, could do so only for their own troops, not for the entire allied force.[61]

It was thus that the opportunity to most effectively use the Forest Service and its employees in order to aid the American war effort finally arose. France had the forests, but she left the responsibility of finding foresters to the American Army upon its entrance into the war. The War Department felt that "the Forest Service was the logical agency to organize a regiment, or regiments, for this specialized task" and called upon the bureau soon after General Pershing left for France to begin making preparations for American deployment.[62] From the outset Pershing recognized that "in the technical branches of the Army were many officers with theoretical training in special lines, but…the more important activities requiring special knowledge included…the direction of forestry;" he therefore "decided to obtain the best talent available and was fortunate…to find able men who were anxious to do their part."[63] It is likely that the agency would have anticipated this sort of specialized involvement in the war. Early in 1916 Senator Chamberlain of Oregon had introduced S. 4070, "To provide for the utilization of the Forest Service personnel for military purposes." Though no formal action had been taken on that bill before the expiration of the 64th Congress its introduction over a year before the nation entered the war suggests that both Congress and the Forest Service predicted that the agency could be of particular use in a national war effort and was both prepared and willing to rise to

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[61] Letter from Mr. Potter of 15 September, quoted in District Forester to Forest Officers, "N.D., For. Regiments," 20 September 1917, 1, RG 95, NARA; Ridsdale, "How the American Army Got Its Wood," 1137.

[62] George T. Morgan, Jr., "A Forester at War—Excerpts from the Diaries of Colonel William B. Greeley 1917-1919," *Forest History* (Winter, 1961), 1, http://www.foresthistory.org/Publications/JofFH/GreeleyDiaries.pdf.

[63] John J. Pershing, *My Experiences in the World War* (New York: Frederick A. Stokes Company, 1931), 104.

such an occasion.[64] Canadian forces set the ideal example of how the United States Forest Service could be best utilized with the formation of the 1,609-man 224th Canadian Forestry Battalion. These men had all arrived in France by the end of May 1916 in order to provide timber to the allied troops, and by the end of the year the number of men serving in the unit had almost doubled.[65] They thus provided to American officials, including General Pershing, an active example of how to successfully use a unit of trained foresters and servicemen in the Great War.

Soon after his arrival General Pershing cabled the War Department from Paris calling for the formation of a regiment of lumbermen and foresters. He believed "that it would be useless to send fighting men unless they could be supplied with lumber and that forestry troops should be sent first."[66] The British and the French, stretched thin from having been engaged in the war for over two years, both echoed this appeal for woodsmen in France. General Bridges, of the British Mission, and Marshal Joffre, on behalf of the French government, each requested one thousand American woodsmen to work in the forests behind the British and French lines, respectively.[67] To the relief of the British and the French, preliminary authorization for the formation of a forestry regiment came May 17, 1917 as an emergency measure before official authorization came via General Order No. 78 on June 27th. For the first time in American military history troops were to be recruited specifically to conduct lumbering operations in the war zone.[68]

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[64] Forester to Mr. Secretary, March 1917, 2, RG 95, NARA.

[65] Davies and Simmons, *Twentieth Engineers*, 161; C.W. Bird and J.B. Davies, *The Canadian Forestry Corps: Its Inception, Development and Achievements* (London: H.M. Stationery Office, 1919), http://archive.org/stream/canadianforestry00birduoft/canadianforestry00birduoft_djvu.txt.

[66] Ridsdale, "How the American Army Got Its Wood," 1137.

[67] Lieutenant Colonel Henry S. Graves, "The Forest Engineers," *American Forestry* XXV, no. 306 (June, 1919): 1109, http://www.foresthistory.org/research/DigitalCollections/WWI/Graves.pdf.

[68] Davies and Simmons, *Twentieth Engineers,* 27.

The Forest Service capitalized on this opportunity to aid the war effort and quickly responded to its call to serve by utilizing its national network of District Foresters and employees to raise a regiment that would be incorporated into the Engineers Reserve Corps. It was to be called the 10th Engineers Regiment, the Forestry Regiment, and its mission was clear: to produce from the French forests an enormous amount of timber for use by the American Army. In France the group was to be equipped with the necessary tools, including portable sawmills, axes, and both motor powered vehicles and horses with which to transport the wood from the forests to the front lines, amongst other things. Its officers were to be experienced foresters drawn primarily from the Forest Service who would be capable of managing an independent organization completing woods work.[69] Various companies of the regiment were to be dispersed throughout the forests of France and would complete the large majority of their work miles behind the battle lines.

Of the utmost importance was upholding the promise that in completing their work the American forestry regiment would avoid further devastation to the forests, ensuring they would be left in good condition for post-war production.[70] The first three years of the war had wreaked havoc on the forests of France, which aside from being shelled and burned in battle had been vigorously converted into wood suitable for war use by the British, French, and Canadians. Before any American forestry troops arrived in France an estimated 16,755,000,000 board feet of

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[69] H.S. Graves to District Forester, 23 May 1917, 2, RG 95, NARA; *Points for Consideration Regarding Forest Regiment in France,* 1, RG 95, NARA; W.B. Greeley, "Organization of 10th Reserve Engineers (Forest)," June 5, 1917, RG 95, NARA.

[70] United States Department of Agriculture (hereafter USDA), Forest Service, *Twentieth Engineers (Forest) and How to Join It*, (Washington, D.C., September 5, 1917), 1, RG 95, NARA; Graves, "The Forest Regiment and How to Join It," 2; Bristow Adams, "Foresters to the Front," *American Forestry* XXIII, no. 284 (August, 1917): 454, http://www.foresthistory.org/research/DigitalCollections/WWI/Front_Adams.pdf.

timber had been felled in France's forests, almost all of it for military use.[71] Nobody recognized the importance of the American regiment's dual mission better than Chief Forester turned head of wartime lumber operations Henry S. Graves: "We have the task not only of efficient timber operations to help those on the firing line, but we must also practice forestry."[72]

Yet Chief Forester Graves questioned how sending his personnel to practice forestry in France would affect the work of the Forest Service within the United States. He personally left for France when asked by the War Department, yet he was initially hesitant to interrupt the civilian operations of the Forest Service by sending government-employed foresters off to France. He believed that the men of the agency were providing a fundamental public service on large swaths of the home front, the National Forests, and feared that disrupting this work could weaken the bureau. Though a young organization, founded just over a decade before the United States entered World War I, the Forest Service had grown strong by 1917 and Graves worried that sending its best men overseas could cause it to falter.[73] In its first five years (1905-1910), Chief Forester Pinchot had rapidly grown the agency by acquiring more acreage and expanding the clerical and field personnel necessary to manage the national forest system. His personal passion for forestry and his goal of instituting a multiple-use philosophy had galvanized the entire organization, many of whom had come to work for the new agency after graduating from

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[71] Percival Sheldon Ridsdale, editor of American Forestry magazine at the time, toured France just after the war to determine the country's forest losses. He estimated that a total of 16,960,000,000 board feet were felled over the course of the war. By subtracting from that number the 205,000,000 feet produced by the American forestry regiments it can be estimated that 16,755,000,000 feet were felled for wartime use before the Americans arrived. See Percival Sheldon Ridsdale, "French Forests for Our Army," *American Forestry* XXV, no. 304 (April, 1919): 963, https://archive.org/stream/americanforestry251919amer/americanforestry251919amer_djvu.txt; Ridsdale, "How the American Army Got Its Wood," 1142.

[72] Henry S. Graves to District Foresters, 23 May 1917, quoted in Morgan, "A Forester at War," 1.

[73] Adams, "Foresters to the Front," 455.

the Yale Forest School that had opened in 1900 thanks to a $300,000 donation made by the Pinchot family.[74] He had possessed the "great devotion to public service and great ability to mold and guide public opinion in the face of powerful assault" necessary to make a federal bureau, especially one with a mission as controversial as that of the Forest Service's, flourish.[75] The men who had come to work for Pinchot, including a number of college student assistants who later chose to pursue forestry as a profession, had been inspired by their chief and had supported his vision for building the bureau. By the middle of 1906, just after its first birthday, the Forest Service had almost doubled the number of acres it controlled from the original sixty-three million to 107 million. At that time the service had employed 806 people, including 511 forest rangers, a force capable of managing its work though stretched thin in the administration of the nation's growing number of public forestlands.[76]

Despite this discrepancy between the agency's available personnel and the amount of land it was responsible for the Forest Service had continued to grow in the 1910s as Chief Forester Henry S. Graves, who had replaced Pinchot upon his dismissal, had developed and implemented a national forestry policy that had focused on fire prevention and an increased research effort. His first year as chief, 1910, had become known as the "Year of the Fires" after five million acres of the National Forests had burned over the course of the year. Some of the worst damage had come in the "Big Blowup" in August when several fires in Idaho and Montana had been so severe they required the dispatch of thousands of troops to contain them. In the wake of this destruction Graves had touted the need for fire prevention and control as the primary reason that the National Forests should stay under Forest Service control. The bureau further

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[74] Lewis, *The Greatest Good*, 43
[75] Pinkett, *Gifford Pinchot*, 150.
[76] Lewis, *The Greatest Good*, 42, 45, 48 & 66.

argued that the fires of 1910 had been so catastrophic due to shortages of funding and personnel. Despite receiving budget cuts in 1911 the agency had pursued an intensive fire suppression policy that proved successful.[77] This success can be partially attributed to the passage of the Weeks Act that year, which, aside from providing for the continued acquisition of large tracts of land by the Forest Service, had created cooperative programs that served federal, state, and private interests when it came to fire protection and ultimately proved successful.[78]

1910, aside from being the "Year of the Fires," had also been when Graves presided over the opening of the Forest Products Laboratory. The inauguration of the facility, located in Madison, Wisconsin, had signified the bureau's attempt to garner congressional support by engaging in research that would yield the best methods to extract the most possible resources from the National Forests.[79] Agency researchers would support the Forest Service's mission by finding the most effective ways to maximize the products of the multiple-use philosophy and to eliminate waste. By 1917, therefore, the bureau was functioning successfully under a well-developed policy, and Graves' fear of inducing weakness by disrupting its work in order to contribute to the nation's involvement in the Great War was well founded.

He ultimately determined that the best way to hold his agency together during this time of national stress was to keep its personnel together, even if doing so meant sending some of them to France and disrupting normal operations. The War Department's need for a forestry regiment provided the perfect opportunity to realize Graves' "military unit of foresters," a force pulled

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[77] Lewis, *The Greatest Good*, 244, 73, 74, 76, 79 & 68; See Figure 4, "Acres burned by wildfires on national forests, 1910-1994," in USDA, FS, *Managing Multiple Uses on National Forests, 1905-1995: A 90-year Learning Experience and It Isn't Finished Yet*, John Fedkiw (1998), http://www.foresthistory.org/ASPNET/Publications/multiple_use/chap2.htm.

[78] Lewis, *The Greatest Good*, 79; West, "Forests and National Security," 279.

[79] Lewis, *The Greatest Good*, 68.

from one bureau to assist another in a time of need.[80] Graves recognized, to his relief, that he would be able to keep some of his best men stateside since there were too few officers' positions in comparison to the number of qualified foresters. With this in mind he made appointments based on both a man's physical fitness and his importance to the regular operations of the Service. District Foresters were asked to submit reports detailing which of their personnel could be released from normal peacetime duties in order to meet the needs of the wartime crisis. America's foresters, considered by some to be naturally patriotic by virtue of their work caring for the nation's "rocks and rills, [its] woods and templed hills," were eager to serve in France. In making his selections Graves noted, "if I feel that some individual because of his personal qualifications is more important to the Regiment than to the home work of the Service, I shall select him."[81] This then suggests that, at least in terms of the Forest Service's higher-ranking personnel, the agency's best men were sent to France because the war work to be done there was paramount to that being done at home. Evidence of this is found in the fact that many career foresters who later went on to hold high-ranking positions within the bureau served as officers in the Forestry Regiment. Of particular note are Evan W. Kelley, Robert Y. Stuart, and Ferdinand A. Silcox, each of whom finished the war with the rank of Major; Kelley later became the Regional Forester of the Northern Region, while Stuart and Silcox each ultimately served as Chief Forester of the United States.[82]

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[80] Adams, "Foresters to the Front," 456.

[81] H.S. Graves to District Forester, 23 May 1917, 4-5; "Recommendations for Action By the Forest Service in Relation to Plans for National Defense," March 1, 1917, 7, RG 95, NARA; Adams, "Foresters to the Front," 456.

[82] History-Robert Y. Stuart, Fourth Chief, 1928-1933, US Forest Service, last modified March 23, 2013, http://www.fs.fed.us/aboutus/history/chiefs/stuart.shtml; History-Ferdinand A. Silcox, Fifth Chief, 1933-1939, US Forest Service, last modified March 23, 2013, http://www.fs.fed.us/aboutus/history/chiefs/silcox.shtml.

Others remained in the National Forests carrying out the agency's normal work, which was scaled back to include only the necessities. Discussions concerning whether or not private lands should be regulated by the bureau were tabled as the loss of Forest Service personnel to military service "left the agency scrambling to meet its [normal] responsibilities," the foremost of which, as previously mentioned, was fire protection. With agency employees serving overseas in twenty-nine divisions not including the 10th and 20th Engineers by February 1918, the bureau could not continue to function properly without hiring new employees. In order to maintain its fire protection policies, as well as to fill other personnel shortages, the Forest Service hired women as lookouts and office clerks.[83] Though these jobs were not permanent positions they did allow women to work for the agency in a significant capacity, though still only in auxiliary positions, for the first time. Overall the women's contribution to maintaining the peacetime work of the agency proved successful as the total number of acres burned by wildfires in 1917 and 1918 remained low, especially when compared to the five million acres that had burned in the Big Blowup of 1910 and had prompted the agency's creation of an anti-fire policy. While more acres burned during the war period then had in 1915 and 1916 the total area devastated by fire never topped between 1.25-1.3 million acres.[84]

One of the many Forest Service men who left his peacetime work in the United States for France was Chief Forester Graves, who became the first agency employee to go overseas and make preparations for the arrival of the Forestry Regiment. This action was made possible by prior agreements between the Department of Agriculture and the War Department instructing employees of the former to assist the latter upon the request of a cooperative measure. By virtue

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[83] Lewis, *The Greatest Good*, 92; USFS, "Forest Service Employees in Military Service," February 7, 1918, RG 95, NARA.

[84] See Figure 4, "Acres burned by wildfires on national forests, 1910-1994," in USFS, *Managing Multiple Uses*.

of the National Defense Act of June 3, 1916, both Chief Forester Graves and Assistant Forester William B. Greeley were commissioned as military officers weeks after the United States entered the war when the need for a forestry regiment became known. In this capacity, though they retained their Civil Service status as employees of the Forest Service within the Department of Agriculture, both men were sent to France.[85] Graves, appointed as a major in the Reserve Engineer Corps, arrived in Paris in June 1917 in order to begin preparations for the forestry work to be done, including the purchase of cutting rights in France's forests. Captain Barrington Moore accompanied him from the beginning and Assistant Forester Greeley, appointed as a major on June 21, 1917 at the request of Graves, joined two months later to assist his superior in the necessary organizational work.[86] The men examined various French state forests to determine whether they would be suitable for American logging operations. Water sources, mill locations, and rail lines in the forests were all taken into consideration. Once sites had been examined Graves made recommendations to the War Department detailing the necessary forces and equipment that would allow the 10th Engineers, upon their arrival, to meet military demand.[87]

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[85] The Secretary of War requested the cooperation of the Department of Agriculture in the mobilization of the Regular Army Reserve in a letter dated 21 October 1916. See USDA, Memorandum No. 180: Regarding the Regular Army Reserve, November 9, 1916, RG 95, NARA; "To provide for the utilization of the Forest Service personnel for military purposes the President directs the following cooperation between the Departments of Agriculture, War, and Navy," 2, RG 95, NARA.

[86] Ridsdale, "How the American Army Got Its Wood," 1138; F.A. Silcox to H.S. Graves, 11 June 1917, quoted in Morgan, "A Forester at War," 1.

[87] An example from Greeley's diary: "September 6: Saw much of Levier State Forest; examined water sources and mill sites near towns of Levier and Arc; talked over ry. [railway] with local *chef de gare*…Levier is a wonderful forest of pure fir…Its operation appears practicable as to snow, logging conditions, and water supply." See Morgan, "A Forester at War," 3; Henry S. Graves quoted in "War Materials from French Forests," *American Forestry* XXVI, no. 290 (February, 1918): 70, http://www.foresthistory.org/research/DigitalCollections/WWI/WarMaterials.pdf.

Of the utmost importance, of course, was the acquisition of the forests where the 10th Engineers would work.[88] Greeley noted that "the French Forest Service were trying to unload their most difficult and inaccessible logging jobs on us," a product of the generally tenuous nature of Franco-American relations during the war.[89] By April 1917 the French, after having been subject to the massively destructive conflict for almost three years, were desperately in need of financial, industrial, and manpower support. The entry of the United States into the Great War brought this much needed relief, though tensions arose as President Wilson and General Pershing insisted that American aid was to take the form of an association rather than a formal alliance. They stipulated that rather than incorporating American troops into deployed allied units as replacements the American forces were to act as an autonomous army; Wilson felt this move would be both psychologically and politically advantageous in the fight against what he saw as European imperialism. Yet, as a result of the limited shipping capacity caused by Germany's increased submarine warfare, the Americans would be unable to do this without receiving heavy equipment from the French.[90] This simultaneous separation from the French and reliance on their war munitions created tensions between the two allied nations.

These tensions were evident in the United States' efforts to secure timber concessions from the French. Graves, Moore, and Greeley found French authorities to be "obstinate," and even after the war General Pershing wrote to Graves, "I oftentimes recall your struggles with the

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[88] "The first problem, of course, was to secure the forests in which the work was to be done." See Henry S. Graves quoted in "War Materials from French Forests," 70.

[89] Morgan, "A Forester at War," 3.

[90] "France supplied the Americans with 100 percent of their field guns and howitzers, 100 percent of their tanks, almost 100 percent of their ammunition, 81 percent of their aircraft, and 57 percent of their long-range guns." See Jean-Baptiste Duroselle, *France and the United States: From the Beginnings to the Present*, trans. Derek Coltman (Chicago: The University of Chicago Press, 1976), 90-92, 95, 97-98.

French bureaus when you were trying to obtain logging concessions for the A.E.F."[91] Friction between the American and French foresters also arose, according to Greeley, because "The French…regard us as wasteful in our use of wood and doubtless think that if they hold us down hard we can get on with much less than we are asking for." Though French officials were reluctant to sell their nation's timber and "maintained their vacillating and obstructive tactics" throughout the war in the end plenty of timber was made available to the American Forestry Regiment.[92]

This perceived French profiteering irked Graves, Moore, and Greeley, who worked with an inter-allied committee that represented French, British, and American timber interests to acquire cutting rights. An American forest officer, alongside his French counterpart, would search for forest tracts ultimately chosen based on the available amount of timber, the potential for constructing or overtaking a mill, and the existing water supply. The French officer would then produce an appraisal before selections were placed before the committee for final approval. Once this was granted French officials completed any necessary negotiations between the owner and the purchaser. The French government would then buy the timber and resell it to the American Army at cost, a process that benefitted the United States by preventing overcharges. The French also reserved the right to requisition privately owned forests, which positively benefited the cause of forestry.[93] Upon the completion of a purchase trees were to be marked by French foresters before any cutting could be done. This facilitated the continuation of scientific

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[91] General John J. Pershing to Henry S. Graves, 21 February 1923, quoted in West, "Forests and National Security," 282.

[92] Morgan, "A Forester at War," 5 & 7; West, "Forests and National Security," 282.

[93] Moore, "French Forests in the War," 1118; Major Morris quoted in Ridsdale, "How the American Army Got Its Wood," 1150.

forestry, a practice of particular importance to the French who, as previously stated, had employed the best silvicultural techniques in their forests since the nineteenth century.[94]

As Graves facilitated the process of acquiring timber in France he also oversaw the war work being done by the Forest Service back home: the raising of the 10th Engineers, the men who would come to do the woods work in France. The first order of business in this capacity was selecting the officers who would lead the regiment and whose expertise would be indispensible to the lumbering operations. In addition to having experience in forest, lumbering, or engineering work the officers were to be men "who [had] fully demonstrated their qualities of leadership and…[had] proved themselves capable of leading men and of filling positions of responsibility."[95] Selection of officers was completed by the end of June 1917, with men drawn from the following disciplines: "two regular army officers, 15 foresters from the U.S. Forest Service and two from the Forest Branch of British Columbia, one lumberman from the Indian Forest Service, and 13 foresters and lumbermen taken from private or institutional work." Lieutenant Colonel James A. Woodruff of the United States Army Engineer Corps was selected by the War Department to command the regiment.[96]

Soon after the completion of choosing the officer corps for the 10th Engineers General Pershing cabled from Paris requesting the formation of four additional regiments comprised of lumbermen. By that time it had become clear that one regiment would not be enough to produce the quantities of wood needed for the American Army in France. After multiple appeals came the issue of General Order No. 108 on August 15, 1917, specifying that there would be ten more battalions of 750 forestry engineers each and nine more battalions of servicemen to accompany

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[94] "War Materials from French Forests," 70.

[95] FS, "Forest Battalions and How to Join Them," September 5, 1917, 2, RG 95, NARA.

[96] USDA, FS, "Officers of Forest Regiment Selected: Recruiting Under Way," June 1917, 1, RG 95, NARA.

them to France. This group officially became the 20th Engineers at the American University Training Camp on September 9, 1917.[97] Together there were ultimately fourteen battalions within the two forestry regiments, and the members of their officer staffs took on a hierarchy of roles similar to the ones found within the Forest Service. Of particular importance was the battalion major, who acted as district forester, and his attendant, a captain acting as assistant district forester.[98] Interweaving the organizational structure of a military regiment with that of the Forest Service proved seamless since both were based on the top-down, center-out movement of power common in bureaucratic structures. When the forestry troops arrived donning military uniforms rather than their normal agency or company issued ones they found themselves in a familiar situation with regard to their superiors: "From the time the khaki goes on until it comes off and we wear human clothes again, what the man higher up says goes, regardless of whether it is the right thing or not."[99] This willing and obedient attitude helped foster the regiment's success in wood production.

Before any work could be done in France, however, the men of the 10th and 20th Engineer Regiments needed to be recruited and trained in the United States. The men who would ultimately go were, in a romanticized sense, the "stalwart sons of America, hardy woodsmen and sturdy sawmill operators" who had long held a place in American cultural life, the progeny of the pioneer woodsmen and bearded lumberjacks who built the nation.[100] When the nation entered the war there were less than 20,000 men enlisted in the American Army and National Guard, and while Wilson wanted to send only volunteers the reality was that the United States would be

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[97] Davies and Simmons, *Twentieth Engineers,* 28-29.

[98] FS, "Form of Organization of the Forest Regiment," 1, RG 95, NARA.

[99] W.H. Icenogel, "Interesting Letter from France," *Southern Lumberman*, http://www.foresthistory.org/research/DigitalCollections/WWI/Icenogel.pdf.

[100] Ridsdale, "How the American Army Got Its Wood," 1141; Williams, *Americans and their forests*, xvii.

unable to raise enough men in this way. The Selective Service Act resolved the problem of raising an army, and many in the forestry profession felt that they would rather serve in a capacity where they could apply their vocational knowledge to the task of winning the war than on the front lines.[101] The 10th and 20th Engineers provided exactly this opportunity, calling for a force of "axemen, teamsters, tie-cutters, millwrights, saw-filers, sawyers, portable sawmill men, farriers, blacksmiths, lumberjacks, cooks, and carpenters, as well as motorcycle and motor truck operators" familiar with forest work.[102] In total the number of forestry troops needed for the 10th and 20th Engineers, as estimated based on the Canadian experience in wood production in France during the war, was colossal: ten forestry battalions of 750 men each, a total of 7,500 men, three engineering battalions comprising 2,250 men, and seven unskilled battalions totaling 5,250 men. The War Department wanted 15,000 woodsmen, and the Forest Service was going to help it achieve this goal.[103]

The first recruiting efforts for the 10th Engineers came in the summer of 1917 via the development of a special process within the Forest Service. Throughout the country local representatives of the agency were designated as "listing officers" who were instructed to collect applications from men within their areas "known to be of the right type." This method of a "still hunt" was believed to be the most efficient means of gathering an effective force of volunteers in the beginning of the enlistment period, a necessity by virtue of the fact that the regiment was to

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[101] Duroselle, *France and the United States*, 93 & 95-96.

[102] "Prior to the receipt of [a telegram concerning the formation of the forestry regiments] the question of enlisting as a volunteer had been debated. Now that an opportunity arose to really help as a specialist, there was no question as to the answer." See Theodore S. Woolsey, *Riding the Chuck Line: A Forester in Peace and War* (New Haven: Tuttle, Morehouse and Taylor Company, 1930), 71, http://www.foresthistory.org/research/DigitalCollections/WWI/Woolsey_Chuck.pdf; USDA, FS, "Forestry Regiment to be organized," 2.

[103] Letter from H.S. Graves, 3, RG 95, NARA.

be recruited, trained, and deployed as quickly as possible.[104] When word reached the National Forests that a Forestry Regiment was being organized, moreover, agency employees were eager to join up. Letters and telegrams poured into the bureau's Washington headquarters concerning the formation of the regiment. An example can be seen through a letter written by Mr. Ernest Wohlenberg of the Coconino National Forest. He wrote:

> "I just had all the hope together to apply for a First Lieutenancy as a Topographic Engineer for the engineer regiment which is being now organized in Los Angeles, when Mr. Guthrie informed me of the move by the Forest Service…I have been in logging camps for the last 14 months and I feel now as though I could knock the block off of the best German that ever walked…There are a number of men here on the Forest who are might keen for this Forest Service Regiment."[105]

For many Forest Service employees the opportunity to serve their country not just by caring for the public lands but also by contributing to the national effort in a foreign war was highly appealing. The proposition seemed even sweeter due to the fact that they would be able to "follow their regular occupations instead of having to go where the draft might send them."[106] After learning about two years of mechanized modern warfare from afar they knew that volunteering to aid the fight from the forests, rather than being sent to the front lines, was a much safer bet.

Volunteers from the Service itself did not provide all of the personnel necessary for the 10th Engineers, pushing the agency to request assistance in gathering the requisite men from American lumber and machinery manufacturers. According to Assistant Forester turned Major W.B. Greeley "practically every forestry agency in the country, together with the many lumber

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[104] USDA, FS, "Officers of Forest Regimented Selected," 3-4.
[105] Mr. Ernest Wohlenberg to Mr. Ringland, 19 May 1917, 1-2 & 5, RG 95, NARA.
[106] "To France Immediately With the World's Biggest Regiment," advertisement in *American Forestry*, http://www.foresthistory.org/research/DigitalCollections/WWI/EnlistNow.pdf.

companies and associations, took off their coats to help in obtaining the right type of men."[107] Greeley personally sent letters to many of these organizations. A return letter he received from The John Deere Plow Company responded to a request for recommendations of "blacksmiths, wagon repair men, wheelwrights, etc.;" one from Greeley to The General Motors Truck Company listed the need for "high-grade motor truck mechanics" and "competent motor truck drivers" for the regiment.[108] Many of these companies made a concerted effort "to interest capable young lumbermen of [their] acquaintance in this proposition." Others, however, responded that it would be difficult for them to find the right type of men due to the condition that recruits were to be white and between eighteen and forty years of age.[109] At the time the American Army was still strictly segregated, and the fact of the matter was that the profession of forestry, and thus the Forest Service conceived by Pinchot, was made up of conservative, middle-to-upper class white males who had access to a college education.[110] Even Pinchot himself, despite being released from the position of Chief Forester on charges of insubordination only seven years earlier, reached out to members of the Society of American Foresters who were not employed by the Forest Service. He asked these foresters to list "their availability of service"

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[107] Greeley, "The American Lumberjack in France," 1093.

[108] The John Deere Plow Company to W.B. Greeley, 22 June 1917, RG 95, NARA; W.B. Greeley to The General Motors Truck Co.,19 June 1917, 1, RG 95, NARA.

[109] "Your statement that these men must be white, you will realize I am sure, eliminates a great many of our camp employees, and the age requirement eliminates the possibility of securing any stable or barn bosses and blacksmiths, as practically all of our men engaged in this line of work are over forty." See Frank G Wisner to W.B. Greeley, 15 June 1917, RG 95, NARA; Mr. Harrison to Mr. Hall, 5 September 1917, RG 95, NARA; W.B. Greeley to The General Motors Truck Co., 19 June 1917, 2.

[110] George S. Kephart, "A Forester in the Great War: Reminiscences of Company E, 10th Engineers, in France," *Journal of Forest History* (October, 1978): 194, http://www.foresthistory.org/Publications/JofFH/Kephart.pdf; Lewis, *The Greatest Good*, 167.

so that this data, when compiled with that collected by the bureau, could be provided to the government as it made changes due to war conditions.[111]

The recruiting process for the 20th Engineers went similarly, the main difference being that the regiment was open not just to volunteers, as the 10th Engineers had been, but also to men subject to the draft. The 20th Engineers' officer corps was to be comprised of practical lumbermen and sawmill operators (fifty percent), technical foresters (twenty five percent), and men with engineering/military training (twenty five percent). Practical lumbermen, sawmill operators, and technical foresters were chosen from men recommended to the War Department by the Forest Service, whereas the engineers and military men were selected directly by the War Department. Colonel W.A. Mitchell, a regular army officer, was put in charge of the regiment and helped raise it.[112] Men not subject to the draft from the ages of eighteen to twenty-one and thirty-one to forty could enlist for the 20th Engineers at any United States recruiting station; the sole prerequisite, aside from being a white male with United States citizenship, was that the men "be skilled workers in the lines mentioned."[113] Many of the men chosen for the 20th Engineers came from the draft and were "selected for forestry work mainly on the basis of their former occupations."[114] As a result of the Selective Service Law a drafted man between the ages of 21 and 31 could ask to join the 20th Engineers so long as doing so did not prevent his local draft board from reaching quota. Drafted men familiar with woods work but assigned to other regiments were encouraged to ask to be transferred to the 20th Engineers, and many sent

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[111] Gifford Pinchot, "Proposed Letter to Members of the Society of American Foresters who are not in the Forest Service," April 6 1917, 1-2, RG 95, NARA.

[112] USDA, FS, *Twentieth Engineers (Forest) and How to Join It*, 1; Ridsdale, "How the American Army Got Its Wood," 1137.

[113] USFS, "Experienced Labor Needed for Lumbermen's Regiment," 3, RG 95, NARA; "To France Immediately With the World's Biggest Regiment."

[114] Greeley, "The American Lumberjack in France," 1093.

telegrams and letters to Washington requesting reassignment.[115] Considering the willingness with which the Forest Service personnel and other pertinent individuals and organizations took on the task of assembling America's first ever forestry regiment it seems clear that the nation's woodsmen were ready to take their work overseas come fall of 1917.

Before shipping off to France to prove themselves the men of the 10th and 20th Engineer Regiments needed to be "organized, trained, and equipped" for wartime operations. The majority of this training was done at American University in Washington, D.C., beginning with the arrival of the 10th Engineers on August 1, 1917.[116] At camp the men received uniforms, arms, and participated in military drills before being reviewed by the Secretary of War and the Assistant Secretary of the Department of Agriculture at the end of the month.[117] In the beginning of September the men of the 10th Engineers left for France, arriving there in early October before being divided and transported to their work assignments by November 1st. Later in November the first companies of the 20th Engineers began arriving in France. Companies of the regiment came across as they became ready, the last arrival being in March 1918. For the men of both the 10th and 20th Engineers the period at camp was short because they required no special training for the work they would do in France. The foresters and lumbermen "were picked men, chosen because

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[115] USFS, "Experienced Labor Needed for Lumbermen's Regiment," 4; "Forestry Regiment Needs Recruits."

[116] Graves, "The Forest Regiment and How to Join It," 1; JNO. D. Guthrie et al., *"The Carpathians": Tenth Engineers (Forestry) A.E.F.—1917-1919 Roster and Historical Sketch* (Washington, D.C.: Forest History Society, May 1940), 3, http://www.foresthistory.org/research/DigitalCollections/WWI/Carpathians_pt1.pdf.

[117] The Department of Agriculture received an invitation to the review of the 10th Engineers at the end of August as a result of the fact that the Forest Service, one of its bureaus, had been responsible for bringing the regiment together. See "The First Forest Regiment Goes Across," *American Forestry* XXIII, no. 285 (September, 1917): 517, http://www.foresthistory.org/research/DigitalCollections/WWI/Across.pdf; Graves, "The Forest Regiment and How to Join It," 1.

of their proficiency in their special work, while the clerical force was selected because of their actual knowledge of keeping lumber accounts and similar information."[118]

Upon arrival in France the Forestry Regiments received their assignments and started lumbering operations where designated as quickly as possible. The six 250-man companies of the 10th Engineers, the first to arrive in France, were divided into five groups and sent to different parts of the country. Some went to the pine forests on the southwestern coast, others to the east to work in the fir forests of the Vosges Mountains, still others to Brittany in the northwest, and the remainder dispersed throughout central France. The forests Graves and Greeley procured for American use, unlike those where the British, French, and Canadian forestry regiments worked, were located farther from the battle lines, a product of the fact that the Americans were last to arrive in France. In completing their work the Americans "had to swing around on a much longer circumference, reaching from the ports of Brest, St. Nazaire and Bordeaux on over through the central southern part of France and up into the Vosges and Argonne section."[119] This ultimately meant that they had to haul wood longer distances in order to get it out to their troops at the front (See Appendix A).

Part of the initial work done upon arrival in the forests was the construction or repair of the infrastructure necessary to get the wood from the forests to the front lines. First on the agenda was setting up a tent camp—there was no time to build permanent barracks to house the forestry regiments. Then came the construction of a corral to hold the horses and mules that would help move the logs. Next roads had to be prepared to facilitate the hauling of logs. Finally, in some areas narrow gauge track needed to be laid from the mill to the railroad so the lumber would be

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[118] Ridsdale, "How the American Army Got Its Wood," 1137 & 1140.
[119] Ibid, 1147 & 1142.

transported as quickly as possible.[120] Once these tasks had been completed milling could begin in earnest. In many places operations began using small French mills that Graves and Greeley secured before the arrival of the Forestry Regiments. These mills, of which there were two in operation as of December 1, 1917, were overhauled to increase their output capacities and were replaced with American equipment as rapidly as possible.[121] The first American mill became operational on November 29, 1917, Thanksgiving Day, producing something the American Army could be very thankful for: the first wood made by American troops with American machinery in France.[122] When determining the placement of coming American mills multiple factors were taken into consideration since the amount of timber and the water supply available in a given area directly affected the size of mill that could be set. These stipulations did not, however, affect the speed with which the mills became active. By the turn of the new year there were ten American mills in operation; come March 1918 there were thirty-four; by the signing of the armistice on November 11, 1918 the 20th Engineers (the 10th and 20th had been incorporated into one regiment by that time) were operating eighty-one American mills throughout France.[123]

The sheer volume of lumber production coming from these mills during their operational period, the final year of the war, was truly astounding. Before the American Forestry Regiments deployed it was estimated that an individual company would be able to produce 1,000,000 board

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[120] Fred E. Davis, "Letter Received from Lumberjack in France," *Southern Lumberman*, http://www.foresthistory.org/research/DigitalCollections/WWI/Davis.pdf; Davies and Simmons, *Twentieth Engineers*, 31.

[121] Morgan, "A Forester at War," 3; Davies and Simmons, *Twentieth Engineers,* 38.

[122] E.L. Lindsey & F.S. McNally, *Company 'E' 10th Engineers in France* (Published by Lindsey and McNally), 9, http://www.foresthistory.org/research/DigitalCollections/WWI/CompanyE.pdf.

[123] *Points for Consideration Regarding Forest Regiment in France,* 4 & 5; Colonel J. A. Woodruff, "An Appreciation to the Officers and Soldiers of the Twentieth Engineers and Attached Service Troops," *American Forestry* XXV, no. 306 (June, 1919), http://www.foresthistory.org/research/DigitalCollections/WWI/Woodruff.pdf.

feet per month.[124] By the signing of the armistice the eighty-one American mills in France were turning out 2,000,000 feet, including lumber and round products, such as poles barbed wire stakes, every working day. Virtually all of the mills ran all through the day and all through the night, some with two ten-hour shifts and others with three eight-hour shifts. One company, the 27th, managed to set the high watermark—they cut 177,486 feet of lumber in twenty-three hours and thirty-five minutes.[125] The wood produced had an indisputable impact on the American war effort. From it the battalions of servicemen working with the 20th Engineers built 17,120 barracks to accommodate American troops as they arrived. The construction of new hospitals provided 141,000 hospital beds, over half of the total number of beds available by November 1918. Facilities necessary for water supply, electric power, refrigeration, and oil storage were built from lumber cut by the forestry troops.[126]

All of this work was completed, moreover, under harsh and variable conditions. The topography of the lumbering areas where the American foresters worked was "rough, broken and steep," making it difficult to transport the logs from the forest to the mill and then out to the front. Hail, sleet, and snow created less than ideal conditions for weeks at a time, and the ensuing creation of mud added another element of difficulty to the transportation processes.[127] Medical Officers reported that the men were being worked too hard, but as a result the lumbermen were able to steadily increase their yields as the months passed. They even continued cutting after the

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[124] Letter from H.S. Graves, 3.

[125] Woodruff, "An Appreciation;" Davies and Simmons, *Twentieth Engineers,* 38; Ridsdale, "How the American Army Got Its Wood," 1141.

[126] Davies and Simmons, *Twentieth Engineers,* 25-26.

[127] Major George H. Kelly, "Intimate View of Forest Regiment Work," *The Timberman* (August, 1918): 37, http://www.foresthistory.org/research/DigitalCollections/WWI/Kelly.pdf; Major Frank R. Barns, "Experience of a Forestry Engineer Officer in France," *American Forestry* (October, 1918): 586, http://www.foresthistory.org/research/DigitalCollections/WWI/Barns.pdf; Ridsdale, "How the American Army Got Its Wood," 1141.

armistice was signed; by February 1, 1919, "the forest regiment had to its credit 205,000,000 feet of sawed lumber; 2,998,000 standard gauge and 941,000 narrow gauge ties; 1,746,378 pieces of round products; 39,595 pieces of piling [support beams used in the construction of docks] and 319,057 cords of fuelwood."[128]

These numbers indicate that the American Forestry Regiment completed the task requested of it in the Great War. When called for by General Pershing soon after the United States entered the hostilities its mission was "to convert available timber into material suitable for bridges, railroads, trenches, and other construction work with the least possible waste."[129] Colonel Woodruff, who began as commander of the 10th Engineers before taking command of the united force when the 10th and 20th Engineers were combined, wrote the following in a letter to his troops in December 1918: "the Army has been given the lumber which it needed, and the suspension of hostilities finds us with a substantial surplus which will be used for the restoration of France."[130] In his eyes his regiment not only produced the requisite timber for the combat troops, providing the literal material on which the allied victory was built, but also did so at a pace so impressive that they were able to contribute to France's reconstruction after the war. When producing this astonishing amount of lumber the 20th Engineers upheld their promise to practice forestry. According to one GI who wrote back to the Forest Service while abroad:

> "In carrying on our operations we are adhering to the rules and customs followed by the French in connection with their system of forest conservation, which at first seemed strange to us, but after we became accustomed to it, we found that it is not only practicable, but very necessary as well."[131]

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[128] Woodruff, "An Appreciation;" Ridsdale, "How the American Army Got Its Wood," 1142.

[129] USDA, FS, "Forestry Regiment to be organized."

[130] Ridsdale, "How the American Army Got Its Wood," 1137; Woodruff, "An Appreciation."

[131] USDA, FS, *Messages from Abroad*, 3, http://www.foresthistory.org/research/DigitalCollections/WWI/MessagesFromAbroad.pdf.

The men who served in the regiment left France feeling as though they had successfully done what was asked of them.

The process of leaving France and returning home after the end of the war was delayed for the 20th Engineers. Though the armistice was signed on November 11, 1918, the men of the American Forestry Regiment stayed on in France to shut down their operations and help repair roads that had been worn out. Milling and cutting operations were dismantled and the work areas were cleaned up and signed off on by local forest inspectors from the French service. Surplus forest products were sold or used in road repairs, and the state forest tracts that had come under American control were sold back to the French government.[132] Men began trickling home on January 1, 1919, and the final troops of the 20th Engineers arrived stateside in July of that year. They received no public heroes welcome, no glory, and no special recognition for the work they had done.[133]

Around the same time the forestry troops returned to civilian life and the Forest Service resumed its normal operations Chief Forester Graves determined that, after serving in the bureau's highest office for ten years and in the Great War, he was ready to retire. He chose Assistant Forester William B. Greeley, who had served alongside him in France and preferred to be addressed by his military rank of Colonel, as his successor. Greeley had been a fixture in the Division of Forestry and then the Forest Service since he had graduated from Yale Forest School in 1904. As a public servant he demonstrated

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[132] Morgan, "A Forester at War," 12; Interview of Evan W. Kelley by Amelia R. Fry, The Bancroft Library Regional Oral History Office, 1974, University of California, Berkeley, 17-18, https://archive.org/stream/forestserviceleg00roberich#page/n9/mode/2up.

[133] Timeline of Events, World War I: 10th and 20th Forestry Engineers, Forest History Society, last modified 2012, http://www.foresthistory.org/research/WWI_ForestryEngineers.htm#service; Woodruff, "An Appreciation."

the same aptitude for the political process as had Pinchot, and he used it to support the continued growth of the bureau's forestry policy in the postwar years. Colonel Greeley took office as chief in April 1920 and immediately began incorporating the lessons he and other foresters had learned while abroad into the agency's forestry policy.[134] Experience in France had demonstrated indispensible nature of forests to both industrial expansion and national security, and Greeley aimed to continue national forest protection through agency cooperation with state and private interests in the 1920s. His campaign as chief focused on "federal cooperation with states in fire protection, the extension of federal forests, the reforestation of federal lands, a study of forest taxation policy, and a survey of American forest resources."[135]

Under Greeley the Forest Service continued to manage the nation's public forestlands in a custodial fashion as the timber produced by private interests continued to meet the nation's needs. Some cutting was done in the National Forests in order to facilitate the transformation of these tracts from "wild" to "cultivated" forests. The cutting of slow-growing "overmature" trees allowed for the planting of young trees that would increase the volume of available wood at a more rapid rate. Through the implementation of this policy the Forest Service continued to prepare for the coming timber famine by employing the principles of scientific forestry.[136] Cooperative fire protection programs like those implemented with the passage of the Weeks Act

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[134] USDA, Division of Publications, Office of Information, *Here Is Colonel W.B. Greeley, the Government's Chief Forester, Who Has Risen from the Ranks—He Wants to Make the Nation's Forests Serve You Better*, October 11, 1920, 4, http://www.foresthistory.org/ASPNET/People/Greeley/Greeley_pressrelease.pdf; Lewis, *The Greatest Good*, 245 & 93-94.

[135] West, "Forests and National Security," 284; William B. Greeley, "What Our National Forest Policy Should Be," *American Forestry* XXVI (October 1920): 612-613, 617, quoted in West, "Forests and National Security," 285-286.

[136] Lewis, *The Greatest Good*, 88-89 & 92.

in 1911 continued with one of Greeley's biggest triumphs as chief: the passage of the Clarke-McNary Act in 1924. This legislation "established a de facto cooperative policy for fire control, reforestation, education, and land acquisition," thus allowing the bureau to wield its influence over the National Forests as well as state and private lands.[137]

In the mid-to-late 1920s the agency also began to recognize the American public's interest in partaking in recreational activities on the National Forests. As the prosperity of the "Roaring Twenties" enabled more people to purchase automobiles and take recreational trips the Forest Service took on the responsibility of providing improved roads, campgrounds, and sites on which to build vacation homes.[138] Doing so allowed the bureau to continue to grow as recreation fit well into its multiple-use philosophy and into its promise that the National Forests were there to serve the American people. In 1926 the Forest Service took inventory of all areas under its control that were greater than 230,400 acres in the hopes of determining the remaining amount of wilderness available for recreational use. This study determined that fifty-five million wilderness acres remained and prompted the agency to announce the designation of two new types of wilderness areas, research reserves and primitive areas, in 1929.[139] By then Colonel Greeley had resigned and another career forester and Yale Forestry School graduate, Robert Y. Stuart, had taken over the office of chief. In his tenure as Chief of the Forest Service Greeley, in the years following the war, enacted "positive, if unspectacular, policies that were eventually to lead to real progress in forest regulation, protection, and use."[140]

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[137] West, "Forests and National Security," 287; Lewis, *The Greatest Good*, 94.

[138] USDA, FS, *The USDA Forest Service—The First Century*, Gerald W. Williams (USDA Forest Service Office of Communication: Washington, DC, 2000), http://www.foresthistory.org/ASPNET/Publications/first_century/sec3.htm.

[139] Lewis, *The Greatest Good*, 120-121.

[140] USDA, FS, *The First Century*, sec. 3; Williams, *Americans and Their Forests*, 447, quoted in West, "Forests and National Security," 287.

The agency was able to smoothly return to normal after altering its peacetime operations in order to contribute to the war effort. The pause taken by the Forest Service to participate in a war where "wood [was] a military necessity" made an indisputable impact on the success of the overall American effort. In France the men of the Forestry Regiment labored under the philosophy that "every stick of firewood, every tie, every piece of lumber furnished, may accomplish as much for the common cause as the bullets and shells," and upon returning home they felt as though they had successfully completed the task assigned to them.[141] Without the willingness of the United States Forest Service, the preeminent forestry organization in the nation by 1917, to allow its personnel to go overseas and join the war effort the work of the Twentieth Engineers would not have been possible. When called upon directly in a time of national crisis the men of the Forest Service, in seeing an opportunity to make a unique contribution to the war effort, responded effectively. In doing so the agency helped display its importance to the nation and continued its growth trajectory, which would persist through the interwar period and into the Second World War.

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[141] Moore, "French Forests in the War," 1113; Barns, "Experience of a Forestry Engineer," 587.

"This country was practically rubberless. And we needed rubber:"[142] The World War II Emergency Rubber Project

By 1939, when the Second World War began in Europe, the United States was a "highly mechanized civilization [resting] upon a cushion of rubber." Yet America's rubber was in no way American; ninety-five percent of the country's supply was grown and tapped on plantations in Southeast Asia that, by early 1942, were located in the "danger area" under attack by the Japanese army.[143] By that time the government, based upon the likelihood of the nation going to war, had stockpiled 600,000 tons of rubber to combat a war-induced shortage. This amount barely satisfied the nation's need for a single year under peacetime conditions, to say nothing of wartime demand, causing the government to take further action in order to assure that enough natural rubber or a substitute could be produced to meet both military needs and essential civilian needs. Domestic synthetic rubber production was still in its initial stages, and whether an expansion of production or the quality of the material could be improved quickly enough was unknown.

An alternate source of natural rubber, that from the guayule shrub, seemed more promising in early 1942 as the nation mobilized for war. Guayule had been grown commercially in the United States for almost thirty years before the war, and the rubber it produced had been used in American rubber processing since the turn of the century. Consideration of these factors, and the emergency nature of the rubber situation, resulted in the government's decision "to launch a huge guayule growing program immediately upon the outbreak of [American

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[142] Interview of Evan W. Kelley by Amelia R. Fry, 22-23.

[143] USDA, FS, ERP, *Rubber from Guayule* (1943), 1; R. Ashton, "U.S. Dependency on Far Eastern Rubber," British Foreign Office minutes July 7, 1941, quoted in Tully, *The Devil's Milk,* 320.

involvement in] the war."[144] Thus the Emergency Rubber Project (ERP) was born within the Department of Agriculture and placed in the hands of the Forest Service. The agency was chosen to facilitate the project due to its prior experience operating large nurseries and conducting vast planting jobs.[145] In a time of national stress resulting from the Second World War the Forest Service, in addition to its normal work of caring for the nation's public forestlands, became the organization responsible for attempting to produce, for the first time in history, a domestic supply of rubber.

In the decade before the war began, from 1929-1939, the Forest Service had continued to come into its own as a federal agency. No longer in its infant stage, as it had been in the years before the First World War, the bureau persisted in the custodial management of the National Forests and still emphasized fire prevention and protection above all else. During the Great Depression the Forest Service was responsible for the facilitation of multiple federal relief programs. In the immediate aftermath of the crash lumber prices, which had been sinking since 1926, plummeted as demand drastically declined. While many private timber companies went bankrupt and their employees lost their jobs the personnel of the Forest Service continued working for lower wages. The issue of federal versus private control of forested lands became contentious. Once again, private companies were accused of liquidating their assets through processes of destructive and wasteful lumbering and premature cutting in order to remain in business.[146] Such policy debates were forced to take a backseat as the government as a whole,

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[144] USDA, FS, ERP, *Final Report The Emergency Rubber Project: A Report on Our War-Time Guayule Rubber Program*, December 1946, 1, RG 95, NARA.

[145] Virgil Wyatt, "U.S. Forest Service Rushes Guayule Planting," *Christian Science Monitor*, December 19, 1942.

[146] USDA, FS, *The First Century*, sec. 4; Lewis, *The Greatest Good*, 95.

including the agency, worked to alleviate the problems faced by the nation as a result of the Great Depression.

One of the Forest Service's largest internal projects in the beginning of the Depression era was the compilation of *The National Plan for American Forestry*, better known as the Copeland Report. The massive 1,677-page report, released in early 1933, was written in only a few months and provided a comprehensive review of the activities of the entire agency and the conditions of the National Forests for the first time in over ten years. All aspects of forestry, including "timber, water, range, recreation, state aid, and fire protection" were covered, and this topical breadth expressed the agency's continued pursuit of a multiple-use philosophy. The Copeland Report suggested that, in moving forward, the Forest Service intended to employ "a comprehensive plan for more intensive management of all the National Forest System lands."[147] This refurbished management plan included hundreds of improvement projects that required funding, manpower, or both for completion. Upon taking office in March 1933 President Franklin Delano Roosevelt, a lifelong supporter of conservation who had learned his love of the outdoors from his cousin Theodore Roosevelt, looked to the Copeland Report for ways to put America back to work.[148]

As Roosevelt quickly took to the task of enacting relief programs he used the Copeland Report as a blueprint to create work programs that would aid in the nation's continued pursuit of conservation. The most important of these programs was the Civilian Conservation Corps (CCC), which came into being with the passage of the Emergency Conservation Work Program (Public Law 73-5) on March 31, 1933. Its mission was to put thousands of unemployed men between the ages of eighteen and twenty-five to work across America, predominantly in order to

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[147] Lewis, *The Greatest Good*, 96-97; USDA, FS, *The First Century*, sec. 4.
[148] USDA, FS, *The First Century*, sec. 4; Lewis, *The Greatest Good*, 98.

maintain the nation's public lands and national monuments, and its success "marked a renewed interest in the conservation of natural resources." The agency's new chief in 1933, Ferdinand A. Silcox (yet another graduate of the Yale Forest School), helped make sure that the Forest Service continued to perform its duties during the Depression era with the help of the CCC. Eight million acres of cutover lands and 3.8 million acres of abandoned plains lands were purchased and placed under the control of the agency to ensure the availability of as much work as possible for the men of the CCC. 2,600 camps developed just months into the CCC's existence, and over its nine years in operation at least one work camp was built in each of the National Forests.[149]

During the CCC's operational period the Forest Service administered half of its projects. Relief workers constructed recreational facilities such as ski lodges, trails and trail shelters, recreational campgrounds, and scenic viewpoints in the National Forests. They also made a number of important contributions to the bureau's fire prevention efforts through the erection of fire lookouts and towers, telephone lines, and ranger stations, as well as through literal firefighting; in nine years Corps members dedicated 6.4 million man-days to fighting forest fires. From 1933-1942 the CCC completed an astonishing number of federal work projects:

> "48,060 bridges; 13,513 cabins and dwellings; 10,231 fire lookout houses and towers; 360,449 miles of telephone lines; 707,226 miles of truck trails (forest roads); 142,102 miles of food and horse trails; 101,777 acres of campground development; 35.8 million rods of fences; 168 emergency landing fields; 13.3 million acres of insect control work;…over 2.6 million acres of planting and seeding; and almost 1 billion fish stocked."[150]

Despite its successes in providing employment and completing numerous improvement projects in the National Forests and elsewhere the CCC was rapidly disbanded when the United States entered the Second World War in December 1941. Its camps in the National Forests closed as

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[149] Lewis, *The Greatest Good*, 98-99; USDA, FS, *The First Century*, sec. 4.
[150] USDA, FS, *The First Century*, sec. 4; Lewis, *The Greatest Good*, 99.

the thousands of young men who had been working under the direction of the Forest Service departed to take on another duty of great importance to the nation: military service. In less than six months the CCC era officially came to a close as Congress terminated the project's funding on June 30, 1942.[151]

Yet the Civilian Conservation Corps had not been the only Depression era project that the Forest Service had helped facilitate. The agency had also been responsible for what historian Wilmon H. Droze recognizes as "the most ridiculed undertaking of the New Deal era:" The Prairie States Forestry Project, more commonly known as the Shelterbelt Project.[152] The project, announced in mid-1934, was another one of Roosevelt's New Deal conservation efforts, and its main goal was to assuage the damage that had been done to the Great Plains by the "ecological disaster" that was the Dust Bowl. Massive dust storms resulting from soil erosion had blackened the skies and drastically altered the livelihood of the plains farmers, who desperately needed federal relief. Secretary of Agriculture Henry Wallace and Chief Forester Silcox proposed that over the course of a decade, and at a cost of $75,000,000, the Forest Service, with the aid of the Works Progress Administration (another New Deal relief program), would plant a series of forest strips stretching one hundred miles across. These tree breaks would, according to Chief Silcox, "ameliorate drought conditions, protect crops and livestock, reduce dust storms, and [thus] provide relief to the residents of the drought-stricken area."[153]

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[151] USDA, FS, *The National Forests of the Northern Region: Living Legacy*, Robert D. Baker et. al., 1993, http://www.foresthistory.org/ASPNET/Publications/region/1/history/chap8.htm; USDA, FS, *The First Century*, sec. 4.

[152] Wilmon H. Droze, "The New Deal's Shelterbelt Project 1934-1942," in *The Walter Prescott Webb Memorial Lectures: Essays on The New Deal*, ed. Harold M. Hollingsworth and William F. Holmes (Austin: The University of Texas Press, 1969), 23.

[153] Lewis, *The Greatest Good*, 99; Droze, "The New Deal's Shelterbelt," 27 & 23.

From the outset the project was controversial—plainsmen, in desperate need of relief, felt that the shelterbelt was simply a "rain-making scheme" that would provide no substantive assistance, and congressmen felt that allocating $75,000,000 to aid a sparsely populated area in the midst of a truly national crisis was both "politically unwise" and "grossly unfair." Yet the president believed in the possibilities of relief, including job creation for local residents, offered by the project and allocated $10,000,000 to the project in June 1934. With seed money secured the Secretary of Agriculture and the Chief of the Forest Service met in early August, along with other agency officials, to organize the Shelterbelt Project. Two directors, both career foresters, were named: Raphael Zon was appointed the Technical Director and Fred Morrell was the Administrative Director, though he was replaced by Paul H. Roberts just a few weeks later. By September the project was coming together at headquarters in Lincoln, Nebraska, and Roberts, under instruction from Chief Silcox, "was directed to proceed with vigor and enthusiasm and to win political support for the scheme at the grassroots level."[154]

Chief Silcox was particularly excited about receiving the opportunity for the Forest Service to extend its reach into a region where it was virtually unknown through the implementation, for the first time, of a program of plains forestry. His hope was that the residents of the planting areas, including North and South Dakota, Nebraska, Kansas, Oklahoma, and northern Texas, would recognize the benefits that federal forestry could bring to the Great Plains region. The first shelterbelt was planted on March 18, 1935, and from then on through the project's eight-year life over 220,000,000 trees were planted on 30,000 plains farms, ultimately creating 18,600 linear miles of tree strips. In completing this work the Forest Service spent almost $14,000,000, all drawn first from various emergency relief appropriations and later from

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[154] Droze, "The New Deal's Shelterbelt," 25 & 27-29.

the Works Progress Administration. The bureau remained in control of the project until Roosevelt approved its transfer from the Forest Service to the Soil Conservation Service, another Department of Agriculture agency that had been created in 1935 to conserve the nation's soils and water resources, on July 1, 1942.[155] By that time the United States entered the Second World War and Paul Roberts had been re-appointed to a project of a more pressing nature: the Emergency Rubber Project.

Wartime demands pulled the entire nation out of the Great Depression and shifted the attention of the Forest Service. Of the utmost importance was increased timber production to meet military needs—it was this task that remained the agency's primary responsibility through the duration of the war. As military orders for lumber more than doubled from 1941 to 1942 the Forest Service, through the Timber Production War Project, increased the amount of wood harvested from the National Forests as resources from private interests diminished. The single largest use of this wood was in the construction of packing crates that were to be filled with military supplies and shipped to the European and Pacific theaters. It was also used in the construction of barracks, docks, bridges, and other structures as well as in the manufacture of ships and aircraft.[156] Though timber may have been the agency's main focus as the United States geared up for war the nation as a whole, and especially the federal government, was preoccupied not by wood, as had been the case in the First World War, but by another natural material absolutely necessary in order to wage a modern war: rubber.

The history of rubber and its rise to power dates back to over fifty years before the outbreak of World War II. Rubber had become a vitally important resource in the late nineteenth

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[155] Droze, "The New Deal's Shelterbelt," 30, 33, 38 & 45-47; USDA, FS, *The First Century*, sec. 4; History of NRCS, National Resource Conservation Service, accessed March 28, 2014, http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/about/history/.

[156] Lewis, *The Greatest Good*, 107 & 104; USDA, FS, *The First Century*, sec. 5.

century largely as a result of the proliferation of bicycles and automobiles that were manufactured with tires made from natural rubber. Initially the rubber used in the manufacture of tires came primarily from wild *Hevea brasiliensis* trees found in Brazil, but in 1876 British planter Henry Wickham, motivated by economic incentives, smuggled twenty-two *Hevea* seeds from Brazil to the British Malay States colony in Southeast Asia. By virtue of this act of "botanical imperialism" came the commodification of the *Hevea* tree in that region over the next thirty years. Botanists in the Malay States and other British colonial possessions in Southeast Asia developed effective methods of deforesting the land to make way for rubber trees, propagating the *Hevea* species, and collecting the pure latex via tapping. The Dutch, recognizing the lucrative nature of plantation rubber, began commercial operations on their colony of Sumatra by 1906. By 1907 there were ten million *Hevea* trees on plantations throughout British colonial possessions in Southeast Asia, and the region had become the dominant producer of natural rubber for the rest of the world, including the United States.[157]

It had been the discovery of the process of vulcanization in 1839, however, that had furthered the material's ascent to astounding heights by the turn of the twentieth century. Consumers and manufacturers alike in the first half of the nineteenth century had realized that finished products made from untreated natural latex had a malodorous smell and would harden at low temperatures. An American, Charles Goodyear, discovered that mixing rubber with sulfur under high temperatures transformed the material and allowed it to withstand both extremely high and extremely low temperatures while maintaining its shape. This process also solved the odor problem, and by 1843 the process of vulcanization had been patented and had spurred a "rubber revolution." Two years later a Scottish engineer, Robert William Thompson, took the

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[157] Mark R. Finlay, *Growing American Rubber: Strategic Plants and the Politics of National Security* (New Brunswick: Rutgers University Press, 2009), 5.

first step towards developing the product that would, with the twentieth century advent of the automobile, become virtually synonymous with rubber: the pneumatic tire. His air-filled tire was passed over in favor of those made from solid rubber until another Scotsman, John Boyd Dunlop, developed a more suitable version for his son's bicycle in 1888.[158] By the mid-twentieth century the pneumatic tire was being manufactured via the following process: first, the natural rubber was put through a meat grinder-style machine that softened it. It was then mixed with chemicals either by being combined in a mixer or by being squeezed together with a rubber mill. The prepared sheets of rubber were layered with latex-treated cords before the tire was put into a machine for shaping and vulcanization. Pneumatic tires manufactured in this way fostered the development of "the greatest single market for raw rubber."[159]

Without question *Hevea* rubber had become dominant by the turn of the twentieth century, yet the tree only grew within a belt extending twenty-eight degrees north and south of the equator. This was true of a myriad of rubber-producing species, with one exception being that of the guayule plant.[160] Guayule, by virtue of the fact that it could be cultivated north of the twenty-eighth parallel, including in the United States, grew particularly interesting to the government by the outbreak of World War II. Yet even before that the incorporation of guayule into the global commercial production of natural rubber had been made possible by the mid-nineteenth century discovery of the shrub. Though Indians in Mexico had used rubber from guayule to make balls for their games centuries before the arrival of Europeans in North America the plant was first discovered in a scientific sense by Dr. J.M. Bigelow, a member of the

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[158] Tully, *The Devil's Milk*, 40 & 49-50.

[159] U.S. Rubber Company, Speaking of Rubber (1951), from the Prelinger Archives, accessed March 31, 2014, https://archive.org/details/Speaking1951_2; Tully, *The Devil's Milk*, 50.

[160] Sir Andrew McFadyean, *The History of Rubber Regulation 1934-1943* (London: George Allen & Unwin, Ltd., 1944), 6.

Mexican Boundary Survey, in 1852. Seven years later Professor Asa Gray, the preeminent American botanist of the nineteenth century, described and named the specimen Bigelow had collected.[161] Interest grew in the plant and by the late nineteenth century a number of people were conducting experiments concerning the extraction of rubber from the shrub. One example is that of William Prampolini, whose patented (though impractical) solvent extraction method interested two Americans, Thomas F. Ryan and Senator Nelson W. Aldrich, in guayule. Ryan and Aldrich hired William A. Lawrence, a chemist, to conduct further studies and in 1903 he developed and patented the pebble milling method that would ultimately be used by the ERP.[162] This process proceeded in the following manner:

> "The entire shrub is first [uprooted and] chopped into pieces then crushed between corrugated rollers. The material is then mixed with water and fed into the first of a series of pebble mills. These mills are rotating steel tubes with rough lining and partly filled with smooth pebbles. The movement of the pebbles against the lining macerates the plant material and releases the rubber particles from the fibers. This slurry then flows into a flotation tank where the rubber particles agglomerated into 'worms' float to the surface and the waterlogged bagasse [remaining fibrous material] sinks to the bottom. The worms are skimmed off, put through various cleansing processes to remove adhering particles of cork, dirt, etc., dried, and pressed into 100-pound blocks."[163]

The company responsible for introducing the commercial growing, milling, and sale of rubber from guayule in North America was the Intercontinental Rubber Company (IRC). By 1904 the IRC was operating guayule-processing plants in both Mexico and Texas, and by 1909 thirty million dollars of American capital had been invested in the business. The company was "a prototypical example of the networks of American capitalism that thrived at the turn of the

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[161] USDA, FS, ERP, *Rubber from Guayule* (1943), 3; USDA, Agricultural Research Service (hereafter ARS), Crops Research Division (hereafter CRD), Technical Bulletin No. 1327, *Research on Guayule (Parthenium argentatum): 1942-1959*, Bayard L. Hammond and Loren G. Polhamus, 2, RG 95, NARA.

[162] USDA, FS, ERP, *Final Report*, 9.

[163] Ibid, 171.

century," counting Senator Aldrich and Wall Street tycoons including Bernard Baruch, Daniel and Sol Guggenheim, and Thomas Fortune Ryan amongst its investors.[164] Though the IRC was successfully producing rubber through the processing of wild guayule shrubs in Mexico it transferred its crop development operations to the United States in 1912 as a result of threats from the Mexican Revolution. The unstable nature of politics in Mexico at the beginning of the twentieth century, especially the favoritism many Mexicans felt was shown to foreign investors in the region, made the IRC's operations a target of revolutionary activity. The resulting violence threatened the guayule industry and the United States government felt that American interests needed to leave the area.[165] Dr. W.B. McCallum, Chief Botanist for the IRC, took hundreds of strains of guayule seed for cultivation in multiple indicator plots in the southwest, first in southern Arizona and later in California. In doing this he was able to conduct experiments to determine which strains of the plant produced the most rubber and what areas in the United States were best suited to the growing of guayule for commercial purposes.[166] Guayule produced the same type of rubber as was drawn from the *Hevea* tree, and "while the two [had] slightly different properties in some respects, they [were] readily interchangeable for most purposes." Though American interest in the plant and in domestic rubber production remained sporadic at this time by 1925 the headquarters of the IRC's American operation had been moved to the Salinas Valley in California.[167]

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[164] USDA, ARS, CRD, *Research on Guayule*, 1; USDA, FS, ERP, *Rubber from Guayule* (1943), 3; Finlay, *Growing American Rubber*, 24.

[165] Finlay, *Growing American Rubber*, 27-28.

[166] USDA, ARS, CRD, *Research on Guayule*, 3; USDA, FS, ERP, *Rubber from Guayule* (1943), 3.

[167] Finlay, *Growing American Rubber*, 38; USDA, FS, ERP, *Rubber from Guayule* (1943), 1 & 3.

The first period of significant interest in an American commercial rubber industry came during World War I when increases in demand, decreases in supply, and the disruption of shipping lanes due to German u-boat campaigns highlighted the nation's vulnerability when it came to acquiring rubber. As the first ever total war the conflict "demonstrated…that economic leaders in the industrialized nations began to speak a new language that encompassed the terms 'war preparedness,' 'strategic materials,' and 'synthetic substitutes.'"[168] When it came to rubber the United States had no preparedness in the form of a stockpile, did not recognize its importance as a strategic material, and lacked the technology to create a synthetic substitute at the outbreak of the war. Some organizations mobilized during the war to change this outlook on the rubber situation, including the Committee on Scientific Research of the State Council of Defense for California and the Committee on Botany to the Pacific Coast Research Conference. Both organizations made the search for rubber crops that could be grown domestically a high priority by May 1917.[169]

The situation never became dire—plantation rubber sources in Southeast Asia were not disrupted by the conflict. Yet as a result of experiencing the strain on resources caused by a total war both the government and private interests began researching rubber-bearing plants that could provide a domestic source of natural rubber should another wartime emergency occur. The Department of Agriculture began conducting such research in 1922 on species including the kok-saghyz strain of Russian dandelion, the Cryptostegia vine, and goldenrod. Prominent Americans including Henry Ford, Thomas Edison, and Harvey Firestone fueled the private effort to find domestic rubber crops. Meanwhile, the IRC continued its development of commercial guayule cultivation in the Salinas Valley. Shortly after moving its headquarters there in 1925 the

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[168] Finlay, *Growing American Rubber*, 7 & 43.
[169] Ibid, 40.

company constructed and began operating a mill capable of producing 10,000 pounds of rubber each day.[170] Though the company's more lucrative activities remained in Mexico at the time its efforts to develop a guayule rubber industry in the United States continued.

Much of the interest in such activities, especially concerning guayule, diminished from 1930 to 1939. On the New York market at this time a ribbed smoke sheet of *Hevea* plantation rubber averaged 12.4 cents per pound, whereas the most optimistic market price for guayule was no less than 18 cents per pound. It has generally been most popular to sell natural *Hevea* rubber in ribbed smoked sheets, which are produced through the following process: after tree latex is coagulated by adding acid it is passed through a ribbed mill to create sheets that are then hung to dry and smoked.[171] Simply put, it was easier and less expensive to import plantation rubber from Southeast Asia. This fact did not deter the IRC from informing the War Department, now cognizant of the necessity of material preparedness before the next war, "that experimentation and development had demonstrated the commercial practicability of producing rubber from guayule cultivated in the United States." The company invited government officials to inspect their American properties and operations and the Secretary of War, "interested in any project which offers a reasonable opportunity for the production of raw rubber in continental United States," obliged.[172] Two Majors, Gilbert Van B. Wilkes and Dwight D. Eisenhower (who, of course, would later become the commanding General of the American effort in the European

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[170] USDA, ARS, CRD, *Research on Guayule*, II & 1; Finlay, *Growing American Rubber*, 7; USDA, FS, ERP, *Rubber from Guayule* (1943), 3.

[171] The Story of NR Production, Bouncing Balls, accessed March 26, 2014, http://www.bouncing-balls.com/serendipity/pictale.htm; USDA, Bureau of Plant Industry (hereafter BPI), *Guayule as an Emergency Source of Crude Rubber*, Loren G. Polhamus, March 1942, 4, RG 95, NARA.

[172] Dwight D. Eisenhower and Gilbert Van B. Wilkes, *Report of Inspection of Guayule Rubber Industry*, June 6, 1930, 1 & 3, RG 95, NARA.

theater of World War II before serving as President of the United States for two terms), were appointed to make the inspection.

Their mission was to report back to the War Department on the current state of the guayule industry and whether or not it held any significance for the agency.[173] After visiting the guayule growing areas in the Salinas Valley, northern Mexico, and southern Texas, Eisenhower and Wilkes prepared a confidential report of their findings. Of particular importance was their opinion

> "that the Government might be interested in encouraging the Guayule industry in the United States in view of:
> a) the opportunity to build up a domestic source of supply for rubber so that in a grave emergency we would not be wholly dependent on southeast Asia and the adjoining islands for this important raw material…
> c) the possibility of building up an industry in the United States that would give profitable employment to some thousands of American farmers, mechanics, and laborers. We send some two to three hundred million dollars annually to foreign countries to pay for the rubber we import."[174]

In addition to noting that the guayule industry would provide an emergency supply of natural rubber while creating jobs and keeping huge sums of American money within the country the report noted that guayule, due to the slow nature of its growth (generally a period of four to five years without irrigation), would have to already be growing before the crisis emerged. Eisenhower and Wilkes believed the government could plant the acreage necessary for an emergency supply. They estimated that 400,000 acres would produce 160,000,000 pounds of rubber per year and would provide no less than 250,000,000 pounds in reserve at all times. Based on these calculations the report concluded: "We are personally convinced that under real

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[173] USDA, ARS, CRD, *Research on Guayule*, 3.
[174] Eisenhower and Wilkes, *Report of Inspection*, 3 & 18.

encouragement the production of Guayule rubber would develop rapidly into an important industry in the United States."[175]

Were the government to take any action of this nature, however, it would have to do so with the cooperation and assistance of the IRC; in the opinion of Wilkes and Eisenhower the company was the only organization in a position to facilitate a guayule development project. For its part the IRC, after years of trying to promote a domestic rubber industry based on guayule cultivation, hoped the government would take over its operations within the United States as a national security measure.[176] George Carnahan, the president of the company, stressed the fact that for thirty million dollars, the same cost as building a single battleship, the government could plant a "living warehouse" of guayule that would be ready for harvest when necessary. Thomas Edison, though a supporter of domestic rubber cultivation, responded to Carnahan's idea by suggesting to his friend "that [he] had not learned an important lesson of World War I: that the government was unlikely to spend any significant funds on war-preparedness stockpiles."[177] It was Edison who turned out to be correct, and despite the interests of the IRC and the recommendations of the report no government action was taken concerning guayule at that time.

By the time the Second World War broke out in Europe on September 1, 1939, crude rubber had become the United States' largest single import in dollar value. The nation was addicted to rubber, responsible for consuming upwards of fifty-two percent of the world's supply, but produced virtually none of it. 35,000 different products were either made of rubber or

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[175] Eisenhower and Wilkes, *Report of Inspection*, 20-23; USDA, FS, ERP, *Rubber from Guayule* (1943), 2.

[176] Eisenhower and Wilkes, *Report of Inspection*, 16; USDA, FS, ERP, *Final Report*, 13.

[177] Finlay, *Growing American Rubber*, 89.

had a rubber component.[178] This degree of consumption, encompassing 600,000 tons of natural rubber per year, existed under peacetime conditions and was guaranteed to increase during the war, especially if the United States were to become directly engaged in the conflict. The government outlook on domestic rubber cultivation at that time, despite the prospect of impending involvement in a foreign war, remained predominantly negative and divided. Isolationists felt as though material preparedness was unnecessary; some felt that investing in the production of synthetic rubber and stockpiling natural plantation-grown rubber was the answer; others favored pushing for a revival of Latin American natural rubber production; still others hoped that the British and the Dutch would be able to contain Japanese aggression in the Pacific, thus securing their rubber operations and avoiding any disruption of the American supply.[179]

In early 1940 Secretary of Agriculture Wallace led a group of "agricultural internationalists" who believed that rubber, aside from being a raw material with both civilian and military importance, could also be used by the government "to leverage broader strategic goals." They believed that supporting the development of a plantation rubber industry in Latin America as an extension of Franklin Roosevelt's Good Neighbor Policy was the key to securing a continuous supply both during the war and after its end. Beginning on May 10, 1940, the United States aggressively promoted the revival of the rubber industry by signing trade deals

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[178] According to the U.S. Census of Manufacturers in 1939, the following products were all made of rubber: "Pneumatic casings, inner tubes, solid and cushion tyres, boots and shoes, heels, soles, and slab soling, rubberized fabrics, rubberized clothing (finished), and bathing caps and bathing suits, mechanical rubber goods, rubber flooring, rubber mats and matting, hard-rubber goods, rubber thread, cement, and gloves, tyre sundries, repair materials, rebuilt or retreaded tyres, and camelback, other products, including drug and medical sundries, balloons, stationers' bands, erasers, golf and tennis balls, toys, and sponge-rubber products (upholstery)." See McFadyean, *The History of Rubber Regulation*, 17; Attilio Bisio and Vernon Herbert, *Synthetic Rubber: A Project that Had to Succeed* (Westport, CT: Greenwood Press, 1985), quoted in Tully, *The Devil's Milk*, 18; Finlay, *Growing American Rubber*, 1; Tully, *The Devil's Milk*, 25.

[179] Finlay, *Growing American Rubber*, 132.

with Brazil and fourteen other Latin American and Caribbean nations.[180] In doing so the government hoped to guarantee the availability of *Hevea* rubber, which originated in Brazil and could be cultivated in the tropics, even if Japanese aggression in the Pacific cut off supplies coming from Southeast Asia. Following the signing of these agreements the Department of Agriculture planted between eight and ten million *Hevea* trees in Latin America and the Caribbean, providing good prospects that the plantation rubber industry would return to the Americas.[181] Around the same time the government began purchasing enough rubber to create a stockpile. The Reconstruction Finance Corporation, at the request of the president, created the Rubber Reserve Company (RRC) for this purpose. Its goal was to accumulate 150,000 tons by the close of 1940 and to increase that number to 430,000 tons by the end of the following year. In this effort the RRC found success: by December 7, 1941, the government stockpile sat at approximately 500,000 tons of imported natural rubber.[182]

It had been in the summer of 1941, however, that Congress had first seriously considered the prospect of a government project dedicated to growing guayule. As the likelihood of the United States going to war had continued to grow John Z. Anderson of California had introduced a bill into the House of Representatives that would provide for the planting of guayule as a means of developing a domestic source of natural rubber.[183] Anderson's interest in guayule

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[180] Ibid, 133.

[181] *Guayule Rubber: Hearing before the Committee on Agriculture*, HR 6299, 77th Cong., 2d sess., January 7, 8, and 13, 1942, 29, RG 95, NARA.

[182] Speech of Senator Harry S. Truman, Chairman of the Special Senate Committee Investigating the National Defense Program, June 15, 1942, 1-2, RG 95, NARA.

[183] In 1940 officials from Salinas, California and their counterparts in Washington had attempted to alert the government to the guayule alternative. Bernard Baruch, one of the government's war-preparedness advisors, had brought Carnahan to Washington so that he could present an argument in favor of guayule cultivation to the National Defense Advisory Committee. During his testimony Carnahan stated that for an investment of $112 million the government would be able to produce from guayule grown on American soil 100,000 tons of

stemmed from the fact that Salinas was located in his congressional district; in his testimony during a House Committee on Agriculture hearing concerning guayule rubber he noted, "I have watched with a great deal of interest the development of this company [the IRC] in and around Salinas."[184] His bill, H.R. 5030 introduced June 11, 1941, recommended that the Department of Agriculture plant 45,000 acres of guayule in California. This was to be done after the government acquired the IRC's properties in the state and through the use of the company's methods of seeding, planting, harvesting, and milling.[185] No immediate action was taken on the bill when it was first introduced, yet the situation changed with the attack on Pearl Harbor. Through the remainder of December 1941 Anderson's guayule bill continued to garner support; the Department of Agriculture reported favorably on the bill on December 16th, and on December 22nd Senator Sheridan Downey, also of California, introduced to the Senate S. 2152, which was identical to H.R. 5030.[186]

Just days into the new year Representative Anderson introduced H.R. 6299, "to provide for the planting of seventy-five thousand acres of guayule or other rubber-bearing plants in order to make available a domestic source of crude rubber for emergency and defense uses." This bill increased the original planting acreage from 45,000 to 75,000 acres as a result of the fact "that the availability of seed is such that we can plant a somewhat larger acreage and because of the general rubber situation we think that we ought to be prepared to go as far in subsequent years as

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crude rubber per year. He also proposed that the IRC was prepared to sell all of its assets in the United States to the government. See Finlay, *Growing American Rubber*, 134; "Notes on Meeting with Intercontinental Rubber Company, 9 July 1940," quoted in Finlay, *Growing American Rubber*, 135; George Carnahan to Clarence Francis, 13 July 1940, and George Carnahan to William McCallum 25 July 1940, quoted in Finlay, *Growing American Rubber*, 135.

[184] HR 6299, *Hearing,* 48.

[185] USDA, FS, *Legislative History of the Emergency Rubber Project*, 1, RG 95, NARA; USDA, FS, ERP, *Rubber from Guayule*, June, 1946, 1, RG 95, NARA.

[186] USDA, FS, ERP, *Rubber from Guayule* (1946), 1; USDA, FS, *Legislative History*, 1.

the need then may dictate."[187] Support for the increased guayule program proposed in H.R. 6299 came from men within the government such as Anderson and from private interests. The Secretary of the Navy, in a letter to the Secretary of Agriculture, noted that a domestic guayule program would "offer a fairly definite basis for a supply of rubber which would be available within a reasonable length of time" and that "the money expended in the production of guayule rubber [would] remain in the United States in place of the large sums which [flowed] from this country for the procurement of crude rubber."[188] Some of the nation's largest tire manufacturing corporations, including The General Tire & Rubber Co., The B.F. Goodrich Co., and the Goodyear Tire & Rubber Co., wrote Representative Anderson to express their support for the guayule program.[189] These companies and others were happy to cooperate with the government as a means of strengthening the war effort and securing their interests in a time of a natural rubber shortage. To ensure the well being of the nation no possibility was to be left unexplored in the quest for a domestic supply of rubber.

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[187] Legislation stipulated that the vast majority of this planting was to be dedicated to guayule, a tried rubber crop, and the Secretary of Agriculture was directed to plant no more than 15,000 acres of any crop other than guayule. See USDA, FS, *Legislative History*, 1; HR 6299, *Hearing*, 1.

[188] Secretary of the Navy to Secretary of Agriculture, quoted in HR 6299, *Hearing,* 52.

[189] W. O'Neil, President of The General Tire & Rubber Co., detailed that his company had used guayule in manufacturing its tires for years and that "Congress should not hesitate to pass the necessary legislation to get a program of guayule development underway." John L. Collyer of The B.F. Goodrich Co., though a supporter of building up a synthetic rubber industry to alleviate the nation's dependence on foreign rubber, admitted, "the present emergency, in my opinion, justifies legislation for the increased cultivation of guayule in this country." The Chairman of the Board of the Goodyear Tire & Rubber Co., P.W. Litchfield, felt, like Collyer, that the government's pursuit of a guayule industry would be an emergency wartime measure; he was of the opinion that the guayule program was justified as a measure of national insurance. See W. O'Neil to John Z. Anderson, 29 December 1941, quoted in HR 6299, *Hearing*, 52; John L. Collyer to John Z. Anderson, 3 January 1942, quoted in HR 6299, *Hearing*, 53; P.W. Litchfield, 30 December 1941, quoted in HR 6299, *Hearing*, 53.

The decision as to who would facilitate the federal guayule project remained contentious. Both the Department of Agriculture and the IRC felt as though the government was the organization best equipped to do so. This seemed odd to several congressmen who recognized the company's expertise in the industry, including Representative W.R. Poage of Texas who mentioned to the House Committee on Agriculture that "they [the IRC] have got all of the processes, and they have got all of the records; they have got everything that we have got to have before we can move."[190] While the IRC did have the vital guayule seed and the technical know how Dr. Elmer W. Brandes, Chief of the Rubber Division within the Department of Agriculture, felt as though the government would devote greater concentration and efficiency to the emergency production of guayule rubber than any private interests would. C.L. Baker, the President of the IRC in 1942, firmly opposed the idea of the company facilitating the operation on the government's behalf, citing its incompetence to handle a wartime project of such an "enormous scale." His preference was that the government would buy out both the company's tangible and intangible assets in the United States, leaving only the profitable operation in Mexico in IRC hands. Carnahan had proposed such a sale back in 1940 because "after twenty-eight years of attempts to establish a guayule industry in the United States, the IRC was ready to get out, and the threat of war offered the IRC the opportunity to recoup its investments."[191] From the company's point of view, therefore, the panic caused by the entrance of the United States into the war created a fortuitous opportunity. The men currently employed by the IRC as experts and operators at the Salinas mill would also be turned over to the government, thus ensuring that they

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[190] Finlay, *Growing American Rubber*, 143; HR 6299, *Hearing,* 30.

[191] "Notes on Meeting with Intercontinental Rubber Company, 9 July 1940;" Carnahan to Francis, 13 July 1940; Carnahan to McCallum, 25 July 1940.

would be able to maintain their jobs and that the federal operation would have experts on staff. In total the IRC hoped to release the entirety of its American operation to the Department of Agriculture for $2,600,000.[192]

The final iteration of Anderson's bill, S. 2282, passed in the Senate on February 19, 1942, and in the House on February 28th. It authorized the government's acquisition of the "firm's patents, property, machinery, employees, and…its 22,867 pounds of guayule seed" for no more than $2,000,000, and the final purchase price was $1,721,235.[193] President Roosevelt signed the bill on March 5, 1942, effectively enacting Public Law 473—77th Congress and officially authorizing the Emergency Rubber Project. It directed not only the immediate planting of 75,000 acres of guayule, but also the leasing of land on which to plant the shrub, the construction of mills and purchase of equipment, the cooperation with other public and private agencies in conducting research, and the sale of the guayule rubber produced to continue supporting the project. A week later Claude R. Wickard, the Secretary of Agriculture, "designate[d] the Forest Service as the Departmental Agency to be responsible for the administration of the program authorized by said Act."[194] By mid-March 1942 the Emergency Rubber Project was underway with the Forest Service at its helm.

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[192] The tangible assets, including seed, nursery seedlings, mature plants, land, and a mill at Salinas, were valued at $689,000.78; the intangible, including the labor costs of planting, tending, and analyzing guayule as well as conducting research and experiments over a period of almost forty years, were valued at $1,709,297.18. See HR 6299, *Hearing*, 28, 60-61, 67, 73, 77, 47.

[193] USDA, FS, *Legislative History*, 2; Finlay, *Growing American Rubber*, 145; USDA, FS, ERP, *Rubber from Guayule* (1946), 2.

[194] Section two article (b) stipulated that the Secretary of Agriculture could "delegate any of the powers and duties conferred on him by this Act to any agency or bureau of the Department of Agriculture." See Public Law 473, 77th Cong., 2d sess. (March 5, 1942), 1-2, RG 95, NARA; Memorandum No. 991: Designation of Responsibility to Forest Service for Guayule Rubber Project (March 12, 1942), RG 95, NARA.

The creation of the ERP heralded the fact that rubber, a consumer commodity, had become a war necessity so important to the fight for victory that the government was willing to buy out a private company, the IRC, in order to obtain its resources and expertise. This heightened level of state intervention in agricultural research and production, and the shifting of an entire rubber producing operation from the private sphere into the public sphere, resulted from the urgent nature of the wartime rubber situation.[195] This occurred, moreover, at the exact moment when the Japanese were overtaking, one by one, the world's sources of plantation *Hevea* rubber. Malaya fell first, followed by Java, then Sumatra, and then Burma, until by mid-1942 the only rubber-producing colony remaining in allied hands was Ceylon.[196]

Considering the gravity of the threat to the nation's rubber supply preliminary preparations for the ERP had begun even before President Roosevelt signed S. 2282 into law. In mid-January 1942 a contingent from the Forest Service Regional Office in San Francisco had traveled to Salinas in order to take inventory of the IRC properties that would come under government control under the terms of the impending legislation.[197] Christopher Granger, Assistant Chief of the Forest Service, had become responsible for organizing the coming project. He had selected Major Evan W. Kelley, the Regional Forester of the Northern National Forest Region (Region 1) at Missoula, Montana, to serve as the Acting Director of the ERP. Kelley had begun working for the Forest Service in 1906 as a forest guard before qualifying for a promotion to the position of assistant forest ranger. By 1915 he had been working as a national forest examiner out of the San Francisco regional office, though his work in this capacity had been interrupted when he enlisted as a Captain of the 10th Engineers and left for France. He had

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[195] Finlay, *Growing American Rubber*, 7 & 8.
[196] Speech of Senator Truman, 1.
[197] USDA, FS, ERP, *Final Report*, 17.

finished the war as a Major and had remained in charge of the American Forestry Regiment's road repair work and dismantling many of the unit's operations. Upon his return to the United States Kelley had begun working directly under the Chief Forester in Washington, D.C., where he made contributions to the agency's fire control policies and techniques. In 1929 he had been appointed as Regional Forester of the Northern Region (Region 1), where many of the worst forest fires occurred, "because of his extensive experience…with the problems of fire control."[198] He had labored in this capacity until he was chosen to direct the ERP in January 1942. Granger chose Kelley for the job partially because they had served together in the Tenth Engineers during World War I; as a result Kelley was familiar with the resource issues caused by war and the action the Forest Service, as a bureau of the federal government with a particular skill set, could take to assuage them.[199] For his part Kelley felt "I was sent out…because I had the ability to do things and do them in a hurry. And I could see that men responded to that kind of urge to do things and get on the job, in other words."[200] Such an attitude fit well into the emergency nature of the rubber situation.

Kelley had arrived in Washington around January 20th to participate in a conference with representatives of the Chief of the Forest Service concerning plans for the ERP. A few days later Paul H. Roberts, at that time still serving as the Director of the Shelterbelt Project, had joined him and was appointed Associate Director of the ERP. Project objectives were outlined, tentative plans were made for beginning work on the project, and select Forest Service nurserymen and planting experts working on the Great Plains Shelterbelt Project were officially transferred to the

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[198] "Major Evan W. Kelley," biographical sketch in The Selway-Bitterroot Wilderness History Project Wilderness Pages, accessed March 25, 2014, http://sbw.lib.uidaho.edu/Pages/18.pdf.

[199] USDA, ARS, CRD, *Research on Guayule*, 7; Finlay, *Growing American Rubber*, 149.

[200] Interview of Evan W. Kelley by Amelia R. Fry, 22.

ERP. A study had determined the kind of organization the Forest Service would need to facilitate the ERP; there were ultimately 242 positions classified and approved, and job descriptions for these posts were written.[201] By early February Kelley and Roberts had returned to their respective posts in order to gather personnel for the ERP from Region 1 and from the Prairie States Forestry Project. Around the same time Kelley and other agency representatives requested the urgent re-appropriation of Department of Agriculture funds for the purpose of beginning work on the ERP. The Director of Finance and Budget Officer for the Department of Agriculture, William A. Jump, suggested that the money could be made available from the department's Lend-Lease appropriation. A request was made to President Roosevelt and on February 6, 1942, he allocated $884,000 so that preliminary work on the ERP could begin in Salinas.[202]

With seed money secured Kelley and Roberts arrived in Salinas on February 11th to begin organizing the on site operations of the ERP. Kelley sat at the head of "a one-man autocratic line organization" as things got moving. Each morning at a "breakfast-conference" he would determine the day's tasks and assign the available personnel to complete them.[203] The work that had been started before Kelley's arrival continued as the men from the San Francisco Regional Office who had arrived a month earlier finished making an inventory of the IRC's Salinas properties and spoke with company representatives about "seed treatment, nursery practices, and methods of planting." Two other foresters searched for where land could be leased for the

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[201] USDA, FS, ERP, *Final Report*, 18 & 25; *Emergency Guayule Rubber Project Testimony*, March 15, 1942, 5, RG 95, NARA.

[202] The Lend-Lease policy, instituted in March 1941, provided munitions such as "arms, raw materials, and food to powers at war with the Axis." See Palmer et al., *A History of the Modern World*, 841; USDA, FS, ERP, *Final Report*, 18 & 4; *Emergency Guayule Rubber Project*, 9.

[203] USDA, FS, ERP, *Final Report*, 27.

purpose of establishing guayule nurseries and plantations. The arrival of supplies from Lincoln, Nebraska, including everything from typewriters to farm equipment, continued through the end of the month. Legislation officially authorizing the ERP had not yet been signed, but, as Major Kelley stated, "We were well under way with all activities before March 1."[204]

With the signing of the Guayule Rubber bill on March 5, 1942, came the official mobilization of the Emergency Rubber Project in Salinas. On that day the "mowing and digging of seedlings in the nursery beds acquired from the Company" began, and by noon individual plants had been graded and were in the process of being planted in the fields.[205] March 5th had been previously been designated as Guayule Rubber Day in Salinas, complete with a formal banquet to be held that evening at the Cominos Hotel. The news of Roosevelt signing the bill that day made the event an even more exciting celebration. Local, state, and federal bureaucrats, including Salinas Mayor E.J. Leach, Monterey County Superior Court Judge Henry Jorgensen, California Governor Culbert L. Olson, and Senator Downey, all spoke about the project at the banquet. Kelley introduced the government employees serving on the project, of whom there were just under fifty at that time coming predominantly from the Forest Service. Dr. W.B. McCallum, the longtime botanist for the IRC, also offered remarks.[206] The evening heralded the fact that the melding of public and private interests concerning the guayule rubber industry in the United States was complete. Another banquet dinner held just twelve days later echoed the excitement of the ERP finally begin underway; Major Kelley served as the Master of Ceremonies and, along with Roberts, led the attendees in the singing of a song entitled "Guayule" and sung to

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[204] *Emergency Guayule Rubber Project*, 5 & 6.
[205] Ibid, 8.
[206] Finlay, *Growing American Rubber*, 145; Program from Guayule Rubber Day Banquet, Salinas, Thursday, March 5, 1942, RG 95, NARA.

the tune of "Rose O'Day" (See Appendix B).[207] Government interest in procuring rubber from guayule had officially evolved into a federal program designed for emergency purposes, and with the arrival of the ERP in the spring of 1942 Salinas, California developed into a rubber boomtown.[208]

One of the biggest challenges faced by the project from its early days was that of acquiring the land on which to develop guayule nurseries and fields. Though in January Representative Anderson had received a telegram from Salinas stating that "plenty suitable acreage can be secured here…at reasonable figure as patriotic duty" the reality confronted in March was that many farmers were unwilling to lease their land to the government.[209] The fundamental problems faced by the Forest Service concerning land acquisition concerned the emergency nature of the project and the particular type of land necessary for proper guayule cultivation. The urgency of the ERP presented an unfamiliar challenge to the Forest Service as it attempted to lease land from farmers in the Salinas Valley. In the past the bureau, when purchasing land from private owners, had generally been able to wait until the owner came to see the government's point of view or was willing to work with the government to develop a reasonable compromise.[210] Such was not the case with the ERP—without land the guayule seed purchased from the IRC could not be planted and no rubber could be produced.

The type of land necessary for the ERP also contributed to the difficulty of the situation. Rubber develops in the guayule shrub when a period of growth (generally four to five years, as previously mentioned) is followed by one of "moisture stress" when water is not readily

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[207] Program from Guayule Emergency Rubber Project Dinner, March 17, 1942, RG 95, NARA.

[208] Finlay, *Growing American Rubber*, 149.

[209] Telegram from Salinas to John Z. Anderson, quoted in HR 6299, *Hearing,* 95.

[210] USDA, FS, ERP, *Final Report*, 65.

available. To facilitate the highest levels of rubber growth the Forest Service needed to lease lands with "good agricultural soils having nearly ideal moisture relationships," lands privy to a "short wet growing season followed by a long dry period."[211] Such conditions could be guaranteed in California by utilizing irrigated land. Under irrigation it was possible "to force the crop to produce as much rubber in two years as it otherwise would in three or four," a prospect of the utmost importance to those worried about the nation's rubber shortage. Choosing to lease irrigated land substantially increased the cost of the operation as the ERP paid four times more to lease irrigated tracts than it did to lease non-irrigated ones. These cost considerations went largely disregarded due to the fact that the ERP was an emergency wartime measure. Rubber was imperative to the nation's war effort no matter the cost—"dollars would be no good if the Japs gained a foothold on our beaches, and rubber was one of the things that must be had to prevent that calamity."[212]

The irrigated tracts of interest to the ERP were the same properties, however, that farmers prized for their ability to support the growth of valuable food crops. Wartime demand had created an agricultural boom in California, and many farmers believed they would make more by growing food crops than they would by leasing their land to the government.[213] County Agricultural Adjustment Administration (AAA) committees sent letters to farmers in Salinas, Bakersfield, Santa Barbara, and other areas with desirable lands to encourage them to lease their land to the government for guayule cultivation. The letters said that a Forest Service official "will be glad to examine your land, and, if it is adapted to guayule, discuss the terms of leasing

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[211] USDA, FS, ERP, *Rubber from Guayule* (1943), 2; USDA, ARS, CRD, *Research on Guayule*, 140.

[212] USDA, FS, ERP, *Final Report*, 19-20.

[213] USDA, FS, ERP, *Rubber from Guayule* (1946), 4.

arrangement with you." They also stressed the importance of acquiring land to carry through the guayule program:

> "It is not too much to say, in fact, that the safety of the Nation may depend upon whether or not we can somehow produce sufficient rubber for our needs. That being true, there is certainly no higher use to which the land can be put, speaking in terms of the best interests of the Nation, and if you have any such land you are urged to get in touch with the leasing representatives at once. The time for getting the land prepared is growing short – and the country's rubber stock is growing even shorter!"[214]

Despite these efforts many farmers remained firm in their conviction that growing food was the best was to contribute to the war effort. Within the first operational year of the project, March 1942-March 1943, attempts to acquire land became particularly contentious in Kern County, where Bakersfield was located, and in the Santa Maria Valley near Santa Barbara. Organizations including the Kern County Chamber of Commerce, the Kern County Farm Bureau, and the California Lettuce Growers mobilized against the ERP; they refused to lease their properties to the government, accused the project of allowing inefficient labor use and cultivation practices that would damage the long term viability of the soil, and ran newspaper ads that championed raising food as answering a call to patriotic duty (See Appendix C).[215] In the end, however, the Forest Service did manage to lease enough property to continue the project: by April 1943 60,454 acres of land were under lease by the ERP, the vast majority (47,785 acres) in California.[216]

Another challenge faced by the Forest Service in its mission to provide the nation with an American grown natural rubber supply was that of obtaining the requisite labor force necessary for the ERP to move ahead at full steam. Part of this force was made up of government

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[214] "Material for Circular Letter to Farmers by County AAA Committees," 2.
[215] Finlay, *Growing American Rubber*, 202-204.
[216] USDA, FS, ERP, *Final Report*, 70.

employees from the Forest Service and other agencies that came to work on the project due to an exemption allowing the ERP to gather its personnel without regard to the dictates of the Civil Service laws. The Bureau of Plant Industry, Soils, and Agricultural Engineering became responsible for researching crop production, the Bureau of Agricultural and Industrial Chemistry assisted in improving rubber extraction methods, and the Bureau of Entomology and Plant Quarantine studied the insects that affected guayule. At the project's peak there were 830 classified personnel on its payroll.[217] These "plant pathologists, plant physiologists, geneticists, agronomists, entomologists, foresters, and agricultural engineers" made up the brain trust of the ERP, a project combining agriculture, scientific research, and industry in the hopes of finding the nation's answer to its rubber emergency within its very own soil.[218]

Yet as the project moved forward in the summer of 1942 their brain was useless without the brawn needed to care for the 300-million guayule seedlings growing in the Salinas nurseries. As a result of the war the Forest Service as a whole, still a predominantly male organization, suffered significant labor shortages as its personnel enlisted or were drafted into the army. In order to continue the maintenance of the National Forests the agency once again hired women in multiple capacities as it had during the First World War. "Shasta Susies," the bureau's own iteration of Rosie the Riveter, got to work patrolling The Shasta National Forest in northern California. In Portland the regional office hired over 200 women to serve as fire lookouts, dispatchers, telephone operators, and cooks during the 1943 fire season. Some women even worked as rangers and supervisors without being paid; women of the Santa Barbara Red Cross volunteered to patrol the Los Padres National Forest through the duration of the war.

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[217] USDA, FS, ERP, *Final Report*, 17; USDA, ARS, CRD, *Research on Guayule*, 3; USDA, FS, ERP, *Rubber from Guayule* (1946), 3.

[218] Finlay, *Growing American Rubber*, 141-142.

Conscientious objectors were also offered the opportunity to continue working on unfinished CCC projects, including in tree planting and fire fighting details; in California's Modoc National Forest, for example, these men planted over 700,000 pine seedlings in an effort to reforest a 1,200-acre burned over area.[219] The Forest Service, stretched thin to find laborers to take over its peacetime projects, thus struggled to find even more workers for the ERP.

Of particular importance in the beginning was the creation of a labor force specifically designated to pull weeds growing in the same fields as the seedlings. The weeds presented a great threat to the young plants and had to be pulled by hand. A force of 3,000 people was recruited from the surrounding areas in order to complete this work. Many of these laborers were women who, like the iconic Rosie the Riveter, wanted to do their patriotic duty to help win the war.[220] The first group, comprised of seventy-five high school girls and twenty-five women, was recruited through the United States Employment Service (an agency responsible for helping place people into jobs) and began their work in the 240-acre Alisal nursery outside of Salinas in late May 1942. More soon followed and spent their days earning fifty cents per hour removing weeds from the nursery. Their contributions were reported in a local paper, though in a decidedly gendered fashion: "Foresters have found that women make better weeders than men because they are good at rapid and delicate finger work."[221] By 1943, however, such work had become largely unnecessary as the ERP shifted from hand pulling weeds to the use of chemicals and burning to combat them.[222]

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[219] Lewis, *The Greatest Good*, 105-107.

[220] USDA, FS, ERP, *Rubber from Guayule* (1943), 7; USDA, FS, ERP, *Rubber from Guayule* (1946), 2.

[221] "Guayule Girls Now: 100 Girls Aid Rubber Project," *Index-Journal* (Salinas, California), May 26, 1942.

[222] Finlay, *Growing American Rubber*, 151.

Local women were not the only answer to the labor shortage. From its first days officials on the ERP recognized "that local supplies of resident and transient labor would be insufficient to meet the requirements…and that the bulk of the Project labor would have to be imported." It was determined that Mexican Nationals could fill this need, and late in 1942 the first group arrived from Mexico to begin work. Over the next year, the peak year for the ERP, more Mexican laborers continued to arrive until they constituted forty percent of the entire project's 4,300-person workforce.[223] In order to house this influx of workers the project contracted private firms to construct seventeen labor camps at a cost of $3,262,295. The labor demographic of the ERP continued to evolve as it ran its course, and by 1945 many Mexican Nationals had been replaced by Prisoners of War.[224] In filling labor shortages with women, Mexican Nationals, and POWs, the Forest Service managed to maintain its normal operations by avoiding the transfer of skilled foresters into the thousands of unskilled jobs needed to maintain the ERP.

Through the importation of labor the Emergency Rubber Project altered the demographic composition of the state of California from 1942 to 1945. Yet the project also intersected with the demographic transition caused by the forced relocation of Japanese Americans to internment camps by supporting external efforts to conduct guayule research at Manzanar, one of the camps into which Japanese-Americans had been forcibly concentrated in the panic following Pearl Harbor. By April 1942 a professor at the California Institute of Technology, Dr. Robert Emerson, had become convinced that research to aid the efforts of the ERP could be done by the internees at Manzanar. He wrote to Major Kelley about his idea and the Director agreed that the formation of such a program could aid the mission of the ERP.[225] Emerson drew up a list of objectives

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[223] USDA, FS, ERP, *Final Report*, 50-51.
[224] Ibid, 51, 53-54, 56.
[225] Finlay, *Growing American Rubber*, 153.

concerning the work to be done at Manzanar, including the following: the development of a "large reservoir of growing guayule plants;" "to study the dependence of growth and rubber production on watering;" "to produce…varieties of guayule which yield larger amounts of rubber per acre."[226] These objectives, while remaining in line with the government's guayule work, also provided an opportunity for some Japanese Americans, despite having been forcibly incarcerated by their country, to make their contribution to the nation's war effort. As Emerson noted:

> "Many of them are more than willing to make any contribution to national defense which circumstances permit. The known talent of the Japanese for breeding and propagation of plants, together with the national need for rubber, offer a unique opportunity for occupational work in which the Japanese will take a just pride, and which may be of genuine service to the country."[227]

In April fourteen gunnysacks full of the tops of guayule seedlings were taken to Manzanar and the work to cultivate them began at once. Two months later there were 169,000 guayule plants in growing in the fields at Manzanar. Dr. Shimpe Nishimura, once a graduate student of Emerson's, led the camp's research team comprised of two chemists, a cytologist, two nurserymen, two horticulturalists, two mechanical engineers, a statistician, and several others.[228] Journalists from across the country published articles about the guayule work being done at Manzanar, including Neil Naiden from the *Washington Post* who "extensively praised the Japanese American scientists' 'unbelievable patience,' 'exceptional skill,' and desire to prove loyalty to the United States."[229] This positive publicity garnered national attention, embroiling the rubber issue in the controversies over the internment policy. Some associated with the ERP, most significantly secretary of the Salinas Chamber of Commerce Fred McCargar, felt that this

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[226] Robert Emerson, "Objectives of the Guayule Project at Manzanar," April 28, 1942, 1-2, RG, 95, NARA.
[227] Ibid, 3.
[228] Finlay, *Growing American Rubber*, 153-154.
[229] Ibid, 156.

association threatened the federal project by taking away from the work being done outside of Manzanar. McCargar wrote to J. Edgar Hoover, director of the Federal Bureau of Investigation, to express concern regarding the danger of "propaganda" such as the Washington Post article.[230] In response to this pressure government cooperation with the Manzanar efforts ended abruptly and unceremoniously—officials shut off the water that irrigated the guayule plants, though two of the internee researchers managed to keep them alive by watering them at night. This suspension of government support was lifted, however, in February 1943, at which time the Manzanar research was allowed to resume so long as Emerson and Caltech remained in charge.[231]

McCargar's fear of the work at Manzanar stemmed partially from the fact that he and some of his colleagues in Salinas believed that some of the internees were loyal to the Japanese government and would attempt to provide them with guayule seeds.[232] While the government did not want to share its guayule or its research on the crop with any of the Axis powers the ERP did develop an international component through the disbursement of guayule seed to friendly nations. In 1942 and 1943 the ERP provided guayule seeds and seedlings to over thirty nations and colonies in South America, Africa, and Asia.[233] Of particular note is the Soviet Union, which had been pursuing its own investigation of domestic rubber production from the Russian

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[230] Ibid.
[231] Ibid.
[232] Ibid.
[233] Guayule seed and seedlings were sent to the following places: Australia, Argentina, Belgian Congo, Ceylon, Chile, China, Cuba, Dominican Republic, Egypt, England, French Equatorial Africa, Gold Coast, India, Jamaica, Kenya, Mexico, Nyasaland, Palestine, Peru, Reduit Mauritius (Indian Ocean), Northern Rhodesia, Southern Rhodesia, St. Helena (S. Atlantic Ocean), Union of South Africa, Spain, Sudan, Uganda, U.S.S.R., Uruguay, Venezuela, Virgin Islands. See Memorandum to The Record from R.S. Monahan, "Disbursement of Guayule Seed and Seedlings to Foreign Countries by Emergency Rubber Project, during 1942 and 1943," February 21, 1944, 3-12, RG 95, NARA.

dandelion. The Soviets "showed far more interest in guayule than any other country," as evidenced by the fact that two Soviet commissioners visited the project in May 1943.[234] A Mr. Makeev, Vice Commissar of the Soviet Rubber Commission, and a Mr. Litvin, representing the Soviet Purchasing Commission, observed the guayule nurseries, plantations, and mills over the course of a three-day trip. They told Associate Director Roberts of how impressed they were with the ERP's research, experimentation, and success of its guayule plantations. The representatives requested a "Seed and Nursery Handbook," a "Planting Handbook," and a copy of the results of the project's investigative surveys. Upon their departure Roberts noted, "I gathered…that Russia does not intend in the future to be dependent on other countries for rubber, and that every effort will be made to have a goodly supply within Russia itself."[235] This observation points to the fact that the Soviet Union, like the United States, was anxious to free itself from the shackles of purchasing plantation *Hevea* rubber.

Two months before the Soviet visit, however, the Emergency Rubber Project, poised for continued expansion, received its first curtailment order. All project activities were to be immediately reduced to a minimum, and there were to be no new nurseries, no new land leases, no further construction, and no further purchases. On March 4th the federal Rubber Director William Jeffers, who had been appointed to his newly created office within the War Production Board in September 1942, told Secretary of Agriculture Wickard, "It is my opinion that if we try to solve the rubber problem of 1946 and 1947 by sacrificing the food problem of 1943 and 1944,

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[234] USDA, FS, ERP, *Final Report*, 45.

[235] Memorandum to Evan W. Kelley from Paul H. Roberts, "Trip by U.S.S.R. Rubber Commission," May 13, 1943, 1-3, RG 95, NARA.

we would be imposing a grave injustice on the American people."[236] The two agreed that food production had become a more pressing issue than the development of a domestic natural rubber supply. This dovetailed with the fact that, by the spring of 1943, the government's "synthetic program was seen to be developing satisfactorily."[237] Just as synthetics were on the rise the ERP shipped its first load of domestically grown guayule rubber from the Salinas mill. It was milled from the mature shrubs acquired when the government took over the IRC's operations and yielded 880,286 pounds of crude rubber that sold for twenty-seven cents per pound. After investing millions the government received only $236,574 from this first sale, and it would be another year before any useable rubber could be milled from guayule plants seeded and grown by the ERP.[238] Kelley had initially traveled to Washington to protest these cutbacks, but when he arrived and discovered the promising nature of the synthetic rubber program even he realized that scaling back the guayule program was the reasonable thing to do.[239] The fact was that guayule rubber production was moving at a snail's pace and garnering a negligible amount of money from sales while its synthetics counterpart made rapid advances.

At the outset of American involvement in the war nobody could have predicted that the development of the synthetic rubber industry would take off in the way that it ultimately did. In 1942 the nation's synthetic rubber factories produced 40,000 tons, and this number skyrocketed to 900,000 tons by the end of the following year. Over the course of two years, the same amount of time it took a guayule seedling planted on irrigated land to mature to the point that it could be

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[236] USDA, FS, ERP, *Final Report*, 34 & 5; Franklin Roosevelt, Executive Order 9246, "Providing for the Coordination and Control of the Rubber Program," (September 17, 1942), RG 95, NARA.

[237] "Guayule Rubber Plan Curtailed," *Times Herald* (Washington, D.C.), March 31, 1943; USDA, FS, ERP, *Rubber from Guayule* (1946), 5.

[238] USDA, FS, ERP, *Rubber from Guayule* (1946), 6; USDA, FS, ERP, *Rubber from Guayule* (1943), 4.

[239] USDA, FS, *Living Legacy*, ch. 8.

harvested and milled, the synthetic program "duplicated the capacity of the entire world's natural rubber plantations."[240] Synthetic rubber could be derived from two natural sources: alcohol and petroleum. A simple explanation of the processes by which these two materials were converted into synthetic rubber is as follows: "in the first case, alcohol is derived from grain, molasses, or similar products of the soil, and converted first into butadiene and then into rubber. In the second case, petroleum is converted into butadiene, and then the butadiene into rubber." In both cases the butadiene, a monomer, is polymerized, and the resulting polymer has the characteristics of natural rubber.[241]

Despite the success of synthetics the tides seemed to turn in guayule's favor once again in August 1943 when the Rubber Director proposed that the ERP resume its program on the basis of producing 20,000 tons of rubber per year. Around this time Major Kelley left the ERP and returned to his post as a Regional Forester, at which point Paul Roberts became Acting Director.[242] This insurance policy was to be carried through on non-critical lands already under lease and appeared promising until, just before the end of the year, Congress denied the expansion on the grounds that taking such action "would not supply rubber before the probable end of the war."[243] Work on the Emergency Rubber Project continued quietly into 1944; the issues with land leasing and labor supply had been mostly taken care of by that point, and congressional support for the development of a domestic source of natural rubber continued to dwindle. In February Representative Anderson introduced H.R. 346, a resolution requesting that the Committee on Agriculture investigate the entirety of the ERP's operations. A five-man

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[240] Harold M. Fleming, "Good News on Synthetic Rubber," *Harper's Magazine*, December 1943, quoted in Tully, *The Devil's Milk*, 326.

[241] Finlay, *Growing American Rubber*, 172 & 3.

[242] USDA, FS, *Living Legacy*, ch. 8.

[243] USDA, FS, ERP, *Final Report*, 6; USDA, FS, ERP, *Rubber from Guayule* (1946), 5.

subcommittee developed for this purpose with Representative W.R. Poage of Texas serving as chairman.[244] Poage himself admitted that "knowledge was the main thing produced thus far by the Guayule Project," citing as evidence the fact that "there were only some 600 tons of rubber to show for the $30,000,000 investment." Over the course of the remainder of 1944 the Poage Committee made an exhaustive survey of guayule production by not only the ERP, but also in Mexico and Haiti. Its findings were published in a report dated January 2, 1945 and entitled "Study of Rubber in the United States, Mexico, and Haiti."[245] Based on these findings the Poage Committee recommended that the government "continue a comprehensive program of research and experimentation to determine the full possibilities of culture, processing, use, and development of guayule." It also recommended unanimously, however, "that the actual commercial production and processing of guayule and all other crops should in the postwar period be in private hands."[246]

Thus began the government's process of withdrawal from its wartime attempt to develop a domestically grown source of natural rubber. What began as a promising emergency measure in March 1942 came to an unceremonious close by the end of 1945. With the victory over Japan on August 15, 1945, came a massive shift in the nation's rubber outlook. The Japanese had not destroyed the *Hevea* rubber plantations in Southeast Asia through the use of a scorched earth policy as had previously been thought. Providing a supply of domestically grown natural rubber no longer seemed necessary to many congressmen, and the project was officially liquidated on

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[244] USDA, FS, ERP, *Final Report*, 6.

[245] USDA, FS, ERP, *Final Report*, 198; USDA, FS, ERP, *Rubber from Guayule* (1946), 10.

[246] Poage Committee Report, 78th Cong., 2d sess., No. 2098, quoted in USDA, FS, ERP, *Final Report*, 198-199.

August 25, 1945.[247] In early September the Budget Bureau recommended that the ERP be dismantled as quickly as possible. The Rubber Director felt as though

> "the Emergency Rubber Project was valuable insurance but that fortunately through the early termination of the war, we did not have to avail ourselves of the insurance…I recommend that the Project be liquidated as rapidly as possible and with the least expenditure of additional funds."[248]

Liquidation seemed all the more appropriate as a result of the fact that, by October, a mere eleven percent of the rubber industry's raw material came from natural sources. The same vigor caused by the emergency of the war had galvanized the production of synthetic rubber in state owned factories that were leased to the nation's private rubber corporations, and technology had progressed to the point that synthetics could replace natural rubber in numerous cases.[249] Synthetic rubber also "better fit the emerging cultural and political milieu of the United States in the postwar world;" the billows of smoke rising from the synthetic rubber factories symbolized modernity in the post-war world and better fit the "progress ideology" that American consumers and industrialists were beginning to favor even more heavily.[250] Synthetics were in and guayule was decidedly out.

With the passage of the Recession Bill on December 11, 1945, the state withdrew all funds previously appointed to wartime agencies, including those given to the ERP. Three days later the Spence Mill in Salinas, which had been taken over from the IRC, officially shut down. Instructions were given that the liquidation of the entire project, including the removal of healthy guayule plants from the fields, be completed by December 31, 1946.[251] Growing shrub was

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[247] USDA, ARS, CRD, *Research on Guayule*, 4; Finlay, *Growing American Rubber*, 219.
[248] USDA, FS, *Legislative History*, 6; USDA, FS, ERP, *Final Report*, 209.
[249] "Rubber" (January 3, 1945), unpublished typescript from the BF Goodrich Files in the University of Akron Archives, quoted in Tully, *Devil's Milk*, 320.
[250] Finlay, *Growing American Rubber*, 11, 222 & 224-225.
[251] USDA, FS, ERP, *Final Report*, 8.

disposed of through two methods: removal from the field by digging, burning, or transporting the shrub for milling and plowing the plants under as a fertilization technique. In total 23,552 acres of shrub were destroyed. Private landowners completed removal on 17,768 acres while the ERP took care of the remainder, digging and burning 3,276 acres and plowing under 2,508 acres. As the guayule operations were dismantled some local farmers benefitted from being given the opportunity to purchase discarded equipment including fence posts, pipe, motors, and other items necessary for farming.[252]

Other Californians residing in guayule-growing areas, however, felt that the government was doing a disservice to the post-war nation, and to the state, by eliminating the guayule industry. They argued that jobs could be made available within the industry for those returning from service and that the ultimate success of the crop would provide "a more comfortable feeling about our future in case of war."[253] Despite their feelings liquidation moved swiftly ahead in 1946. The remaining 132,000 pounds of guayule seed were prepared for storage, producing 17,298 pounds after threshing that were sealed for potential future use. All leased land, save a few experimental tracts, was released by the end of June. When the prospect of liquidation had been on the horizon a plan had been designed to place ERP employees into regular positions within the Forest Service or other agencies. Information had been collected in an attempt to find suitable work for those who desired it. As the ERP closed out its operations project employees dispersed; some returned to their regular positions within the Forest Service, but others who had previously been employed on projects that had since been discontinued did not enjoy that

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[252] Ibid, 211-213.
[253] "Give Guayule a Fair Trial," *Colusa Daily Times* (Colusa, California), July 24, 1945.

luxury.[254] By the end of the year the Emergency Rubber Project had decisively faded into the past.

From a statistical standpoint the Emergency Rubber Project was a colossal failure. During its three and a half years the project milled and shipped only 2,974,272 pounds of rubber to the Rubber Reserve Company of the Reconstruction Finance Corporation. The negligibility of this number is apparent when considering that this was less than one percent of the nation's annual pre-war consumption. Eighty-five percent of the project's shrub went un-harvested—the ERP "was a 37 million dollar casualty of the war."[255] Yet the scope of the ERP, likened to the Manhattan Project due to its enormous scale and level of urgency, illustrates the steps that a government, and the bureaus within it, is willing to take in order to push for victory. Thousands of politicians, civilians, and government employees poured their time, labor, and faith into the ERP when the United States was embroiled in the Second World War.

The project failed because it was not fast enough and did not receive enough funding, especially when compared to the appropriations and technology thrust into the development of the synthetic rubber industry during the war.[256] In the panic of the months following Pearl Harbor many bureaucrats had felt that, since synthetic rubber was still in its test tube stage, guayule was a safer bet. When presented with the option of purchasing the IRC's domestic operation and its crop of the plant, which was already growing in California and would be ready for milling almost immediately, the federal government, unsure of how quickly the synthetic program would progress, took what they perceived at the time to be the best option. Guayule was not ideal, but in the desperate search for a guaranteed source of rubber it fit the bill. Despite its

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[254] USDA, FS, ERP, *Final Report*, 110, 8 & 220-221.
[255] USDA, ARS, CRD, *Research on Guayule*, 4; USDA, FS, ERP, *Final Report*, 223.
[256] Finlay, *Growing American Rubber*, 2 & 11.

final outcome the Emergency Rubber Project did offer the Forest Service another wartime opportunity to utilize its particular skill set to help the nation's effort. Though it did the best it could, executing "miracles of construction and preparatory work" and reshaping the labor demographics of California, in the end it simply was not enough.[257] Domestic rubber could never compete with plantation imports and synthetics, and guayule faded into the nation's past.

[257] USDA, FS, ERP, *Final Report*, 1 & 194.

Conclusion

In its first fifty years the United States Forest Service encountered a wide variety of external and internal challenges. From its start the bureau, in keeping with what James Q. Wilson suggests is one responsibility of a bureaucratic agency, "reflected a new (or at least greater) emphasis on the enlargement of the scope of the government."[258] This particular enlargement came predominantly via the controlling of millions of acres of forestlands with the aim of making them useful for the population. As the agency gathered its "knowledge and command of space," an expression of power according to Timothy Mitchell, it exerted an elevated degree of federal influence over the forestlands and over the people living near them.[259] The two World Wars and the Great Depression also presented opportunities for the Forest Service specifically, and for the federal government as a whole, to expand their reach. In these times of national stress the agency took on additional responsibilities, and by midcentury the bureau had solidly established itself in the federal bureaucracy. It had shown through the implementation of successful fire protection and timber conservation policies that it was the organization best equipped to manage the public forestlands. In abnormal times it had not only completed its standard duties of maintaining the National Forests, but had also worked to help alleviate the emergencies brought on by war and economic collapse. It had adapted to changing circumstances and had become one of the most recognizable federal agencies.

Its success must be attributed to its capable leaders, its organizational style, and its *esprit de corps*. All had been cultivated since its inception and had progressed to the point that, in the years following the war, the Forest Service was, according to a study conducted by the Department of the Army, "representative of many of the finer principles we associate with the

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[258] Wilson, "The Rise of the Bureaucratic State," 327.
[259] Mitchell, *Rule of Experts*, 90.

American way of life." The U.S. Army praised the bureau for its "democratic way," "dedication," "efficiency," "effectiveness," and "organizational morale."[260] Part of the agency's success resulted from the fact that, in order to keep things running smoothly, it had placed professional foresters whose ideals matched its own in the vast majority of its positions, including those concerning personnel and administrative management. In peace and war Forest Service personnel had been scattered throughout the United States and had often worked semi-autonomously, yet the agency had remained strong because these individuals had shared the same vision. These uniformed men, in keeping with the tradition established in 1905, had themselves been uniform: white, middle-class, educated, conservative, and wholly devoted to the agency and its objectives. They had actively been made familiar to the American public as agency-approved books, movies, radio programs and television shows had presented the forest ranger "as the epitome of the mid-twentieth century American man." They had been one version of Timothy Mitchell's experts, and the work they had conducted utilizing their expertise—the work of managing millions of acres of public land—had benefitted the nation. By the 1950s, just a half century after its birth, the Forest Service had "reached its peak in power and prestige and was the undisputed leader in American conservation."[261]

Did its specialized participation in the two World Wars contribute to its ascent? In answering this we must first look to the period from 1905 (when the Forest Service was founded) to 1945 (when World War II ended), a time when the federal government experienced three distinct moments of growth: World War I, the Great Depression, and World War II. All three

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[260] Department of the Army, "An Army Study on Program Control in the U.S. Forest Service Department of Agriculture," 1, quoted in Lewis, *The Greatest Good*, 167-168.

[261] Lewis, *The Greatest Good*, 166-169; Herbert Kaufman, *The Forest Ranger*, 214-215, quoted in Steven J. Balla and William T. Gormley Jr., *Bureaucracy and Democracy: Accountability and Performance* (Washington, D.C.: CQ Press, 2004), 43.

were national crises during which the federal government took the initiative to expand its reach.[262] In response to war emergencies much of the federal government's effort to extend its reach came through the expansion of existing bureaucratic agencies, including the Forest Service. It was thus that the bureau was repeatedly provided with opportunities for self-promotion and to expand its duties from 1905-1945.

The Forest Service's overall development was enhanced by its monopoly of a particular expertise that could be employed to solve problems for the federal government. As Timothy Mitchell argues in *Rule of Experts*, techno-power develops through the application of human ingenuity in attempts to manipulate nature and alter natural processes. In both World Wars and in the Great Depression the agency's approach when solving problems of national importance was to utilize its expertise in order to "manufacture" or reorganize nature via the cutting and growing of particular crops. Under the expert direction of the Forest Service trees were successfully felled and converted into timber during World War I, and were planted on the Great Plains during the Great Depression. During the Second World War this expertise was once again applied successfully in the sense that the guayule grown on irrigated land for the ERP developed rubber stores twice as quickly as that grown in the wild. In these cases, therefore, the application of human intentionality effectively overruled nature and its processes—these projects were thus good examples of techno-power in action.

In the First World War the agency's special wartime undertaking, the creation of, administration of, and service in the Twentieth Engineers, made an irrefutable contribution to the efforts of the American Expeditionary Force in France. Many agency employees enlisted in the regiment or requested to be transferred to it in order to put their vocational expertise to military

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[262] Wilson, "The Rise of the Bureaucratic State," 324.

use. The timber produced by the Twentieth Engineers was much needed and was immediately used to build barracks, hospitals, and docks, amongst other things, necessary for the American forces.

During the depression years the Forest Service's facilitation of almost half of the CCC's projects and of the Shelterbelt program put thousands of America's young men to work at a time of high unemployment. Administering these projects allowed the agency to accomplish a number of custodial goals in the National Forests and attempted to help alleviate the soil erosion on the Great Plains that had caused the Dust Bowl. The implementation of the Shelterbelt project, furthermore, exemplified the victory of institutional, in this case bureaucratic, desires over local knowledge, a practice identified by James Scott in *Seeing Like a State*. The Forest Service saw the planting of shelterbelts not only as an opportunity to combat soil erosion, but more importantly as an opportunity to expand its reach by introducing forestry into a traditionally un-forested region. Planting trees in a treeless area would create work for the agency in the present, through planting, and in the future, through upkeep. It would also transform the plains landscape, thus exerting a heightened level of human control over nature (another practice of high modernism discussed by Scott). The agency's new stands of trees, stretching right down the middle of the nation, would serve as a visual expression of its increasing power. Great Plains farmers, by contrast, viewed the scheme as a poor allocation of relief funds and federal aid in a time of crisis. Federal bureaucratic interests once again triumphed over local ones, just as they had in the final decade of the nineteenth century when the Forest Reserves had been created against the wishes of many Westerners. Western lumber interests had seen the forests not as abstract resources that could be regulated by the federal government and made profitable over

the course of time, as the Washington bureaucrats had, but as the raw materials on which rapid economic growth might be built.

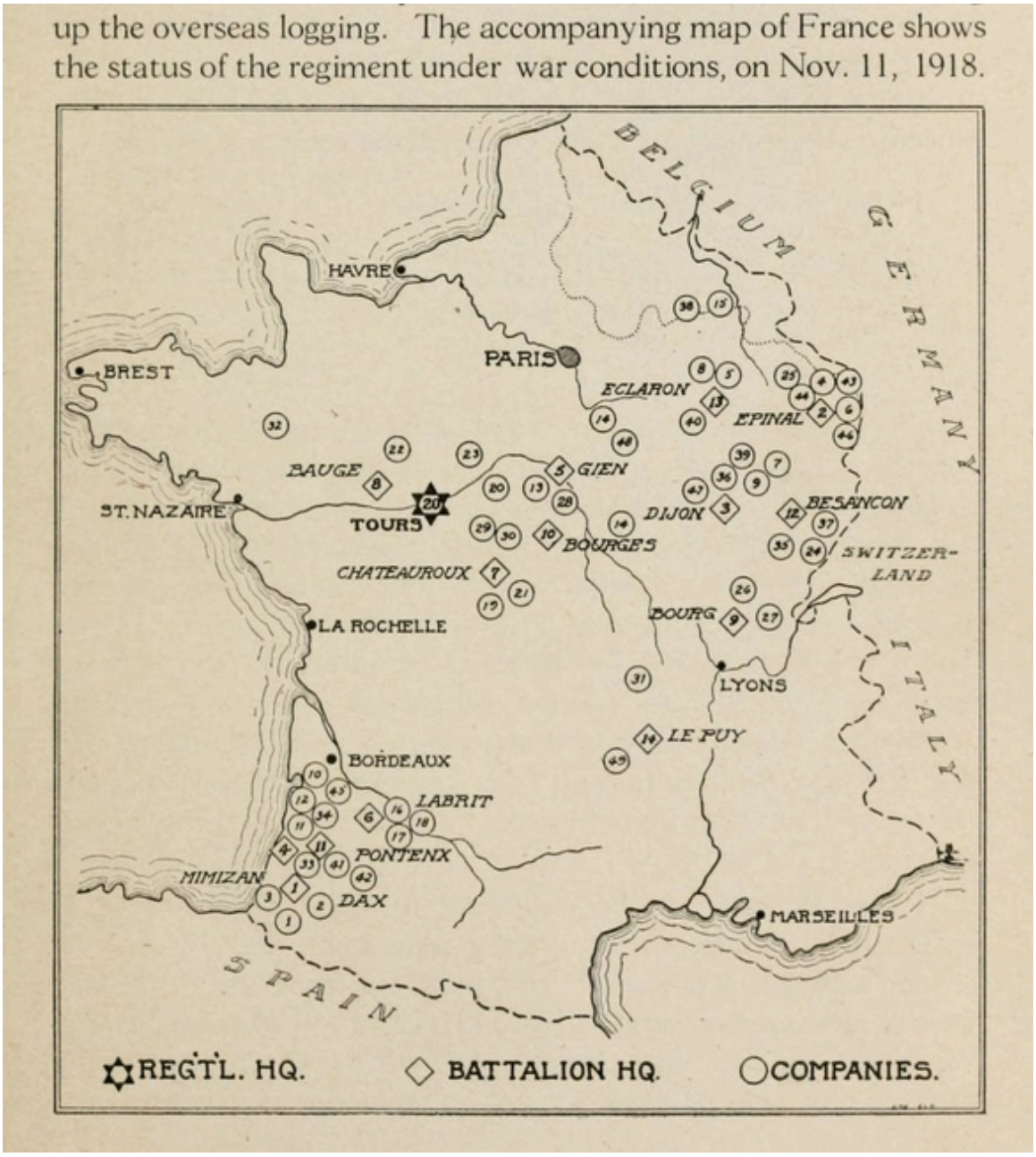
Wood had been of the utmost importance in the late nineteenth and early twentieth centuries, but no material was more important in the panic after Pearl Harbor than natural rubber. The federal government's search for a viable source of latex that could be grown domestically resulted in the Forest Service's World War II venture: the Emergency Rubber Project. In the event, the ERP made little difference to the allied war effort despite its application of human expertise to a very specific problem. Guayule grew too slowly, and the synthetic rubber industry in the United States took off more rapidly than anyone had expected. The victory of the synthetic rubber industry also points to a moment of transition, a time when the federal government began to look to private corporate interests as problem solvers rather than continuing to rely on the expertise of its own bureaucracies. American tire manufacturing corporations had solved the rubber crisis faster than the Forest Service had been able to, and in the post-War years the federal government would continue to look to technology and to private interests for assistance and for answers. The ERP and its attempt to secure a domestic source of natural rubber did, however, attract the attention and support of many Americans throughout its lifetime.

During each of these three crises the members of the Forest Service's existing force were re-allocated to the war projects. In the two wars women, in breaking with tradition, were brought in to fill positions and continue the agency's normal work until the men could return. Though the bureau did not experience a personnel increase as a result of the two wartime measures it did experience a general personnel growth trend consistent with the overall expansion of the federal government during the first half of the twentieth century (See Appendix D). In the end its contributions during the wars, though not paramount, advanced the agency's long-term interests

at the expense of disrupting its own normal operations.[263] In taking on two extraordinarily different emergency tasks the bureau, though born only at the beginning of the twentieth century, effectively continued its growth trajectory. By the middle of the century the United States had emerged from the two World Wars as a leading global power, and the Forest Service had become an iconic American institution.

[263] Balla and Gormley, *Bureaucracy and Democracy*, 176.

Appendix A (Part I)



Map illustrating the work locations of the Twentieth Engineers on the day of the signing of the armistice. The Western Front is designated by the faint dotted line between Paris and Belgium, and the numbered circles indicate the locations of the various companies of the Forestry Regiment. Printed in Davies and Simmons, *Twentieth Engineers, France, 1917-1918-1919*, 32.

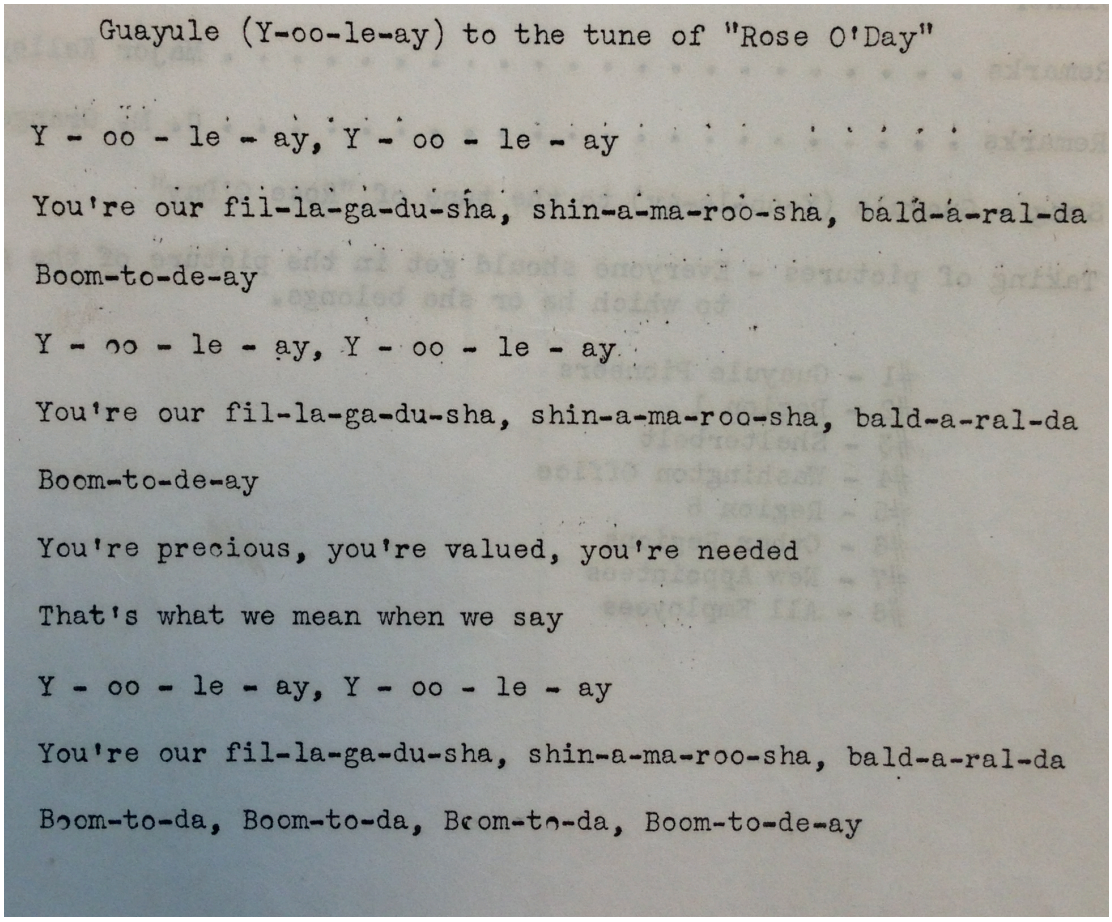
Appendix A (Part II)

Image redacted due to Copyright law. Please see WW1 Battlefields of the Western Front, The Great War 1914-1918, accessed March 30, 2014, http://www.greatwar.co.uk/places/ww1-western-front.htm#mapwesternfront for a map illustrating the Western Front with army locations. Of note is the fact that the front is located a significant distance from the majority of the Twentieth Engineers' logging operations.

Appendix A (Part III)

Image redacted due to Copyright law. Please see Pershing, *My Experiences in the World War*, 82 for a map displaying the rail-lines used by the American Army during the war. Railroads were used to transport wood from the locations of the logging operations to the front.

Appendix B



Guayule (Y-oo-le-ay) to the tune of "Rose O'Day"

Y - oo - le - ay, Y - oo - le - ay

You're our fil-la-ga-du-sha, shin-a-ma-roo-sha, bald-a-ral-da

Boom-to-de-ay

Y - oo - le - ay, Y - oo - le - ay

You're our fil-la-ga-du-sha, shin-a-ma-roo-sha, bald-a-ral-da

Boom-to-de-ay

You're precious, you're valued, you're needed

That's what we mean when we say

Y - oo - le - ay, Y - oo - le - ay

You're our fil-la-ga-du-sha, shin-a-ma-roo-sha, bald-a-ral-da

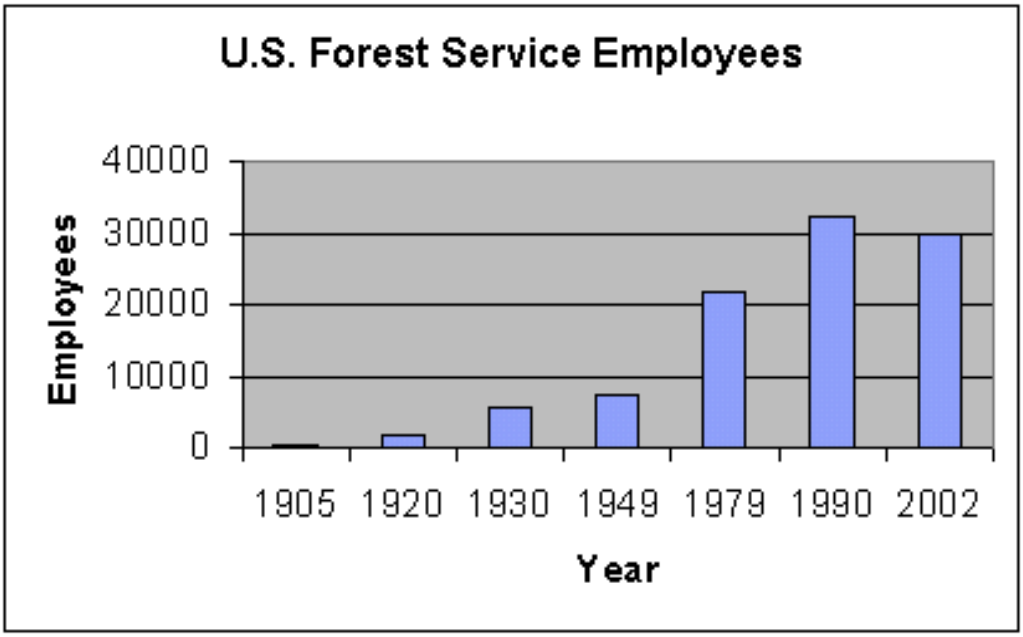
Boom-to-da, Boom-to-da, Boom-to-da, Boom-to-de-ay

Lyrics to "Guayule" from the Program from the Emergency Rubber Project Dinner, March 17, 1942, Record Group 95, National Archives and Records Administration, College Park, Maryland.

Appendix C

Image redacted due to Copyright law. Please see "Food Will Win the War," Advertisement in the *Daily Times* (Santa Maria, California), February 22, 1943, Record Group 95, National Records and Archives Administration, College Park, Maryland.

Appendix D



These two diagrams illustrated the continued growth of Forest Service employees from the agency's inception to the twenty-first century. Of particular importance is the steady growth from 1905-1950, the period during which the agency participated in World War I, the Great Depression, and World War II. See Doug MacCleery, *Re-Inventing the United States Forest Service: Evolution from Custodial Management, to Production Forestry, to Ecosystem Management*, Food and Agriculture Organization of the United Nations, http://www.fao.org/docrep/010/ai412e/AI412E06.htm; "A New Profession Takes Seed," in *If Trees Could Talk: A Curriculum in Environmental History*, Forest History Society, http://www.foresthistory.org/education/curriculum/Activity/activ5/essay.htm.

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