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## FOREST RESEARCHER

# Raphael Zon

by Norman J. Schmaltz

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**R**APHAEL ZON's arrival in the United States in 1897 was an auspicious event for the future of American forest research. Zon was born in Simbirsk, Russia, on December 1, 1874. He characterized his father, Gabriel, a piano tuner and repairer of musical instruments, and his mother, Eugenia, as "non-religious and liberal."<sup>1</sup> At Simbirsk, a commercial center on the Volga River, Zon studied at the classical gymnasium; the director of the secondary school was Alexander Kerensky's father. An older classmate was Lenin, described by Zon as "rather bashful." Later Zon went to the University of Kazan to pursue courses in the medical and natural sciences. He graduated with a bachelor's degree, specializing in comparative embryology.<sup>2</sup>

Zon's involvement in political activity as a student, particularly his agitation for representative government in Russia, led to his arrest for short periods. He was assigned briefly to the international zoological station at Naples, but he came under investigation both for his political views and for his activities in helping to form the first Russian trade union at Kazan in 1894. The investigation led to an eleven-year sentence of confinement at Archangel, but Zon escaped with the help of Alexis Aladin, a future leader in the Russian Duma. He made his way first to Tilsit, Germany, and then to Belgium where he studied briefly in Brussels and at the University of Liège. As an emigré in London, he found employment translating German philosophy works into Russian for the British Museum. He also frequented meetings of the Fabian Society. Zon's social and political philosophy was sharpened by his acquaintanceships with George Bernard Shaw, Beatrice and Sidney Webb, and his work with Tom Mann in labor union organization.<sup>3</sup>

In the late 1890s, Zon joined the flood of eastern Europeans seeking freedom and opportunity in the United States. After passage in the steerage of a steamer, he arrived in New York City with but fifteen cents and was almost refused entrance because he was neither a laborer nor did he have a trade. Fortunately a Democratic politico and saloonkeeper found temporary work for the young immigrant in a drugstore. In search of a career more appropriate to his training, Zon soon went to Ithaca, New York, to study at the newly established New York State College of Forestry at Cornell University. Under such leaders as Bernhard E. Fernow and Filibert Roth, Zon followed the school's learn-by-doing methodology, each student being assigned a project of surveying a forty-acre wooded lot, making a map of the plot, estimating the timber on it, calipering the trees, and calculating the real value of the stand.<sup>4</sup> He earned his keep by doing translations and odd jobs. As a member of the first graduating class, Zon won the degree of forest engineer in 1901. Fernow's high esteem for the bright student led him to recommend Zon to head the forestry department at Michigan Agricultural College (now Michigan State University), but the post was offered to someone else.<sup>5</sup>

Instead, Zon went to Washington, D. C., in 1901 and accepted the humble post of student assistant in the area of forest research for the U.S. Bureau of Forestry. He received the munificent salary of \$300 per year. He ambitiously sought to improve his knowledge of English grammar, and in 1903 he became a citizen. In the same year, Zon married Anna Puziriskaya, who also

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<sup>4</sup>See Zon's diary of his Cornell experiences, May 24, 1900, Box 1, ZP.

<sup>5</sup>Fernow to Zon, November 29, 1901, Box 2, ZP. The two men had a temporary falling out in 1905 concerning credit for translation of some forestry literature from a foreign language into English, but the friendship was repaired as they worked together on editing the profession's periodical literature. Fernow to Zon, February 1, 1905, February 27, 1907, October 8, 1908, and October 18, 1913; and Zon to Fernow, February 14, 1905, all Box 2, ZP.

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<sup>1</sup>Zon to Louis Adamic, August 2, 1939, Box 10, Raphael Zon Papers (hereinafter cited as ZP), Minnesota Historical Society, St. Paul.

<sup>2</sup>Clipping, undated, Box 14; and Zon to I. I. Rotschin, May 17, 1931, Box 7, both ZP.

<sup>3</sup>Clipping, undated, Box 14; and "Identification and Personnel Data for Employment of U. S. Citizens," Box 1, both ZP.

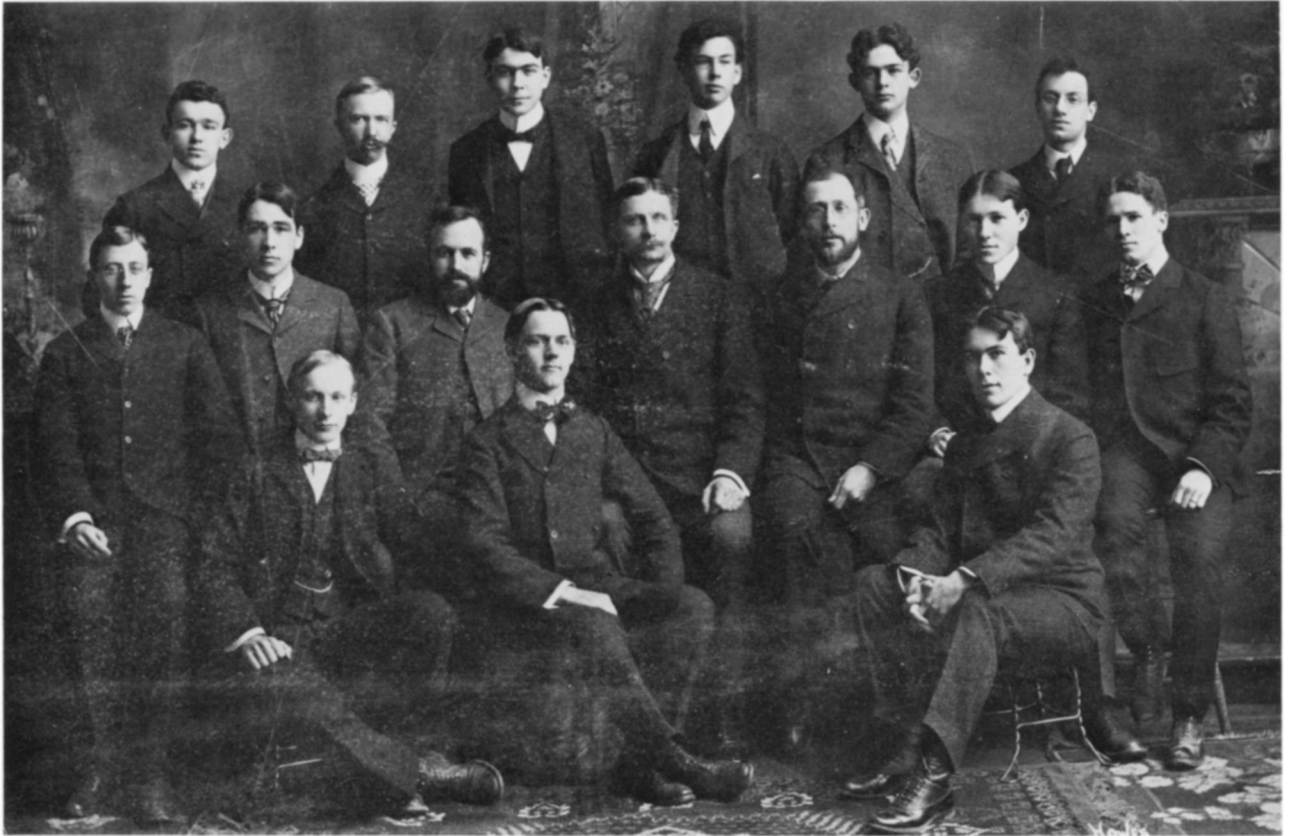


Raphael Zon as director of the Lake States Forest Experiment Station,  
ca. 1926.

University of Minnesota, courtesy of the author

Mr. Zon is my old and valued friend.... There is no  
higher authority in forestry in America.

Gifford Pinchot



Professors and students of the New York State College of Forestry at Cornell University posed for the photographer in 1900. At the center is Bernhard E. Fernow, dean of the forestry school; to the left of him, Prof. Filibert Roth; to the right, Prof. John C. Gifford. Students who attained some fame in the profession include Ralph C. Bryant ('00), to the right of Gifford; Walter Mulford ('01), second row, left end; Clifford R. Pettis ('01), second row, right end; and Raphael Zon ('01), third row, right end.

FHS Collection

had been involved in political movements at Kazan and sentenced to incarceration at Archangel. She too had escaped and, in fact, had preceded her future husband to America. Anna had graduated from the medical school in Kazan with the title of assistant surgeon.<sup>6</sup> One of Zon's colleagues remembered her as being both intelligent and friendly, sharing with her husband a keen interest in world events and ideas on a broad spectrum of subjects, which they frequently discussed with friends and co-workers over cups of her tasty spiced tea. In an early letter to Anna, Zon expressed his determination to "push myself by all means *forward*." He felt that his clerical duties did not "give work to the higher intellectual faculties."<sup>7</sup>

Zon's drive was stimulated by his close friendship with Gifford Pinchot, chief of the Bureau of Forestry, who later referred to his younger colleague as "my advisor and my guide." Pinchot recalled in his autobiography that Zon's little office on the sixth floor of the Atlantic Building became "the first cradle and treasure house of

forest research in America."<sup>8</sup> Zon was promoted to assistant forest expert in 1902 and to forest assistant in 1904. He also joined the Society of American Foresters in 1904. His mastery of English grammar by that time was such that he helped establish his profession's periodical literature. Beginning in 1905, Zon served on the editorial board of the *Forestry Quarterly* and also edited the *Proceedings* of the Society of American Foresters.<sup>9</sup>

At a time when Americans were developing awareness of the dangers of wasteful exploitation

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<sup>8</sup>The best evaluations of Pinchot's seminal influence on American forestry and conservation are to be found in Harold T. Pinkett, *Gifford Pinchot: Private and Public Forester* (Urbana: University of Illinois Press, 1970), and M. Nelson McGeary, *Gifford Pinchot: Forester-Politician* (Princeton, New Jersey: Princeton University Press, 1960). Another valuable source is Pinchot's autobiography, *Breaking New Ground* (New York: Harcourt, Brace and Company, 1947). See page 308 for quote.

<sup>9</sup>The two publications were merged in 1917 to become the *Journal of Forestry*, which Zon would serve as managing editor and as editor-in-chief. See Henry Clepper, "The Journal of Forestry: An Historical Summary of the First Fifty Years," *Journal of Forestry* 50 (December 1952): 899-903.

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<sup>6</sup>Certificate of graduation for Anna Puziriskaya, Box 1, ZP.

<sup>7</sup>Author's interview with Paul Rudolf, June 26, 1976; Zon to Anna, undated, Box 1, ZP.

of limited land and timber resources, Zon refused to give way to vague and maundering emotionalism, arguing instead that trained researchers should be assigned to identify and confront forest problems. What he called the "heroic phase of the conquest of the West" must now be replaced by the objective gathering of accurate facts upon which to base sound programs of management of the nation's forest resources. Zon initially thought that researchers should be attached to national forests. Forest supervisors sometimes resented the embarrassing professional questions asked by the upstart technicians that Zon sent to the field, but, he proudly asserted, "What these men lacked in wildness and wooliness . . . was more than made up for by their persistence and utter unreasonableness."<sup>10</sup> The Office of Silvics, of which Zon was made chief in 1907, was soon fielding requests for advice on the species of trees most suitable for given terrains, for recommendations concerning relevant literature on forestry, and for analyses of causes of specific tree diseases — to mention only some typical queries. In addition to visiting technicians in the field, Zon frequently served as guest lecturer on subjects relating to silviculture and forest research. Particularly notable were his lectures sponsored by the Biltmore Forest School, under the direction of Carl A. Schenck. Zon's visit to Germany, Austria, and France in the winter of 1908 provided him with an opportunity to visit leading centers of forest research and particularly to see firsthand how European forest experiment stations operated.<sup>11</sup>

Sometimes Zon agonized over what he called the "bit by tit" approach toward the application of silviculture to the anticipated problem of timber famine, but he also saw this piecemeal approach as being necessitated, at least in part, by the lack of scientists trained in conducting a more comprehensive approach. He wished for a national timber census to reduce the guesswork of long-range forest planning, but he was realistic enough to warn, "We must take up problems as they come to the front and get results which could best be put to use."<sup>12</sup> Skeptical of attempts to solve problems by creating an elaborate administrative hierarchy, Zon argued for separating all

## HERE WE SHALL PLANT THE TREE OF RESEARCH!

It was a sultry afternoon in August 1908. Raphael Zon, then chief of silvics in the Forest Service, had come to Flagstaff to select a location for what was to be the first forest experiment station in the United States. Zon, Willard Drake, and I were urging our phlegmatic livery stable cayuses over the road to Fort Valley to examine a site that had been recommended by Frank Pooler, supervisor of the Coconino National Forest. Two miles short of our destination a thunderstorm crashed down upon us in true Arizona style. The downpour was more violent than usual, so we took shelter in a large barn of the old A-1 Cattle Company. When we emerged an hour later, the normally dry Rio de Flag was running a hundred yards wide with a fluid whose color and consistency told plainly that the country was going to the dogs even in that early day. After crossing the "river," it was only half a mile to the area we had come to see — a beautiful stand of ponderosa pine. "Here," said Zon, "we shall plant the tree of research!"

G. A. Pearson, first director of the  
Fort Valley Experiment Station

research work from administration in the Forest Service.<sup>13</sup> This independence was finally achieved in 1915 with establishment of a separate Branch of Research.

### Field Research Established

Zon's persuasive and persistent advocacy of research led directly to establishment of the first national forest experiment station in 1908 and the inception two years later of the Forest Products Laboratory. He set forth in his memo to Gifford Pinchot ("Plan for Creating Forest Experiment Stations") a proposal that was first implemented with establishment in August 1908 of an experiment station at Fort Valley, Arizona, on the Coconino National Forest. Zon not only formulated the scientific rationale for the program but helped locate the site ("Here we shall plant the tree of research!"), shingle the roof, and build

<sup>10</sup>Zon, "The Search for Forest Facts," *American Forests and Forest Life* 36 (July 1930): 421-22.

<sup>11</sup>Zon to Austin Cary, February 7, 1908, Container 3, Correspondence of the Office of Silvics, Series 107, Records of the U. S. Forest Service, Record Group 95 (hereinafter cited as RG 95), National Archives, Washington, D.C.; Zon to Carl A. Schenck, January 8, 1923, Box 4; and Schenck to Dr. Jentsch, September 22, 1908, Box 2, both ZP; Zon to Hugh P. Baker, June 1, 1909; and Zon to Fernow, October 10, 1908, both Container 16, Series 107, RG 95.

<sup>12</sup>Zon to Samuel T. Dana, June 9, 1908; Zon to Frederick E. Clements, April 25, 1908, and May 12, 1908, all Box 12, Series 107, RG 95.

<sup>13</sup>Zon, "Plan for the Development of Silvical Investigations in the Bureau of Forestry," and "Memo for Pinchot," December 13, 1906, Drawer 371, Research Compilation File, Series 115, RG 95. See also his "Plan for the Organization of All Research Work in the Forest Service," January 21, 1911, Drawer 362, Series 115, RG 95.



Fort Valley Experiment Station, Arizona, 1912.

U. S. Forest Service photo, FHS Collection

the road in from the main route to the station. Stations in Colorado, Idaho, Washington, California, and Utah soon followed. Technicians at the centers began carrying on both short-term and longer-range experiments, and they maintained model forests typical of the region in which they were located. Stations came to be accepted as having the same relationship to the science and practice of forestry as agricultural experiment stations had to the science and practice of agriculture. The results of the experiments performed at the stations furnished object lessons for professional foresters, lumbermen, owners of forest land, and, of course, administrators of the national forests. The program began to bear such fruits as marketing rules for selling national forest timber on the stump, the development of more economical methods of slash disposal, the discovery of ways to increase yield in reforestation projects, the formulation of sound working plans for national forests, and studies of the relation of forests to climate and streamflow. From Zon's pilot program came the impetus for the McSweeney-McNary Act of 1928, which authorized a comprehensive program of forest research, including regional forest and range experiment stations and, later, development of subregional research centers.<sup>14</sup>

The Forest Products Laboratory was dedicated in 1910 at Madison, Wisconsin. Earlier Bureau of Forestry efforts at conducting research on such matters as wood properties and chemistry, wood preservation, naval stores product improvement, and kiln drying had been carried on in cooperation with Yale, Purdue, and the universities of Washington, California, and Oregon, as well as at a small experimental pulp mill in Boston.

<sup>14</sup>Zon, "The Search for Forest Facts," pp. 421-23, 482; Elwood L. Demmon, "Present and Prospective Forest Research in the United States" [presented at the Mid-Century Conference on Resources for the Future, Washington, D.C., December 3, 1953], Box 14, ZP; "Forest Studies," February 27, 1913, Container 364, Series 115, RG 95.

These sporadic activities pointed to the need for more elaborate and centralized facilities. Several factors converged fortuitously to yield the desired goal. Zon continually advocated the need for high quality research on all phases of forestry, from seedling planting to more effective forest product development. McGarvey Cline, chief of the Forest Service's Office of Wood Utilization, suggested that a federal laboratory be conducted in cooperation with a major university. In 1909 the University of Wisconsin's offer to make its facilities available was accepted, leading immediately to construction of the lab. Forest products research at the laboratory expanded greatly in subsequent years, complementing the forest research of the regional experiment stations.<sup>15</sup>

By 1911 headquarters and field staff members of Zon's Office of Silvics were actively carrying on research in forest management, forest influences, and mensuration. Examples of specific investigations were studies of seed extraction, direct seeding, nursery work, field planting, tree breeding, methods of cutting and brush disposal, effects of grazing upon natural reproduction, effects of forest cover on streamflow, threats to forest cover by insects and fungi, and effects of altitude, precipitation, and soil upon seed growth. Field libraries were kept supplied with books and articles. By 1912 some 179 projects were under way, and Zon was named chairman of the agency's Central Investigative Committee, assigned the task of evaluating achievements and problems in synthesizing national forest administration and research programs.<sup>16</sup>

When Chief Forester Henry Graves evidently took note of Zon's sometimes acerbic relations with administrative officers by proposing to replace him as chief of the Office of Silvics with Samuel T. Dana (then assistant chief), Zon wrote a stinging letter of protest. He characterized the proposed move as "ungenerous, uncondusive toward building up a high moral esprit de corps, and unproductive of sincere devotion to work and highest efficiency." Zon asked that he be judged by his record of success.

I fought for certain ideals in this work at a time when they were unpopular and ridiculed; I have

<sup>15</sup>U. S. Forest Service, Branch of Research, *The Forest Products Laboratory: A Decennial Record, 1910-1920* (Washington, 1921), pp. 9-10, 16, 21-22, 37-59; F. J. Champion, "The U. S. Forest Products Laboratory," *Forest Products Journal* 4 (June 1954): 153-57; U. S. Forest Service, Forest Products Laboratory, *50 Years of Service through Wood Research*, USFS Miscellaneous Publication No. 820 (Washington, 1960), no pagination. For a scholarly view, see Charles A. Nelson, *History of the U. S. Forest Products Laboratory (1910-1963)* (Madison: Forest Products Laboratory, 1971).

<sup>16</sup>Zon, "Forest Investigations" [1912], and "Organization and Administration" [1912], Container 7, Series 115, RG 95.



undergone humiliations for the sake of bringing these ideals into being. During the past few years I have had the moral satisfaction of seeing my ideas of scientific organization in the Service gradually materialize and grow into its present form. Men trained in the Office of Silvics have gone out to take charge of the experiment stations in the West and are now building the scientific foundation upon which the future practice of American forestry is to rest.<sup>17</sup>

Zon was mollified to some extent in 1914 by his appointment as chief of the Office of Forest Investigations, but he rankled at the appointment in 1915 of Earle H. Clapp as his superior in the newly created Branch of Research.

### Achievements and Issues

As chief of the Office of Forest Investigations from 1914 to 1920, Zon established routines for adopting yearly research programs and for reviewing progress of individual investigations. Results of the investigations were shared in departmental bulletins, monographs, shorter articles in technical or trade journals, and in regional status progress reports. Zon and an associate also worked out a simplified and practical scheme for classifying forest growth. Respect for Zon among his peers led to his appointment in 1915 as a member of the American Association for the Advancement of Science and his election in 1918 as a fellow of the Society of American Foresters. During World War I, President Woodrow Wilson appointed him to serve on the National Research Council to study forest problems relating to the war effort. Zon's concern for returning soldiers led him to join with the National Reclamation Association in urging a program to grant veterans credit to buy farmable land, with the produce grown to be handled by a cooperative marketing arrangement. He also proposed public works programs in natural resources protection and development, including government-administered pulp and paper mills on some national forests.<sup>18</sup>

By the end of the war, Americans were becoming more aware of the need for a comprehensive national forest policy. Opinion was sharply divided on the essential features, especially the issue of public regulation of timber cutting. Zon himself helped identify the problems when he participated in writing the Capper Report (formally titled *Timber Depletion, Lumber Exports, and*

*Concentration of Timber Ownership*), prepared by the Forest Service and submitted in 1920 to the United States Senate. He also served on the Committee on Forests of the National Conservation Association, an organization headed by Pinchot, which favored wider federal regulation of timber cutting. Although Zon raised some searching questions about "conservation reform" zealots, he was more concerned about the power of industry to thwart the social goals of forestry. He saw organizations like the American Forestry Association losing their idealism and commitment and coming increasingly under the influence of business and timber interests. He even suggested packing the AFA convention with professional foresters. As managing editor of the *Journal of Forestry* (since its inception in 1917), Zon worried that his outspoken publication would become the next target for the lumber industry. Foresters could work with lumber associations, Zon conceded with tongue in cheek, "provided we do not give up fundamental things like Article X and the Monroe Doctrine." Although somewhat suspicious of the interest in forestry being manifested by engineering societies, he felt that their weight could be used favorably, because "the more they agitate the question of forestry the better it will be in the long run, especially if we can more or less guide it into rational channels."<sup>19</sup> The issues "agitating" forestry during these years were partly resolved with passage of the Clarke-McNary Act of 1924, which stressed federal-state cooperation in many matters, but the regulation issue persisted into later decades.

In late 1920 Zon took a special assignment in forest economics and began work with William N. Sparhawk on the magisterial *Forest Resources of the World*.<sup>20</sup> A labor of love, this book was completed in 1923 and quickly became a widely consulted reference work, reinforcing Zon's stature among forestry scholars. Whenever given the opportunity, he continued to argue forcefully for the collection of forest statistics to provide a scientifically based forest conservation policy. Such a policy must assume that research and technical forestry are essential to proper management. "Research can supply technical facts, but unless the entire administrative personnel charged with the management of the forests is interested in and

<sup>17</sup>Zon to Graves, April 1913, Box 2, ZP.

<sup>18</sup>Zon, "Forest Research in the United States Department of Agriculture," Food and Agriculture Organization of the United Nations, *Preliminary Report* (1951); Zon, "A New Classification of the Native Vegetation of the United States into Natural Groups," December 13, 1916, Container 46, Series 115, RG 95; Zon, "Program of Work in Connection with the Returning Soldier," May 29, 1918, Box 2, ZP.

<sup>19</sup>James W. Toumey to Zon, June 7, 1920; Zon to F. E. Olmsted, June 24, 1919; Zon to Earle H. Clapp, November 14, 1919; Zon to R. C. Bryant, January 27, 1920, all Box 3, ZP; Zon to Dana, July 11, 1922, Box 4, ZP. Zon's concerns regarding the AFA were shared by Professor Herman H. Chapman of Yale University; see his three-part article, "Has the American Forestry Association Lost Its Former Usefulness?" *Journal of Forestry* 19 (March 1921): 285-90; (April 1921): 327-53; and (May 1921): 449-65.

<sup>20</sup>Zon and Sparhawk, *Forest Resources of the World*, 2 Volumes (New York: McGraw-Hill, 1923).

undertakes the application of these facts, Research is helpless."<sup>21</sup>

In 1923 Bernhard Fernow stepped down as editor-in-chief of the respected *Journal of Forestry*, and Zon, who had been managing editor for six years, succeeded one of the great pioneers in American forestry. For the next five years, he would uphold the high standards of his predecessor. In his editorials Zon addressed both immediate and perpetual forestry problems. He warned, for example, that urban sportsmen's groups were gobbling up large acreages of tax-reverted, cut-over land in the Lake States; he argued that some of the attractive forest areas should be acquired for public ownership and for future timber and recreation values. On the subject of forest research, Zon urged foresters to boldly take the lead; they might cooperate with other scientific groups, but there was need for "building a science peculiarly characteristic of forestry alone." Scientific research, however, must be "tempered with common sense." Zon was wary of academic "formula-hunting" as an end in itself; he urged researchers to bear in mind the need for solutions to "immediate, practical problems" encountered every day in the woods. He also recommended that the training of foresters include more work in economics. The "ills besetting our lumber and forest industries," he observed, are largely economic — overproduction, marketing, financing, investments in raw materials, exports and imports, and relationships with other industries — and foresters must be equipped to make "sound economic judgments." Zon also praised the self-help mood of the lumber industry in promoting itself out of the doldrums with aggressive trade extension campaigns, but, always suspicious, he warned the industry to be truthful and to show genuine concern for perpetuation of the forest. Industry must regain public confidence by proving that "as a trustee of the largest, finest, and best part of the forest wealth of the country, it is not going to abuse the trust but handle it with care, knowledge, and skill."<sup>22</sup>

In his valedictory editorial, Zon took a retrospective view of his profession and saw that it had passed through the scientific-academic stage, epitomized by the leadership of Fernow, and the stage of forest evangelism, led by Pinchot. The

present stage he saw as one of "big forest economic problems," a stage marked by greater cooperation between the lumber industry and the forest conservation movement. Henry Graves and William B. Greeley were "leaders of forest thought" in that stage. Zon forecast that the next stage would focus on the study and solution of technical forest problems as a way of supporting industries and timber owners to work out solutions to their economic problems.<sup>23</sup> When he retired as editor, Zon was lauded for having maintained "the highest standard compatible with the profession of which [the *Journal of Forestry*] has been the exponent and mouthpiece." "There is no other man," wrote an appreciative member of the Society of American Foresters, "who has done more to develop forestry literature in the United States than yourself, and you have done so against all sorts of obstacles, including apathy on the part of many members of the Society."<sup>24</sup>

### Lakes States Forest Experiment Station

In 1923, the year that Zon became editor-in-chief, he left the national capital to direct the new Lake States Forest Experiment Station. Zon accepted Chief Greeley's offer on the condition that he would have the option after three years to decide whether he would like to return to Washington. He welcomed the opportunity to break out of the rut of being a "paper forester" — to engage in active fieldwork and deal with lumbermen, land companies, and other organizations from which he had been relatively isolated. He intended to be "as wise as a serpent and as harmless as a dove" but was determined to disappoint those who saw the station as a mechanism for palming off on the government for a handsome price land that was a burden to them.<sup>25</sup>

Zon's first task was to determine where the headquarters of the station would be located. He settled on the University of Minnesota Farm in St. Paul because of the facilities for cooperation with the university's Forestry Department. To his research expertise would have to be added the development of skills as "a practical politician who must face realities, beg, threaten, be humble, impudent, address Kiwanis, Rotary, and Lions Clubs and infinite numbers of Women's Clubs." He immediately gained three fellowships for forest research from the University of Minnesota and was given the title of full professor at that institution. Zon was also instrumental in gaining

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<sup>21</sup>Zon, "The Need of an Organization for the Collection of Forest Statistics" [ca. 1923], Box 4; and draft of a talk to a Forest Service group, November 24, 1920, Box 3, both ZP.

<sup>22</sup>See the following editorials by Zon in the *Journal of Forestry*: "Conservation Cashes In," 24 (March 1926): 223-25; "Who Will Lead Forest Research?" 24 (May 1926): 461-62; "Formulas and Common Sense," 25 (January 1927): 1-2; "The Lumber Industry Takes the Cure," 25 (November 1927): 777-79; "Are Foresters Biologists or Economists?" 26 (March 1928): 281-82.

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<sup>23</sup>Zon, "The Passing of the Old Time Forester," *Journal of Forestry* 26 (May 1928): 561-63.

<sup>24</sup>W. W. Ashe to Zon, March 23, 1928; and Harris A. Reynolds to Zon, April 26, 1928, both Box 5, ZP.

<sup>25</sup>Zon to Dana, May 7, 1923, and May 31, 1923; Zon to Henry C. Cowles, May 11, 1923; Zon to Schenck, July 17, 1923, all Box 4, ZP.



Original headquarters of the Lake States Forest Experiment Station at the University of Minnesota Farm in St. Paul.

U. S. Forest Service photo, courtesy of the author and the North Central Forest Experiment Station

financial support from Rudolph Weyerhaeuser for the cause of forestry education.<sup>26</sup> He later was placed in charge of forest research projects at the University of Wisconsin, where he was named a nonresident professor of forestry.

An experiment station director had to wear several hats, Zon discovered upon assuming office. He was expected to organize, supervise, and coordinate scientific research in Michigan, Wisconsin, and Minnesota for the fields of silvics and silviculture, forest products, and forest economics, as well as meshing such research with that carried on by other bureaus and agencies dealing with problems of forest entomology, forest pathology, and forest biology. It was his responsibility to conceive, plan, and conduct the most difficult and demanding research. In addition he was to interpret the significance and applicability of research to the conservation of forest land resources; to cooperate with the appropriate legislative and private agencies of the region in outlining workable principles of forestry; and to act as consulting expert to federal, state, and other agencies requiring advice on forest policies or problems. Last but not least, he was to select, inspire, and train competent and responsible scientific and technical personnel, always promoting the public interest.<sup>27</sup>

<sup>26</sup>Zon to Roth, June 14, 1923, Box 4; Zon to Benton MacKaye, May 26, 1925; Zon to Charles L. Pack, March 22, 1927, both Box 5, ZP.

<sup>27</sup>U. S. Forest Service, "Classification of Field Service: Tentative Class Descriptions of Positions Peculiar to the Activities of the Branch of Research" [1929], pp. 46-49; Zon to Lyle Watts, February 26, 1936, both Box 8, ZP.

By the time of Zon's retirement twenty-one years later, the station would have responsibility for supervising activities at the following branch stations: Chippewa at Cass Lake, Minnesota; the Superior at Ely, Minnesota (and Kawishiwi Experimental Forest); the Upper Peninsula near Dukes, Michigan; the Huron Planting Station on Michigan's Lower Peninsula; the Forest Fire Research Station near Roscommon, Michigan; the Pike Bay and Cutfoot experiment forests on the Chippewa National Forest in Minnesota; the Denbigh in North Dakota; and the Soil Erosion Station at LaCrosse, Wisconsin. The field study area under the purview of the Lake States Station comprised 57 million acres of national, state, and county forest land, in addition to private and tax-delinquent land.<sup>28</sup>

Zon arrived at St. Paul with his own ideas for experimental work that should be undertaken immediately. An advisory committee consisting of representatives of forest industries and state agencies concerned with regional forest problems further clarified areas of needed investigation.<sup>29</sup> Although an ardent supporter of forest research,

<sup>28</sup>Unpublished manuscript by Zon, "Forest Research Points the Way," Box 10, ZP.

<sup>29</sup>Zon, "Lake States Forest Experiment Station and Its Field: An Impromptu Address before the Chicago Conference of the American Paper and Pulp Association," *Lumber World Review* 45 (November 10, 1923): 61-63; Zon, "Practical Results from the Forest Experiment Station," *National Lumber Manufacturers Association, Report 23* (1925): 6-7; Zon, "Advisory Committee to the Lake States Forest Experiment Station," *Science* 59 (May 2, 1924): 393.



Zon never advocated "science for science's sake," considering such a slogan an alibi for incompetence. Research must be geared to practical problems in the field. His method of administration was direct, demanding, but reasonable. The remarkable record of publication by Zon's staff was in part attributable to his trick of keeping researchers in the office each spring until they had written up findings of the previous season's work. He preferred dictating ideas to colleagues rather than to secretaries so as to get their initial critical reactions. The esprit de corps among members of his staff was ranked highly by Paul Rudolf, a former associate who also appreciated Zon's accessibility, his penetrating mind, and his high standards.<sup>30</sup>

The annual reports of the Lake States Forest Experiment Station illustrate the extraordinary breadth of research undertaken during the Zon years. Protection of forests from natural and human enemies, particularly fire, was a continuing subject of investigation. Fire statistics were gathered, weather conditions most conducive to the outbreak of fires were studied, fire damage was charted and analyzed, and studies were made for improving firefighting techniques, such as the use of chemicals, the construction of firebreaks, and improvement of equipment.

Forest economics was a second category of study. Timber supply and production information required improved methods of mensuration. Forest taxation and insurance were also scrutinized for their relations to sustained-yield production. Land-use surveys were undertaken, sometimes on a scattered and local level and sometimes in cooperation with regional and national projects.<sup>31</sup> The station staff had the benefit of Michigan's experience with its Land Economic Survey of the 1920s and early 1930s, a study that identified agriculture, forestry, and recreation as the three desirable elements of cutover land use. Zon had serious misgivings, however, about encouraging recreational development of forested lands. He

<sup>30</sup>Zon to Arthur N. Pack, November 13, 1933, Box 7, ZP; Earle H. Clapp, "Zon," *American Forests* 62 (December 1956): 6; author's interview with Paul Rudolf, June 26, 1976.

<sup>31</sup>The *Economic Notes* (numbers 1-11) of the Lake States Station highlight its contributions to the Forest Survey in the period from 1935 to 1939. See especially "Introduction to Reports of the Forest Survey of the Lake States," #4 (May 1936); "Forest Areas and Timber Volumes in Michigan," #5 (June 1936); "Volume Tables Used in Connection with the Forest Survey," #8 (July 1937); "Methods of Predicting Growth and Forest Stands in the Forest Survey of the Lake States," #9 (April 1938); "Forest Areas and Timber Volumes in the Lake States," #10 (March 1939); and "Timber Supplies, Growth, and Depletion in the Three Lake States," #11 (August 1939).



Zon (left) in the field with Parker O. Anderson of the Minnesota Forest Service, 1924.

U. S. Forest Service photo, FHS Collection

feared that if the recreation movement were left to overenthusiastic private interests, the end result would be overdevelopment, just as there had previously been agricultural overdevelopment and massive tax revision on formerly forested lands. "Recreation," he warned, "must not be separated from forestry, and the best recreational possibilities can be built only on a background of green forests."<sup>32</sup>

Some of the topics of research undertaken by station staff relative to silviculture and forest management were swamp forest growth, management of northern hardwoods, methods of cutting Norway, white, and jack pine, conversion of inferior stands, thinning of second-growth Norway and jack pines, and damage to young tree growth by logging. Reforestation and tree growth were scrutinized by means of studies in the typology of soils and forests, growth patterns and yields in second-growth Norway and white pine, possibilities of scrub oak lands, and experiments in developing drought-resistant planting stock. Special war projects carried on in the early 1940s focused

<sup>32</sup>Lake States Forest Experiment Station, *Report* (1930), p. 8. See also Norman J. Schmaltz, "Michigan's Land Economic Survey," *Agricultural History* 52 (April 1978): 229-46, and Schmaltz, "P. S. Lovejoy: Michigan's Cantankerous Conservationist," *Journal of Forest History* 19 (April 1975): 72-81.

on reviving older uses of forest products and exploring new sources of raw materials, stimulating timber production by encouraging cooperation between timber owners and lumber users, and saving manpower in methods of scaling and cruising timber.<sup>33</sup>

In his dual role of "forester-statesman" and "statesman-forester," Zon urged the appropriate Lake States agencies and leaders to establish conservation departments, to support them financially, and to staff them with competent persons. In so doing he frequently acted as a counselor and sometimes as an adversary to governors, legislators, lumbermen, small woodlands owners, and other private individuals who had a stake of some sort in the development of the region's natural resources. When he surveyed the situation in Michigan upon assuming the directorship, he perceived that the atmosphere was "surcharged with politics." Zon sent three men into the field to "open up things" in that state. They gained the support of state development bureaus for experiment station activities, emphasizing the industrial possibilities of aspen and jack pine as a spur to Michigan's economy. When the station developed an experimental forest on the Upper Peninsula, the Cleveland-Cliffs Iron Company donated land and the Michigan Conservation Department contributed \$2,500 for an office and laboratory. Located at Dukes, near Marquette, the experimental forest became a mecca to which foresters and lumbermen from all over the country came to see demonstrations of effective methods of selective logging. In Wisconsin, Zon helped prepare a land-use report and advised Governor Philip La Follette regarding reorganization of his state's Conservation Department.<sup>34</sup>

Zon was equally active in the cause of conservation in Minnesota, where, among other things, he challenged the power of the state auditor regarding timber sales. Zon's influence was indispensable in the establishment of the Minnesota Conservation Commission in 1931, but he had

misgivings about the political factors involved in the governor's appointments to the commission. He especially clashed with the new director of conservation, a man Zon considered to be a glorified fish and game warden. The new official's main concern seemed to be "whether ring-necked pheasants lay fifteen or sixteen eggs a year." Zon complained that the conservation director consulted him only when he needed a shock absorber. Zon frequently supplied ideas to Governor Floyd B. Olson for speeches dealing with conservation, and he was instrumental in the organization of a unified land-use and conservation program for the state.<sup>35</sup>

One of Zon's primary objectives was to coordinate federal, state, and academic institutions and agencies in achieving a fourfold land-use policy. The elements included maintaining a sufficient and permanent supply of forest products, protecting watersheds needed for regulation of streamflow, preserving forests for aesthetic enjoyment, and guarding recreational values. He was especially proud of such station projects as a 1929 study of the relationship between swamp forests and drainage, carried on cooperatively by the station, the Minnesota Department of Forestry and Fire Protection, the University of Minnesota's Division of Agricultural Engineering, and the U. S. Bureau of Public Roads.<sup>36</sup>

### Forest Influences

Two of the most significant projects in which Zon's station was involved were those testing relationships between forests and streamflow and

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<sup>33</sup>"How the Forest Experiment Station Helps the War Effort," Lake States Station, *Technical Note*, #200 (August 1943); M. B. Dickerman, "The Co-operative Association as a Wartime Aid to the Small Producer of Forest Products," Lake States Station, *Economic Note*, #18 (July 1942).

<sup>34</sup>Gifford Pinchot, "We Present: Raphael Zon," *Journal of Forestry* 43 (December 1945): 927-28; Zon to Filibert Roth, June 14, 1923; and Zon to E. H. Frothingham, October 18, 1923; both Box 4; Zon to George E. Bishop, July 10, 1928, and Zon to Charles L. Pack, February 18, 1926, both Box 5; Zon to O. T. Swan, January 5, 1928, and Zon to Philip La Follette, July 22, 1932, both Box 7, all ZP; *Mississippi Valley Lumberman*, August 4, 1944, p. 12. See also Norman J. Schmaltz, "Cutover Land Crusade: The Michigan Forest Conservation Movement, 1899-1931," Ph.D. dissertation, University of Michigan, 1972, pp. 198-234.

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<sup>35</sup>Zon to Ovid M. Butler, August 10, 1928, Box 5; Zon to A. D. Stedman, July 29, 1931; Zon to Charles L. Pack, August 27, 1931; Zon to P. S. Stahlnecker, July 28, 1932; and Zon to Clapp, July 28, 1932, all Box 7, ZP; author's interview with Paul Rudolf, June 26, 1976; Zon, "Planned Land Use," *Minnesota Conservationist*, No. 4 (September 1933), p. 1; memo, Zon to Olson, "Organization and Development of State Forests," September 16, 1933, Box 7, ZP. A particularly revealing example of Zon's splenetic style may be seen in an eight-page letter to Herman H. Chapman, dean of the Yale School of Forestry, defending himself against charges of meddling and backbiting in working for the removal of Horace Cox as director of the Minnesota Conservation Commission. "[You are]," Zon told Chapman, "temperamentally not fitted to be the arbiter and judge of human actions because you bring to the task inherent prejudice, personal animus, and a megalomaniac complex, and lack two essential traits, human understanding and charity." Zon to Chapman, December 26, 1932, Box 7, ZP.

<sup>36</sup>James L. Averell and Paul C. McGrew, "The Reaction of Swamp Forests to Drainage in Northern Minnesota," February 1929, Box 7, ZP; Zon, "National Economic and Social Objectives in Forest Policy," National Council of Land Utilization, *Proceedings*, November 19-21, 1951, p. 78.

the planting of shelterbelts on the Great Plains. In both projects Zon's closest colleague in the research and technique involved was Carlos G. Bates.<sup>37</sup> Bates came to St. Paul in 1928 after long service in the Rocky Mountain District, especially as director of the Fremont Experiment Station (1909-1927), and a brief stint at the Forest Products Laboratory. He had supervised for sixteen years the first controlled experiment in the forest-streamflow relationship at Wagon Wheel Gap on the Rio Grande National Forest in Colorado. Bates, who had been a candidate for the appointment Zon received in 1923, would stay on at the Lake States Station for twenty-one years until his death in 1949. Zon, an independent-minded researcher himself, respected similar qualities in Bates and allowed him to maintain a highly unpredictable work schedule.<sup>38</sup>

The question of whether or not forests were a major factor in flood control caused heated controversy in the early conservation movement, particularly arousing bitter debate between foresters and engineers.<sup>39</sup> Zon had been in the thick of this debate and had written a landmark report on the subject in 1912, stating, "There is perhaps no other problem facing the American people today which demands such care in the scientific accuracy of its data and conclusions as does the relation between forests and water." He argued that any forest policy that slighted the problem threatened the well-being of the people. Zon's study



Carlos G. Bates

FHS Collection

examined the influence of forests on streamflow from two perspectives: (1) actual measurement of total discharge and high and low stages of rivers having essential similarity regarding precipitation, geological formation, topography, and soil, but differing in amount of forest cover, and (2) determining the total amount of water available for streamflow. Using the second method, Zon concluded that forests cannot prevent floods produced by exceptional meteorological conditions, but they can nevertheless help lessen the severity and destructiveness of floods while, at the same time, providing such benefits as moderating air temperature, providing shade for the ground, and contributing to the process of converting into precipitation "continental vapor" blowing inland.<sup>40</sup> Gifford Pinchot called Zon's *Forests and Water in the Light of Scientific Investigation*, which was initially published as an appendix to the report of the National Waterways Commission, "the most comprehensive and authoritative statement" on the subject. It was sub-

<sup>37</sup>Richard S. Sartz, "Carlos G. Bates: Maverick Forest Service Scientist," *Journal of Forest History* 21 (January 1977): 31-39, explores Bates's career and his relationship with Zon. A briefer review is Jacob Roeser, Jr., "We Present: Carlos Glazier Bates, Pioneer Silviculturist, 1885-1949," *Journal of Forestry* 54 (April 1956): 272-73.

<sup>38</sup>See Bates and A. G. Henry, "Streamflow Experiment at Wagon Wheel Gap, Colorado: Preliminary Report on Termination of First Stage of the Experiment," *U. S. Monthly Weather Review*, Supplement 17 (1922), pp. 1-55; and Bates and Henry, "Streamflow Experiment at Wagon Wheel Gap, Colorado: Final Report and Completion of the Second Phase of the Experiment," *ibid.*, Supplement 30 (1928), pp. 1-79.

<sup>39</sup>Two useful general treatments are Gordon B. Dodds, "The Streamflow Controversy: A Conservation Turning Point," *Journal of American History* 56 (June 1969): 57-69; and Ashley Schiff, *Fire and Water: Scientific Heresy in the Forest Service* (Cambridge: Harvard University Press, 1962). See also Mrs. George S. Rafter, "Stream Flow in Relation to Forests," and Dan W. Baird, "Effect of Forest Denudation on Water Courses and Water Supply," *American Forestry Association, Proceedings* 12 (December 1, 1897): 139-65, and 165-70; W. G. Hoyt and H. C. Troxell, "Forests and Streamflow," *American Society of Civil Engineers, Proceedings* 58 (August 1932): 1037-66; and Bates's rejoinder in "Forests and Streamflow: Discussion," *ibid.* (September 1932): 1288-93.

<sup>40</sup>Zon, *Forests and Water in the Light of Scientific Investigation* (Washington: GPO, 1927), contains a thirty-six page bibliography. This report was originally published in Appendix V of the *Final Report of the National Waterways Commission*, Senate Doc. No. 469, 62d Cong., 2d Sess. (1912). Other writings by Zon on the subject include "Relation of Forests in the Atlantic Plain to the Humidity of the Central States and Prairie Region," *Science* 38 (July 18, 1913): 63-75, and "Do Forests Prevent Floods?" *American Forests and Forest Life* 33 (July 1927): 387-92, 432.

sequently reprinted and translated into several foreign languages.<sup>41</sup>

Given their mutual interests in forest influences, it was not surprising that Zon and Bates turned in the late 1920s to regional problems of soil and water. Bates was given supervision over studies of soil erosion in southwestern Wisconsin and southeastern Minnesota. Tests were carried out to determine the effect of terracing on surface runoff and soil erosion. The watershed protection values of different land uses — pastured and un-pastured woodlands and cleared pastures — were measured. The goal was to learn more about the role of forests in preventing floods and erosion in the upper Mississippi Valley's unglaciated region, the so-called Driftless Area. Bates's early soil and water research led to establishment of a branch station at La Crosse, Wisconsin.<sup>42</sup> Other studies on the effects of forests were made in the Upper Peninsula of Michigan. These investigations showed that a northern hardwood forest lowered by several degrees the temperatures of both air and soil inside the forest and that the relative humidity of the air was significantly higher than it was outside. These factors slowed down the loss of moisture through evaporation. One technical note and five articles in the *Lake States Forest Research Digest* summarized some of the findings of these investigations.<sup>43</sup>

Zon and the Lake States Station were involved in one of the most controversial federal forestry efforts of the 1930s — the Prairie States Forestry Project, better known as the Shelterbelt Project.<sup>44</sup>

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<sup>41</sup>Pinchot, *Breaking New Ground*, p. 332.

<sup>42</sup>Zon, "Can Floods Be Controlled?" unpublished manuscript, Box 8; Zon, "Forests in Relation to Soil and Water," paper prepared for the American Philosphical Association, August 15, 1944, Box 12, both ZP; Sartz, "Carlos G. Bates," p. 38; Bates, "Soil Erosion in the Mississippi Valley," *Journal of Forestry* 31 (January 1933): 88-96. Much related literature is cited in Sartz, *Thirty Years of Soil and Water Research by the Forest Service in Wisconsin's Driftless Area: A History and Annotated Bibliography*, U. S. Forest Service, General Technical Report NC-44 (St. Paul: North Central Forest Experiment Station, 1978).

<sup>43</sup>"Interception of Rainfall by the Forest," *Technical Note* (August 1929); "Interception of Rainfall by the Forest Canopy," *Lake States Forest Research Digest* (February 1935), p. 2; "Forests and Circulation of Water," *ibid.* (April 1935), p. 2; "Seventeenth Century Italians Understood Forest-Streamflow Relations," *ibid.* (May 1935), p. 1; "Effects of Cover on Run-Off," *ibid.* (September 1935), pp. 6-7; and "What Are Forests Worth for Flood Control?" *ibid.* (Spring 1937), pp. 14-16.

<sup>44</sup>The Shelterbelt Project is fully treated in Wilmon H. Droze, *Trees, Prairies, and People: Tree Planting in the Plains States* (Denton: Texas Woman's University, 1977), which appeared after research for this article was completed.

It culminated a movement whose beginnings might be traced back into the nineteenth century. The commissioner of the General Land Office urged in his report of 1866 that immediate steps should be taken to plant trees on the Great Plains in order to protect the soil. The Timber Culture Act of 1873 offered 160 acres to homesteaders who planted a designated percentage of land to trees. Shortly after the turn of the century, the Nebraska National Forest was established on the Sandhills, and in 1913 Congress permitted the new Bureau of Plant Industry, at its field station at Mandan, North Dakota, to grow, distribute, and make studies of trees suitable to the region. The Clarke-McNary Act of 1924 called for federal-state cooperation in establishing and renewing shelterbelts, windbreaks, and farm woodlots on denuded or unforested land. In addition, various plains states had sponsored forest development work before the 1930s.<sup>45</sup>

Zon, whose station would be assigned chief responsibility for developing the technical elements for the program, had been involved with Carlos Bates in the study of windbreaks as early as 1908 under the auspices of the Office of Silvics. Moreover, he could cite examples of tree planting on the Russian steppes to mitigate conditions of dryness and windiness. In 1929 he had pushed to focus the forest research program for the northern prairies and plains region almost exclusively on developing successful forest planting as an aid to agriculture, specifically through windbreaks. Under the impetus of the damaging dust storms, which were exacerbated by farming of land unsuited to agriculture and the overgrazing of cattle and sheep on even poorer lands, Congress in 1934 appropriated \$528 million for relief of drought-stricken prairies and plains. A portion of this was to be used for planting shelterbelts over approximately 1.28 million acres within a hundred-mile zone along the 99th meridian from Texas to Canada. Zon drafted a plan for Great Plains drought relief in June 1934; he saw the Shelterbelt Project as "the biggest technical job the Forest Service has yet undertaken."<sup>46</sup>

It was clear to Zon that only on the basis of unemotional scientific study and patient experi-

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<sup>45</sup>U. S. Forest Service, Lake States Forest Experiment Station, *Possibilities of Shelterbelt Planting in the Plains Region* (Washington, 1935), pp. 51-57.

<sup>46</sup>Bates to Zon, September 17, 1908, Box 11; Zon to Clapp, April 21, 1930, Box 6; Zon, "Tree Planting in the Prairies of the U.S.A.," unpublished manuscript, June 11, 1945, pp. 1-6, Box 12; and Zon to R. B. Goodman, July 24, 1943, Box 8, all ZP. A copy of Zon's report, "A Plan for Immediate Drought Relief and for the Permanent Benefit and Protection of the Great Plains Belt through Extensive Wind-break Planting" (June 6, 1934), may be found in Box 8, ZP. Bates and others on the staff helped draft the report.

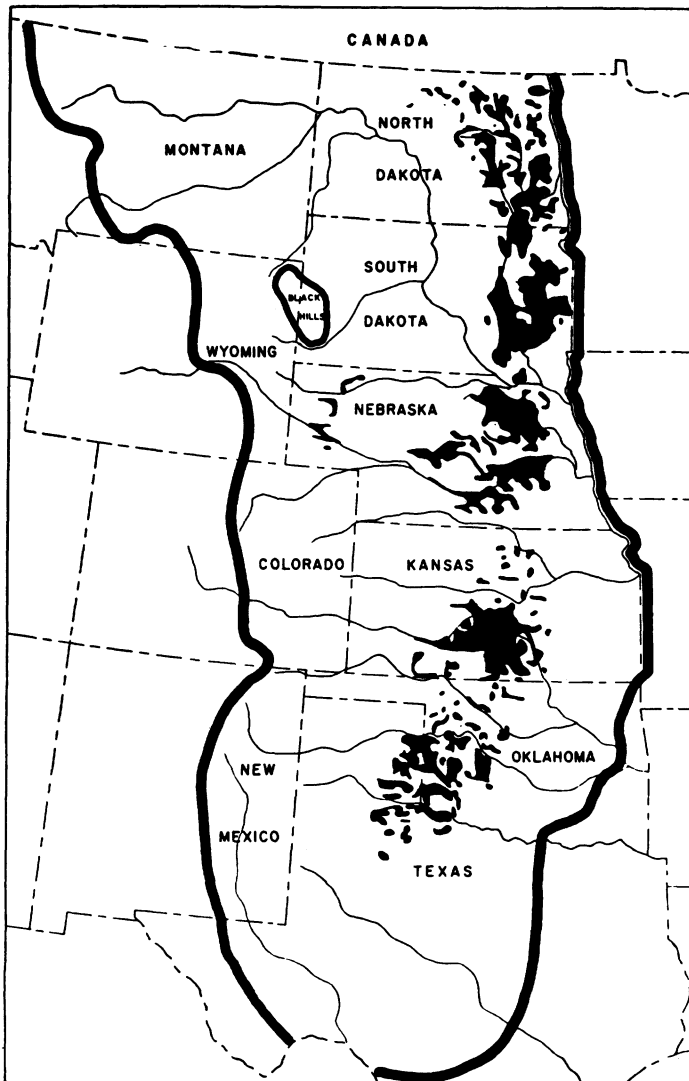
mentation could the project take an effective middle course, rejecting outrageous and miraculous expectations from one side while disarming the carping critics who were so ready to "shoot from the hip." The main purpose of planting shelterbelts was to protect farmsteads from hot summer winds and cold winter blizzards. Such planting was not a panacea but would have optimum effectiveness only when "superimposed on an already existing agricultural economy," with each shelterbelt planting adapted to soil conditions and oriented to prevailing wind patterns.<sup>47</sup>

Zon, Bates, and other members of the station staff produced a study titled *Possibilities of Shelterbelt Planting in the Plains Region*, which took the position that even without irrigation tree planting was feasible over much of the plains area. Carefully nurtured shelterbelt planting was most advisable, however, if done in the form of strips around fields, farmsteads, and schoolhouses in a zone that received between sixteen and twenty-two inches of precipitation annually. Within this zone it was estimated that only about 5 percent of the area was unfit for planting. Trees having the best prospects for success were green ash, hackberry, cottonwood, American elm, tamarisk, Russian olive, caragana, honey locust, Osage orange, eastern redcedar, and Rocky Mountain juniper. The tallest trees should be placed in the center of the belt and low shrubs toward the outer edges so that when mature the tree belt would direct the prevailing winds upward, retarding velocity as well as soil movement. The land on which the shelterbelts were to be located could be purchased outright, obtained through perpetual easements, leased, or used under cooperative agreements with private owners. The report, though controversial, helped to win some congressional support and popular approval for the shelterbelt idea.<sup>48</sup>

Station staff members, especially Bates, labored to carry out and report on a variety of research efforts relating to the Shelterbelt Project. There were studies of the effects of artificial barriers, built to simulate windbreaks, on the retardation of wind velocity, evaporation, moisture content of the soil, accumulation and distribution of snow, and effects on crop yields. Zon termed these investigations "the most exhaustive study undertaken anywhere, so far as I know, on the physics

<sup>47</sup>Zon, "Shelterbelts — Futile Dream or Workable Plan?" *Science* 81 (April 26, 1935): 392; Droze, "The New Deal's Shelterbelt Project, 1934-1942," in Harold M. Hollingsworth and William F. Holms, eds., *Essays on the New Deal*, Walter Prescott Webb Memorial Lectures, Volume 2 (Austin: University of Texas Press, 1969), pp. 33-34.

<sup>48</sup>*Possibilities of Shelterbelt Planting in the Plains Region*, pp. 54-56; Zon, "The Plains Shelterbelt Project," *Minnesota Conservationist*, No. 18 (November 1934), pp. 4-5, 17.



Major areas of shelterbelt planting in the Great Plains region, 1935-1942.

Ralph A. Read, *The Great Plains Shelterbelt in 1954* (1958), p. 11

of wind movement interrupted by living or artificial barriers." In addition, studies were made of various tree-planting methods in order to come to grips with the problem of planting trees in a zone extending over sixteen degrees of latitude and a variety of soil types. Laboratory investigations examined tree seed and shrub durability. Aided by this fundamental research, the shelterbelts were converted from dream to reality. In 1935 and 1936, 23.7 million trees were planted on 57,000 acres, with an average survival rate for the trees of 81.2 percent. By 1938 there were 34.5 million trees on almost 107,000 acres along the 99th meridian. A reexamination of the shelterbelts in 1954 showed that more than 220 million trees



had been planted, with a survival rate of 70 to 80 percent.<sup>49</sup>

But 1935 probably marked the zenith of Forest Service hopes for a comprehensive forestry program on the Great Plains. Considerations more political than scientific began to dominate the project as a result of continuing skepticism about its effectiveness, attacks on its costliness, and jealousy as to the location of the shelterbelts. Pressures in Congress led to several major shifts in funding and supervision of the project; eventually, in 1942, the project was transferred to the Soil Conservation Service as part of a larger program of conserving prairie soils from the effects of wind and water erosion.

An unidentified admirer wrote a poem that dealt with Zon's scrap with Royal Kellogg. Kellogg led the opposition to the Shelterbelt Project within the Society of American Foresters and had also written a critical letter that was published in the *New York Times*.

**Kellogg lives in New York City,  
Far away from drought and wind.  
Broadway dandies never fancy  
Any need for shelter belts.**

**When he hears about the project  
He sits down and writes the TIMES  
In a letter: "I know better.  
They don't need a shelter belt."**

**"Planted trees will die on prairie,  
Eighteen inches not enough.  
Suffocation, radiation  
Kill the trees in shelter belt."**

**"Zon should move to New York City,  
Live with me on old Broadway  
Here it's cozy, here it's rozy  
And forget his shelter belt."**

**What will happen in the future,  
Zon and Kellogg only know.  
Will they conquer or debunker?  
I predict a shelter belt!**

**Chorus:  
Thousand miles of living fences,  
Pinus, Ulmus, Fraxinus,  
Ponderosa, Resinosa,  
Soon will grow in shelter belt.**

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<sup>49</sup>Sartz, "Carlos G. Bates," p. 38; Zon to W. R. Ronald, February 25, 1936, Box 8; U. S. Forest Service, Division of Private Forestry, "Forestry and Duststorms in the Great Plains Region" [ca. 1936], p. 3, Box 8; and clipping from the *St. Paul Sunday Press*, October 16, 1938, Box 10, all ZP; "Shelterbelt Planting," *Lake States Forest Research Digest* (November 1935), pp. 10-12; Droze, "The New Deal's Shelterbelt Project," pp. 46-47; and Ralph A. Read, *The Great Plains Shelterbelt in 1954*, Great Plains Agricultural Council Publication No. 16 and Experiment Station Bulletin No. 441 (Lincoln: Experiment Station of the University of Nebraska College of Agriculture, 1958), pp. 8-10, 116-25.

Although an official of the Agricultural Adjustment Administration was effusive in 1938 when he credited Raphael Zon for the successes of the Shelterbelt Project, the station director could take justified pride in its tangible results: a respectable survival rate for trees in soils judged by some as clearly unsuitable for silviculture; some increase in wild game and songbirds in the area due to protection, nesting sites, and food furnished by the belts; service as snow traps by belts paralleling highways on their windward side; and reduction of wind erosion, especially on sandy soils in the southern Great Plains. As for the effect of shelterbelts on the yield of crops grown under their protection, Zon felt that judgment must be suspended until the plantings were more mature and the observations extended over a larger number of crops under controlled conditions.<sup>50</sup> Judgments in later years were indeed favorable, as the beneficial influences of shelterbelts became more widely appreciated.

### **Zon and the National Forestry Scene**

Even though he left the Washington scene of Forest Service activity when he assumed the directorship of the Lake States Station, Zon remained in the forefront of the national forestry movement. His role and influence as editor-in-chief of the *Journal of Forestry*, official organ of the profession, have been noted. Zon, moreover, was a prolific writer. He was the author or co-author of approximately 200 articles in professional journals, business and development publications, and popular magazines such as *American Forests*. His technical publications were considered to be authoritative, and much of his influence stemmed from his ability to synthesize and effectively communicate the research findings of his colleagues. Zon wrote the article, "Forests and Forestry," for the *Encyclopedia Britannica*, the section on forests in the *Encyclopedia of Social Sciences*, and edited the definitions of forestry and logging terms in *Webster's New International Dictionary*. His influence was worldwide, thanks in part to *Forest Resources of the World*, but also because of his proficiency in Russian, Spanish, German, and French and the extensive translation of his work into these and other languages. He maintained correspondence with fellow scientists throughout the world and served such organizations as the International Congress of Soil Science. At the World's Fair in 1940, he was named one of 600 foreign-born citizens who had made notable contributions to American democ-

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<sup>50</sup>Droze, "The New Deal's Shelterbelt Project," pp. 38-45; undated poem by S. H., "The True Story about the Great Shelter Belt," Box 8; Alfred D. Stedman to Zon, September 8, 1938, Box 9; and Zon, "Tree Planting on the Prairies of the U.S.A.," Box 12, all ZP.

racy in the twentieth century.<sup>51</sup>

Zon was never shy about fighting for forestry principles he felt were intellectually correct as well as morally imperative. Nor was he reluctant to defend new ideas that ran counter to conventional wisdom and the status quo. He wrote in 1932:

**New ideas must go through a struggle before they are accepted both by the public and by foresters. This is the only way in which progress can be made. . . . The success of the U. S. Forest Service is based on the encouragement of free expression of new ideas. If forestry is to make progress in**

<sup>51</sup>Clapp, "Zon," pp. 6, 44, 46; Zon to I. I. Rotschin, May 27, 1931, Box 7, ZP.

### Ask Zon

Ask Zon, Zon, Zon, Zon, Zon,  
Ask Zon!  
Ask him by the telephone,  
Ask with laughter or with moan,  
But for heaven's sake  
Ask Zon!

What a pattern of lucidity that sesame drives  
home!

Ask Zon!  
Do you want to know the scientific title of  
a tree?  
Or is it parlor forestry as done in District Three?  
Or is it Bolshevikiki, or the crops at Saloniki,  
Or the natives of Tahiti who are honing to be  
free?  
Ask Zon!

(Refrain)  
Ask Zon, Ask Zon,  
Ask him by the telephone,  
Yell or whisper, type or scribble,  
But for heaven's sake,  
Ask Zon!  
If he doesn't know the answer take it to the Lord  
in prayer;  
But before you pass the buck and ere you give  
it up in despair,  
Ask Zon!

.....  
(Refrain)  
Ask Zon, Ask Zon,  
Don't neglect to put in writing  
What you get him to reciting,  
It may save pain or fighting;  
But for heaven's sake,  
Ask Zon!  
If he doesn't know the answer, no one does;  
you're safe,  
My boy;  
But to save yourself a sorrow and your enemies  
A joy,  
Ask Zon!

Author unknown, ca. 1919  
From files of Paul O. Rudolf

**the States, the same principle should be recognized even if it calls forth resentment from those who do not want or cannot keep pace with new developments.**

It was the responsibility of his profession, Zon insisted, to speak in behalf of more aggressive policies on both public and private lands and not to compromise in the face of pressures from political and private interest groups.<sup>52</sup> In his editorial work, as elsewhere, Zon believed the truth would emerge from the clash of divergent opinions.

Always dear to his heart was the cause of maintaining high standards for forest researchers and freedom from administrative harassment. In 1931, writing to Earle Clapp, head of the Branch of Research, Zon dealt with the perennial problem of the "they" and "we" spirit of researchers and administrators. Noting that the supposed aloofness of research people caused ill feelings among personnel in other branches, Zon suggested that ordinarily no junior forester should be allowed to enter the Research Branch until gaining administrative experience on national forests. On the other hand, he believed that Forest Service administrative personnel had failed to grow in awareness of new techniques and ideas. He objected specifically to the chief's appointment of two men who were not research oriented to evaluate the work of the Branch of Research. The Washington headquarters, Zon thought, needed to show greater interest in the research of fieldworkers and to coordinate the work of the regional forest experiment stations. He amplified these views to Chief Ferdinand A. Silcox, reminding him that coordination did not mean dictation. Technical accomplishments of research staff members should be placed on a par with those in fire protection and other administrative activities — all in the interest of serving the forest needs of the entire nation.<sup>53</sup>

Zon was "critically supportive" of New Deal conservation initiatives. In the summer of 1932, he counseled a "wait and see" attitude rather than

<sup>52</sup>Zon to Herman H. Chapman, December 26, 1932; and Zon to G. P. Ahern, February 4, 1932, both Box 7, ZP. For an example of an aggressive stance, see "A Letter to Foresters," *Journal of Forestry* 28 (April 1930): 456-58, which was signed by George P. Ahern, Robert Marshall, E. N. Munns, Gifford Pinchot, Ward Shepard, W. N. Sparhawk, and Zon.

<sup>53</sup>Zon to Clapp, July 12, 1929, Box 6; Zon to F. A. Silcox, January 12, 1934, and February 29, 1936, Box 8, all ZP; Zon to G. H. Collingwood, December 3, 1928, Container 356, Series 115, RG 95. See also Zon's "What Is Research?" undated, in the same container. In 1943 Zon urged the creation of a central Forest Research Institute, similar to the Forest Products Laboratory, with field outlets to be located throughout the country. Zon Diary, September 2, 1943, Diaries, 1906-1944, Series 147, RG 95.



Acting Chief Earle H. Clapp, 1941.

dismiss out of hand presidential candidate Franklin D. Roosevelt's call for linking reforestation and soil conservation with reduction of unemployment. It was even feasible, Zon suggested to Silcox, that the experiment stations could alleviate the "white collar" unemployment problem by opening up positions for botanists, physiologists, and economists. Once the New Deal was launched, some branches of the Lake States Station were used as training grounds for Civilian Conservation Corps foremen assigned to forest work. Zon also worked with other New Deal agencies; he wrote, for example, a detailed set of criticisms of the Tennessee Valley Authority's plan for forest conservation work.<sup>54</sup>

The perennial argument over whether the Forest Service should be kept under the Department of Agriculture or transferred to the Department of the Interior naturally was a concern of Zon's, as it was for all foresters and others interested in natural resources. By 1940, when the "threat of reorganization" had subsided, Zon conceded privately that he favored combining the resource agencies into a Bureau of Conservation, which would include soil conservation and flood control. In 1943 Zon noted with some misgivings that Acting Chief Earle Clapp, under whom he had worked for several decades, was replaced by a full-fledged chief, Lyle Watts, formerly regional forester in the Pacific Northwest. Zon suspected that Watts was appointed because "he can get along with lumbermen," but he tempered his criticism with the observation that Clapp's effectiveness had been reduced by playing the role of martyr for forest reform, notably through his vocal opposition to reorganization and his persistent advocacy of public regulation.<sup>55</sup>

World War II brought new issues and priorities. Zon thought it was time to mute the perennial demands for legislative action in the areas of research and public regulation. The most serious problems, he felt, could be dealt with by executive action under wartime powers. On the level of his experiment station, there were new projects implemented in support of the war effort. One of

the most interesting of these, if not necessarily fruitful, was the raising of a Russian dandelion, *koksaghyz*, as a possible rubber substitute.

As the end of the war approached, Zon once again became concerned with social programs for returning veterans. In 1944 he suggested careful planning rather than jumping prematurely into crash programs of settling veterans on unclaimed or abandoned land. Lands used for agricultural purposes, he wrote, should be government owned, machinery use and marketing should be on a co-operative basis, and the income of residents should be supplemented by part-time work in the woods, in mills, or other nearby industries. Where forested lands were concerned, there would be useful opportunities for work in protecting, growing, and harvesting timber crops, as well as in recreation and in industries using waterpower developed from forested watersheds.<sup>56</sup>

Shortly after his retirement from the Forest Service in 1944, Zon drew together a compendium of "Points for Discussion" for a conference with the chief and his staff. Included were his suggestions that the research organization of the Forest Service be simplified so that a national program could be developed and implemented, rather than continuing autonomous regional or local research initiatives. The regional experiment stations should be allowed to concentrate on research, and their directors should be given regular and direct access to the chief and to the head of Forest Research Divisions. A central organ should be developed for publishing and disseminating Forest Service research and technical findings. Research staff should be trained in writing reports cogently, provision should be made for authoritative and speedy review of manuscripts, and allotments for technical publications should be increased.<sup>57</sup>

Always an ardent advocate of forest research, Zon saw it as the key element in achieving the ultimate goal — managing the nation's forests in the best interests of all the people. In assessing Zon's distinguished forty-three-year career in the Forest Service, Gifford Pinchot stressed this overarching link between research and larger goals: "The fundamental fact about [Zon's] work is that to him scientific forestry was never an end in itself, but always a means to the great end of human welfare."<sup>58</sup> □

*Editor's Note:* Part 2 of this article will appear in the next issue. It will focus on Zon's land-use credo and his political and social philosophy.

<sup>54</sup>Zon to Arthur N. Pack, July 16, 1932; and Zon to Edward Richards, August 25, 1933, both Box 7; Zon to F. A. Silcox, May 20, 1935, Box 8, all ZP.

<sup>55</sup>Zon to E. N. Munns, January 12, 1940, Box 10; Zon to George Marshall, January 22, 1943, Box 12, both ZP.

<sup>56</sup>Zon to H. L. Shirley, March 25, 1942; and Zon to Gardner Jackson, November 17, 1942, both Box 11, ZP; Zon, "Toward Fuller Use of All Land," *Land Policy Review* 7 (Fall 1944): 17-20.

<sup>57</sup>Zon, Points for Discussion at Conference with the Chief and His Staff," September 4, 1944, Box 12, ZP.

<sup>58</sup>Pinchot, "We Present: Raphael Zon," p. 928.