Cautious Support: Relations Between The Mining Industry and The Forest Service, 1891-1991

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The histories of mining and forestry in the United States are intertwined to a surprising extent. Mining was a latecomer among the nation's industries, but its time of greatest growth and technical advance was contemporaneous with that of the development of modern forest management and conservation. Mining and forestry professionals jointly supported the movement to preserve and manage the nation's forests, and major mining firms were cautious supporters of the national forest system from its beginning.

Local iron mining and manufacturing was underway in all thirteen states of the U.S. when George Washington became president, but large scale copper, gold, and coal mining began only in the middle of the nineteenth century. Modern mining traces its beginning to the California gold rush. Mining historian T.A. Rickard states that:

> The discovery of gold in California by Marshall in 1848 was the most portentous event in the history of modern mining because it gave an immediate stimulus to worldwide migration, it induced an enormous expansion of international trade, and it caused scientific industry to invade the waste places of the earth.[1]

The wealth of California was enormous, and the works undertaken to win the gold were out of proportion to any mining ever undertaken before in the United States. A gigantic system of dams and flumes was built to supply water to dozens of large hydraulic mines. The lode mines were also major undertakings even by today's standards. The Empire Mine at Grass Valley was discovered in 1850 and produced for 105 years, ultimately becoming one of the deepest mines in the world, developed to an inclined depth of 11,007 feet.[2]

Mining in California created a great demand for technically trained people. Much of this demand was filled by immigrants from Europe, and later by American graduates who had received additional training at the great mining academies of Europe.[3] Geologists, mining engineers, and metallurgists soon moved on from California, ready to repeat their mineral successes in other parts of the United States.[4] Much of the history of mining in the public lands states can be traced to people who employed "California methods."

Prospectors and small miners operated all over the West with varied success. Individuals made important discoveries and were sometimes rewarded handsomely for their efforts when they sold to larger firms.[5] Corporations, employing modern methods and trained technical people, grew into mining giants as they exploited major gold, silver, lead, and copper deposits at places like Butte, Lead, Virginia City, Leadville, and Globe.[6] Further east, great copper mines were developed in Michigan, and a major new industry was developed to mine the colossal iron deposits found in Minnesota.

Western miners operated under their own land laws for many years,[7] and the basic mining statutes of the United States, enacted in 1866 and modified in 1872, adopted many of the principles of mining district laws. Under the federal system, miners are free to search for minerals on public lands, and their reward for discovery is ownership. Mining rights are held by the performance of annual labor, and title thus secured and maintained is good against the world. This arrangement has encouraged mine development, and miners have fought tenaciously over the years to keep these laws unchanged.

From earliest times, the mining industry has been a major consumer of forest products. Timber is used for mine support, buildings, railroad ties, and fuel. The waterworks created for California placer mines consumed incredible amounts of lumber. Charcoal was the major fuel source for iron making well into the late nineteenth century. Miners have always been concerned about timber supplies. Likewise, they are interested in the management of rivers and watersheds, particularly to protect water supplies for ore processing and hydropower. As with the mining law, miners have become active politically whenever timber supplies have been threatened.

During the second half of the nineteenth century, mining, like other interests, developed organizations for the sharing of technical information and engaging in political action. The American Institute of Mining Engineers (AIME; now the American Institute of Mining, Metallurgical and Petroleum Engineers) was founded in 1871 to secure a wider dissemination of professional knowledge. The

American Mining Congress (AMC) was founded in 1897. Its purpose was largely political. The Mining and Metallurgical Society of America was formed to provide for support of professional and cultural interests of mining people. In addition, a vigorous, independent mining press was established.[8]

Leading mining professionals became members of technical and trade organizations, and such organizations held conferences and published technical papers much as they do today. Meeting reports and the mining press reflect the many interests of the mining industry and mining professionals over the years. Among these has been a continuing interest and support for modern forest management practices and conservation of timberland and watersheds.

Rossiter W. Raymond was among the earliest of mining professionals to comment on forest issues. A graduate of Brooklyn Polytechnic Institute and of the Mining Academy at Freiberg, Germany, Raymond was, for several years, United States commissioner of mineral statistics. He travelled throughout the mining regions of the West in the late 1860s and early 1870s, preparing extensive reports of his observations on all aspects of mining. In 1870 he used his report to call attention to the "wanton destruction of timber in the mining regions . . . of the West," and asked "what shall be the remedy."[9] He suggested sale of timber to settlers and a free market solution to the problem. In later years, Raymond was active as an editor of both the *Transactions* of AIME and of the *Engineering and Mining Journal* (E&MJ), a leading mining industry publication. As we will see below, his interest in conservation is reflected time and again in the pages of these publications.

Other mining professionals also expressed concern about timber supply, management of forest resources, the need for technical research on forest products, watershed protection, and even the effect of timber clearing on climate.

AIME met in Utah and Montana in 1887. The meeting opened in Salt Lake City on July 6, 1887. After three sessions in Salt Lake the meeting moved to Butte City, Montana, where 4th and 5th sessions were held. They then moved to Mammoth Hot Springs, Wyoming, where a special meeting of the institute was held on July 17. There Arnold Hague of the U.S.G.S., geologist in charge of Yellowstone National Park and a member of AIME, presented a paper describing Yellowstone Park. Thereafter, institute members undertook a five day tour of the park. Hague made a special point of discussing watershed management issues with the visiting miners, saying that:

> Of the present Park area about 84 percent is forest clad, almost wholly made up of coniferous trees. The timber is by no means of

> the finest quality, but for purposes of water protection it meets every possible requirement. Much has been said of late years by scientific and experienced persons of the great necessity of preserving the forests near the sources of our great rivers. It is mainly for the forest protection that the proposed enlargement is demanded by the public welfare. In my opinion no region in the Rocky Mountains is so admirably adapted for a forest reservation as the Yellowstone National Park.[10]

Hague would later become a member of the Forest Reserve Commission, the group appointed by the National Academy of Sciences in 1896. He would work with Gifford Pinchot, William Brewer, Alexander Agassiz, and Wolcott Gibbs to produce the report that was the basis for President Cleveland's Washington's birthday withdrawal in 1897. Miners were particularly incensed by the loss of timber supplies to speculators who grabbed timber holdings by fraudulent use of the mining and other public land laws.

The close contact between miners and foresters is reflected in the mining press and the *Transactions* of AIME, and is fully described in *Bernhard Eduard Fernow: A Study of North American Forestry*, the biography of Bernhard Fernow, the German-trained forest engineer who would become the third chief forester of the Department of Agriculture, and some might say the father of the National Forest System.[11] Fernow devoted part of his career to mining and was actively associated with the American Institute of Mining Engineers for most of his working life. He became a life associate of the institute in 1878. Several of the prominent members of the institute were interested in forestry. Rossiter Raymond was the institute's president from 1872 to 1875. Abram Hewitt, an iron manufacturer and partner of Peter Cooper, founder of the Cooper Union, was president from 1876 to 1890, and John Birkinbine, editor of the *Journal of the United States Association of Charcoal Iron Workers*, was president from 1891-1893. Fernow quickly came to the notice of these men and gained their support. Fernow's biographer said that "in the course of Fernow's entire career he had no closer friend than Raymond," that "Fernow undoubtedly won the complete confidence and admiration of Raymond and Hewitt," and that "both aided Fernow's later appointment as Chief Forester of the Forestry Division in the United States Department of Agriculture and as a director of America's first professional forestry school, the New York State College of Forestry at Cornell University." Birkinbine, an engineer, was for many years president of the Pennsylvania Forestry Association and editor of its official publication, *Forest Leaves*.[12] He too was closely associated with Fernow, particularly as a student of charcoal making practices.

Raymond helped Fernow develop a practice as a consulting forest engineer. Rodgers comments that "it is interesting to realize that in part, out of the mining industry originated in America the practice of the consulting forest engineer." He also observed that:

> Perhaps the first professional utterances made formally to urge conserving the nation's natural resources were expressed in the appointment at the first session of the [American] Institute [of Mining Engineers], held at Wilkes Barre, Pennsylvania, in 1871, of a committee of eminent mining engineers "to consider and report on waste in coal mining. . . ."[13]

Fernow delivered a paper at the Philadelphia meeting of AIME in 1878. He raised the issue of forest preservation in general, but focussed specifically on wasteful consumption of wood in the United States, particularly in the charcoal industry. Charcoal, used in smelting iron, consumed fifty thousand acres of woodland annually. Fernow's good friend Rossiter Raymond arose during the discussion period to compliment the author for taking a new and wise direction in proposing an economy (in charcoal making) which tends to preserve forests, and then went on to say that:

> Mr. Fernow deserves special credit, because he did not propose legislative interference and the introduction of restrictive laws, a subject of which he is particularly qualified to speak, and recommendation which might have been expected from him as a late member of the Prussian Forest Department.[14]

Despite their friendship, Fernow felt obliged to reply, saying that he:

> [W]ould like to explain briefly his views in regard to government superintendence in the matter of forestry, which had been alluded to by Dr. Raymond. Although not an advocate of the enactment of laws for which no basis has been laid, he was by no means opposed to the idea of government interference in regard to the preservation of forests. On the contrary he was convinced that it was the highest duty of the government to establish the basis for such legislation. He was convinced also that the time for action had arrived, and that it is dangerous to wait until the financial aspect of the matter had made itself conspicuous; he held that the climatological influence of the woodlands, the existence of which is now undoubtedly established, was a much stronger reason for governmental interference than any commercial question whatever.[15]

Raymond, who advocated free market approaches rather than government supervision to secure forest preservation, may not have wholly concurred in Fernow's prescriptions. However, he backed both Fernow and his successor Gifford Pinchot consistently over the next thirty years, sparing no effort to foster the preservation of forests and creation of an effective agency of government to administer forest lands. He kept up a constant commentary on forestry matters in the pages of the *Engineering and Mining Journal* calling for the creation of "an efficient department of forestry" at the federal level. His support of both Fernow and the cause of forestry continued after Fernow became chief of the Forestry Division in the Department of Agriculture. Raymond also helped Fernow keep the support of miners by explaining that forest reservations and forest legislation had no negative impact on mining rights. A grateful Fernow dedicated his book, *A Brief History of Forestry*,[16] to Raymond.

Fernow, as chief of the Forestry Division, spoke again before a meeting of AIME in 1888. This time, addressing directly the issue of the mining industry in its relation to forestry, he invited western miners to support increased appropriations for forest management and more scientific management of private forests.[17]

Gifford Pinchot succeeded Bernhard Fernow in 1898, becoming the fourth chief of the Division of Forestry. Like Fernow, Pinchot maintained close relations with leaders of the mining industry, and he enjoyed the continued support of Rossiter Raymond in the pages of the *Engineering and Mining Journal*. Raymond wrote in 1901 that:

> We have heretofore referred to the importance of a proper consideration of the forest resources of the United States; and to the fact that this is of even more importance to the mining industry than to many others. The work for this purpose is hardly yet begun and its necessity is appreciated by comparatively few people. The Forestry Division of the Department of Agriculture, under both its late and present heads, is doing much to educate the public up to a proper understanding of the work, and has really done so much for a very modest appropriation, that it has set a bright example to other Government bureaus which might be mentioned. We hope for the success of this work and trust that it will receive the encouragement which it deserves.

Pinchot spoke at a meeting of AIME in February 1898, and one of his assistants appeared before a meeting of the AMC in 1905.[18]

Pinchot, in his autobiography, *Breaking New Ground*, describes some large mining enterprises such as Homestake and Anaconda as "principalities", and gives examples of their use of political power to gain access to timber. But he also sympathizes with the problems Homestake encountered when it tried to work out timber purchases with General Land Office bureaucrats and gives that company credit for supporting the Black Hills Forest Reserve and for agreeing to buy from the government the timber they needed for their mines in Sale No. 1.[19] Pinchot worked directly to gain the support of mine operators like Thomas J. Grier, superintendent of the Homestake Mine. While Pinchot makes it clear that Homestake looked after its own interests, he acknowledges that they supported both the Pettigrew Amendment to the Sundry Civil Bill in 1897 and the Transfer Act in 1905.[20]

Although the record of mining industry support for modern forestry and for forest conservation leaders Fernow and Pinchot is clear, the politics of public land availability intruded on the relationship, threatening it in the extreme. Pinchot believed that Congress and the president created chaos in the West when they first withdrew forest reserves in 1891. Miners joined other westerners in opposing what they saw as a lock up of public lands in the forest reserves. As Pinchot states in *Breaking New Ground*, the 1891 Act authorizing Forest Reserves "slipped through Congress without question and without debate." It was "the beginning and basis of our whole National Forest System," but it "did not provide for the practices of Forestry on the Forest Reserves . . . did not set up a form of administration . . . [and] merely set the land aside and withdrew [land] . . . from every form of use by people of the West or by the Government."[21]

Although legislation was passed to restore some lands to mineral entry, the problem was still extant when President Cleveland announced the creation of additional reserves on Washington's birthday in 1897. Pinchot was highly critical of the way in which these new reserves were handled, and confessed to understanding why the people of the West were so upset when they were created. Pinchot was politically embarrassed by the situation and had to work mightily to bring groups like the miners back into support of forestry.

Following a political firestorm of western protest, and a presidential pocket veto of a bill nullifying the reserves, the Pettigrew amendment to the Sundry Civil Bill was passed and the battle over the reserves was ended. In Pinchot's view, that amendment "is the most important Federal Forest legislation ever enacted. It did two essential things: it opened the Forest reserves to use, and it cleared the road to sound administration, including the practice of Forestry."[22]

Pinchot was quick to get the message out to the miners and much of his talk at the AIME meeting in 1898 was directed toward assuring miners that the forest reserves were not withdrawn from mining. Subsequently Pinchot received the support of Homestake and the American Mining Congress for the Transfer Act in 1905.[23]

Leaders of the mining industry were also embarrassed by the unnecessary withdrawal of the forest reserves from the operation of the mining law. Their support for the reserves became cautious until the Pettigrew amendment removed their concern about access to public lands. There is much evidence that the mining giants acted aggressively in securing their timber supply, and it is not unfair to say they acted largely out of self-interest, but they did support Pinchot when he needed help with the Transfer Act.

With the forest reserves finally safe from attack, Pinchot turned his attention to their management. Although Pinchot states in *Breaking New Ground* that his administration "preferred the small man to the big man" and stepped "on the toes of the biggest interests in the West," he and his people soon won the respect of the mining community. His strong support for wise use of all of the resources of the forest reserves, including minerals, and his practical approach to regulation, including transfer of executive power to the field, went over well with miners. Miners took comfort in the language of the Forest Service *Use Book* of 1907 that "it is the policy of the Government to favor the development of mines . . . and every facility is afforded for that purpose. . . ."[24]

Pinchot was particularly skillful in maintaining good relations with the mining industry. When miners began to complain in 1908 about "an excessive price to miners for timber" and "officious" conduct and "red tape" in forest reserves (called national forests sine 1907), Pinchot invited the members of the Committee on Investigation of the National Forest Service of the American Mining Congress to confer with him and other Forest Service officials in Washington. That invitation was taken up and productive meetings were held in Washington and Denver over the next two years.[25] Ravenel Macbeth, secretary of the Idaho Mining Association, had this to say with regard to forestry relations in 1917:

> We have found, in our relations with the Forest Reserve officials, that the personal equation enters, to a large extent, into the matter. We have found in some sections prospectors have been encouraged in their work, whereas, in other sections these officials have failed to give such encouragement—in fact, have so strictly interpreted the provisions of the regulations, that prospecting has been hampered. We would state, however, that since the organization of this Association

> in 1913 a much better condition has existed and that constant improvement is being noted by the mining men.
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> Formerly, in the matter of an examination to secure patent, officials who had no knowledge of the geological conditions existing in the section in which the property was located were appointed to make examinations and frequently, as a result of ignorance, reported adversely, but owing to vigorous representations made to the Department by this Association, such examinations are now made by competent mineral inspectors.
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> At present we have taken up with the Department the matter of withdrawing certain sections in small areas, over which sheep are now permitted to graze, for the use of prospectors who have found it impossible to prospect in certain sections of the State owing to the sheep having caned up the country and not leaving any feed for their stock.[26]

Following a renewed build-up of complaints by miners in the mid-1920s, E. A. Sherman, associate forester of the Forest Service, spoke before a combined meeting of AMC, AIME, and the American Silver Producers Association at Denver in 1926, addressing the issues involved directly, saying that:

> Our officers are instructed to aid and cooperate with the industry in every practical way and to establish cordial relations with the prospectors and miners in their districts. That this policy has been followed in the overwhelming majority of cases is a known fact. That there may have been exceptions to the rule in a few cases is not to be wondered at when we consider the vast territory served and the fact that perfect men are not available for hire by the government say more than by the mine owner. However, a man who fails to cultivate a friendly, helpful, cooperative spirit in his relations with those who are endeavoring to develop the mineral wealth of our mountains has no place in the Forest Service. In seeing that this policy of cooperation is carried out we have welcomed, and will continue to welcome helpful, constructive criticism from the miners and prospectors and from your associations.
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> The American Mining Congress several years ago through a committee undertook to investigate complaints against the actions of Forest officers made by mining claimants, but not in one single

> instance—I am happy to say—did the committee find any just ground for criticizing the action our officers had taken. The Forest Service regretted to see the committee discontinued and would welcome its re-establishment, although we shall constantly strive to so handle our work that it will not be needed.[27]

Although it is clear that leading mining engineers and the professional managers of large mining firms were supporters of Fernow and Pinchot and their cause, it would be an overstatement to say that miners universally supported federal control of forests. Many small prospectors and miners who enjoyed access to the public lands, and who had an equal opportunity to strike it rich under the 1872 Mining Law, did not always accept the leadership of the large mining corporations. As John Ise states in *The United States Forest Policy*, "there was much opposition to the reserves from the very first, and in almost every session of Congress (between 1891 and 1897) war was waged on the reservation policy." He goes on to explain that:

> Two classes in the West were particularly hostile—the stockmen, who found their privileges restricted by the reservation of these lands, and the miners, who were at first entirely shut out of all forest reserves.
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> The prohibition of mining was an unnecessary hardship, for mining, properly conducted, would not have interfered seriously with the purposes for which the reserves were created, and in 1896, certain reservations in Colorado were opened to miners . . . and the day after Cleveland created the thirteen reserves, Secretary of the Interior David R. Francis requested the chairman of the Senate Committee on Appropriations to insert into the Sundry Civil Bill a provision opening all forest reserves to mining. Such a provision was inserted in a later Sundry Civil Bill [the 1897 Act]. . . .[28]

Gifford Pinchot was clearly a gifted organizer and promoter. He built upon Fernow's relationship with the mining industry and used every possible public relations tactic to keep the support of miners and other user groups. Though many of Pinchot's accomplishments were highly visible and meant to be that way to bring support to the Forest Service, he also gained the respect of miners when he showed himself to be objective and capable of working out problems behind the scenes. J. Parke Channing, a highly respected mining engineer who is credited with development of the large Miami copper mine in Arizona, relates that Pinchot helped make land available for tailing storage at Miami by signing an order deleting a sagebrush covered parcel from a forest reserve, and did so at the time when the Cabinet was discussing his dismissal.[29]

Subsequent to the Fernow and Pinchot years, the tradition of communication between the major mining organizations and the Forest Service continued. Often motivated by a desire to keep pressure from building in the public or in Congress for revision of the mining law, miners have worked cooperatively with Forest Service officials to deal with a number of surface management issues, supporting legislation and regulation that were required to deal with problems that arose out of changing public demands on National Forest System lands. Mining support for the Common Varieties Act of 1955 is well-documented, as is the cooperative effort between the Forest Service and the AMC in the development and implementation of the Surface Management Regulations which are now used to protect surface resources from damage by mining activities.[30]

Today, both users of forest resources and the Forest Service itself are under enormous pressure from preservationists to use planning authorities to essentially lock up National Forest System lands. The nation will sort these issues out politically as it always has, and it is fair to predict that miners will continue to be active participants in the process. The very proper collaboration between leaders of the mining industry and the Forest Service during the past century has been productive of changes in laws and regulations that were required to meet changing public requirements and attitudes toward use of forest lands. Hopefully, the spirit of mutual respect and openness that has characterized this relationship will continue as we all struggle with mining and forestry issues of the future.

Notes

1. T.A. Rickard, "The Discovery of Gold In California, University of California," *Chronicle*, April 1928, as quoted in Rickard, *A History of American Mining* (New York and London, 1932).

2. John R. Wagner, *Gold Mines of California* (Berkeley, CA: Howell-North Books, 1970).

3. Clark C. Spence, *Mining Engineers and The American West, The Lace Boot Brigade, 1849-1933* (New Haven, CT: Yale University Press, 1970).

4. Rickard, *A History of American Mining*.

5. The success of prospectors at Leadville is well documented. The Gallagher brothers sold two mines for $250,000 in 1878, and Horace Tabor sold his interest in the Little Pittsburg mine

for $1 million in 1879. Don L. and Jean Harvey Griswold, *The Carbonate Camp Called Leadville* (Denver: The University of Denver Press, 1951).

6. William S. Greever, *The Bonanza West: The Story of the Western Mining Rushes, 1848-1900* (Norman: University of Oklahoma Press, 1963); Rodman W. Paul, *Mining Frontiers of the Far West, 1848-1880* (New York: Holt, Rinehart and Winston, 1963).

7. Charles Howard Shinn, *Mining Camps: A Study in American Frontier Government*, ed. Rodman W. Paul (New York, Harper & Row, 1965).

8. A. J. Wilson, *The Pick and the Pen* (London, Mining Journal Books Limited, 1979); Wilson, *The Pick and the Pen*, 263.

9. Wilson, *The Pick and the Pen*, 94; Rossiter W. Raymond, *Statistics of Mines and Mining* (Washington DC: Government Printing Office, 1870), 342.

10. Transactions AIME XVI 783, 803 (1887). Despite the unbroken record of cooperation between the principal mining organizations and the Forest Service, both parties are often embarrassed by the actions and words of opportunists and crooks who hold themselves out as miners, but who are really people who honor the mining law in its breach. The Forest Service has had to contend with all manner of illegal occupancy and trespass problems, ranging from attempts to use mining claims for summer home sites, to claims staked for marijuana cultivation. These situations are of great concern to the legitimate mining industry, as miners are worried that these fraud situations will bring pressure on a mining law that is generally quite favorable for real miners. The American Mining Congress has recently advocated toughening up enforcement of the surface management rules and has, in the past, assisted the Forest Service directly with efforts to end the abuse of illegal occupancy.

11. Andrew Denny Rodgers III, *Bernhard Eduard Fernow: A Study of North American Forestry* (Princeton, NJ: Princeton University Press, 1951). Reprinted by the Forest History Society, 1991.

12. Ibid., 23, 26.

13. Ibid., 18.

14. B. Fernow, "The Economy Effected By the Use of Red Charcoal," *Transactions of the American Institute of Mining Engineers* 6 (1878): 199.

15. Ibid., 206.

16. "The Government Timber Suits and the Preservation of Forests," *Engineering and Mining Journal* (April 20, 1889): 364; "Common Sense in Forestry," *Engineering and Mining Journal* (August 15, 1891): 184; "Mining Claims Within Forest Reservations," *Engineering and Mining Journal* (March 19, 1898); Fernow, *A Brief History of Forestry in Europe, The United States and Other Countries* (Toronto: University of Toronto Press, 1907, 1911).

17. B. E. Fernow, "The Mining Industry in its Relation to Forestry," *Transactions of the American Institute of Mining Engineers* 27 (1888): 264.

18. Editorial, *Engineering and Mining Journal* (February 16, 1901): 201; Gifford Pinchot, "Mining and the Forest Reserves," *Transactions of the American Institute of Mining Engineers* 28 (1898): 339; R.E. Benedict, "Forest Reserves in Their Relation to the Mining Industry," *Proceedings of the American Mining Congress* (1905): 67.

19. Gifford Pinchot, *Breaking New Ground* (New York: Harcourt Brace, 1947. Reprinted 1972 by University of Washington Press, Seattle), 131, 115, 174. *See also* "Homestake Forest Products Company," in *Homestake Centennial 1976*, unpublished pamphlet available at the Denver Public Library, which relates the history of the Black Hills Forest Reserve and Homestake's forest products operations in the Reserve.

20. Pinchot, *Breaking New Ground*, 198, 114.

21. Ibid., 85.

22. Ibid., 116.

23. Judge Curtis Lindley, the foremost commentator on the mining law of his time, described the confusion surrounding the forest reserves and their impact on mineral entry in his treatise on the *American Law Relating to Mines and Mineral Lands* 3rd edition (San Francisco: Bancroft-Whitney Company, 1914). He refers to Pinchot's paper delivered to AIME in 1898, saying that Pinchot "points out that it was not the intention of the government in creating the national forests to antagonize the mining industry; Pinchot, *Breaking New Ground*, 198; *Report of Proceedings of the American Mining Congress* 7 (1904): 35.

24. Pinchot, *Breaking New Ground*, 263, 259; USDA, Forest Service, *The Use of the National Forest Reserves: Regulations and Instructions for Use of the National Forests* (July 1, 1907), 36.

25. *Official Proceedings*, American Mining Congress (1908): 36; *See* Pinchot to the Special Committee on Mining in National Forests, American Mining Congress, April 24, 1909.

26. *Mining Congress Journal* 7 (1917).

27. E. A. Sherman, "Mining in National Forests," paper read at a meeting of the Western Division of the American Mining Congress, the American Institute of Mining and Metallurgical Engineers, the American Petroleum Geologists, and the American Silver Producers Associations, September 1926.

28. John Ise, *The United States Forest Policy* (New Haven, CT: Yale University Press, 1920), 130.

29. *Transactions of the Mining and Metallurgical Society* (December 31, 1915): 312.

30. Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976. Reprinted 1991), 296, 297; *See* Stanley Dempsey, "Forest Service Regulations Concerning the Effect of Mining Operations on Surface Resources," *Natural Resources Lawyer* 8 (1975).