The historical literature on Canada's timber industry has largely characterized it as one bent on exploitation for short-term profits. But for every rule there is an exception.

AN AMERICAN FORESTER, A CANADIAN PAPER COMPANY, AND THE SPANISH RIVER

BENJAMIN F. AVERY AND HIS SILVICULTURAL PROGRAM IN ONTARIO

The literature of Canada's forest history is long on stories of degradation and mismanagement and short on tales of progressive accomplishments. Authors who have examined the forest industry's relationship to the woodlands have almost universally condemned it for its allegedly wanton ways.[1] What these accounts have overlooked, however, are the instances—more numerous than one would have ever expected—in which firms that harvested Canada's trees implemented sound silvicultural practices.

One of the most important examples occurred in the immediate wake of the First World War. Benjamin F. Avery, an American forester, spurred the effort, and it was undertaken by the Spanish River Pulp and Paper Mills Company, which operated in north-

BY MARK KUHLBERG

UNIVERSITY OF TORONTO ARCHIVES, A1972-0025/059(37), "FROM SPRUCE TO NEWSPRINT"

As Canada's newsprint industry underwent exponential expansion, so, too, did its need for fiber. The wood from this enormous pile fed one of Spanish River's mills and dwarfs the eight men who are working on moving it.

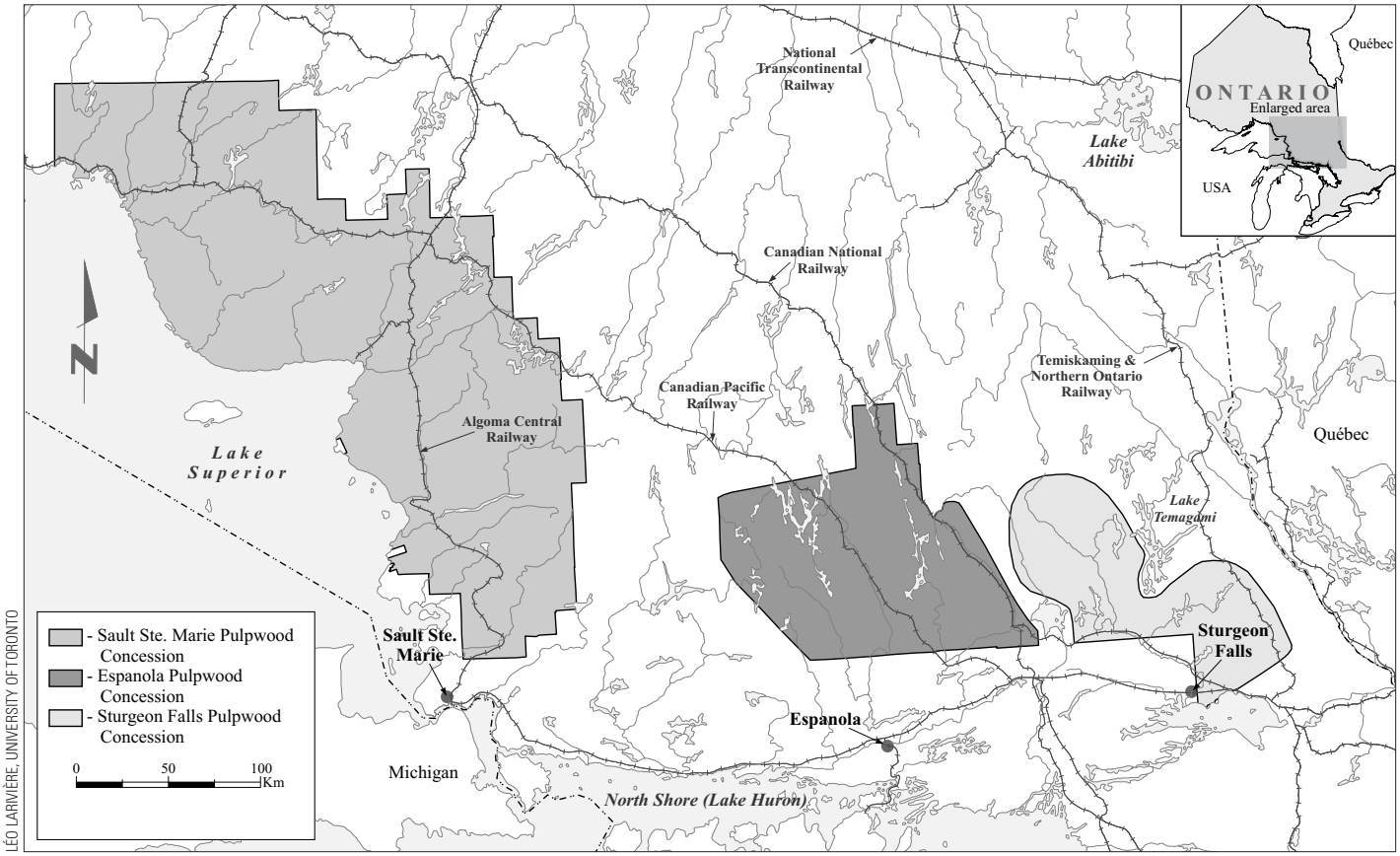
eastern Ontario. In the decade after the war, this firm was driven by several forces, most notably a corporate culture that embraced forward thinking, to implement a comprehensive forestry program committed to managing timber on a sustained-yield basis.[2] This story has remained untold for nearly a century; reviewing it reminds us of the dangers inherent in making generalizations about the past, particularly when discussing the woods.

PAPER'S EXPLOSIVE GROWTH

By the time the Treaty of Versailles formally ended the war in 1919, Canada's most populous province—Ontario, located roughly in the middle of the country—had become the nation's leading producer of newsprint. Capable of producing 100 tons a day in 1905, fifteen years later its capacity had risen to more than 1,200 tons per day. This exponential growth had been fueled by numerous factors, most notably northern Ontario's profuse supply of black and white spruce and hydroelectric energy, and the region's proximity to the midwestern states south of the border, where demand for newsprint was growing by leaps and bounds.

The Spanish River Pulp and Paper Mills Company had been front and center during this period of explosive growth largely because of its president, American paper-maker George H. Mead. He had been instrumental in introducing to the family's eponymous firm in Ohio the tenets of Taylorism, which held that the best way to maximize a firm's efficiency, and thus its profits, was to apply scientific methods and ideas to all aspects of the enterprise. After taking the helm of Spanish River on the eve of the war, Mead imported this ethos to his Canadian firm. It controlled three newsprint mills in northeastern Ontario, in the towns of Sault Ste. Marie, Espanola, and Sturgeon Falls, and Mead's ascendancy signaled the beginning of their revitalization. All aspects of the plants' operations were modernized and their capacities increased. By the end of the conflict, Spanish River's mills represented roughly 20 percent of Canada's capacity and 7 percent of North America's.[3]

The company's aggressive expansion program created wood supply problems, however, ones the provincial government proved unwilling to resolve. Each of Spanish River's three mills had been operating for well over a decade, and the one in Sault Ste. Marie had been going since the mid-1890s. During this time, they had cut a fairly large volume of pulpwood on the timber concessions they held from the Ontario government. In addition, the cutting crews had reported that the forests in which they were operating each season were deficient in spruce. This impression was confirmed during the late 1910s, when Spanish River began undertaking comprehensive surveys of its woodlands. Investigations revealed that the mill in Espanola had but a half-dozen years of wood left, and the others not much more. To augment their wood supply, Mead's management team applied to the provincial government for supplemental timber limits but was rejected.[4]



This map shows the location of Spanish River's three mills and the pulpwood concessions it leased from the Ontario government.

A NEW TYPE OF "WOODS MANAGER" ARRIVES

Those forces coalesced to compel Spanish River to seek out a forester to maximize the efficiency with which it administered its woodlands. Benjamin F. Avery, born in 1890 in the tiny village of Aurora, in the Finger Lakes area of New York, had grown up in a time of reckless overharvesting. After earning his BA in 1914 from Yale University (where he played varsity football and earned honorable mention on Walter Camp's All-America team), he pursued a forestry degree at Yale. As an undergraduate he won a silvicultural prize that came with a small monetary award, which he used to defray the costs of traveling to Sault Ste. Marie to work for Mead's firm in the summer of 1915. He was smitten by the region's natural beauty and returned to "the Soo" after graduating top of his class the following year to become Spanish River's first full-time forester. He interrupted his career to serve in the U.S. Army during the war but returned two years later to take over the company's newly created forestry branch.[5]

Avery recognized early in his tenure with Spanish River that he would have to convince its management team that spending money in the short term would actually save it over the long term. He based his campaign to implement a forestry program on a solid foundation of empirical data and concrete evidence. He also avoided casting aspersions on those who had been heretofore responsible for shaping Spanish River's wood procurement policy.

They had, after all, acted in a rational way, considering the circumstances. The company's woods manager, responsible for overseeing the firm's timber harvest, had been involved in developing an industry in its infancy, an industry whose viability had not yet been confirmed. Moreover, the mill managers had scanty knowledge of the woods in which they had been operating, and they had relied solely on spruce for their fiber supply. Their goal each year had been to obtain the volume of wood needed at the lowest possible cost.

Avery diplomatically pointed out that operating in this manner had actually been counterproductive. Spanish River's cutting teams had been forced to venture farther afield each year in search of wood, and by cutting only spruce—and nominal volumes of balsam fir—they had left many species standing. This had pushed up operating costs, most notably by necessitating more frequent camp moves and longer river drives. Whereas an efficient operation would concentrate harvesting activities in areas closest to the mill, Spanish River's modus operandi had been doing precisely the opposite. Moreover, removing all the mature spruce and leaving the other trees had guaranteed that the future forest would support less and less of this most valuable pulpwood species. And because this shortsighted approach held no hope of sustained employment, it attracted unskilled woodsmen—and thus lowered productivity.[6]

Avery outlined a multifaceted approach to rectifying the situation. One of the first steps would involve compiling an inventory of the company's woodlands to obtain an accurate and detailed picture of the species, age classes, and volumes of timber available to its mills. To realize this goal, the firm employed the latest technology of the day, namely a decommissioned army aircraft and a pilot who had been trained by Orville Wright. The plane would fly over the forest while a timber sketcher mapped the different stands, generating more accurate information about its wood basket in a fraction of the time it would have taken ground crews to perform this task.

Both industry and government feared forest fires, and Avery identified as a high priority the need to improve dramatically the

manner in which Spanish River protected its trees against fire. Heretofore the provincial government had administered a small corps of rangers to perform this function, for which the firm was required to pay a fee, but the level of service had been found wanting. Avery reviewed the vast cordages of timber that the company had historically lost to fire and concluded that it would be cost-effective to supplement this system with its own effort.

To improve the firm's harvesting operations, Avery presented some groundbreaking ideas that reflected his training as a forester and his profession's view that the best means of fostering robust regeneration of the desired species was to incorporate that goal into how the trees were cut in the first place. Avery argued that Spanish River could harvest its woodlands on a much shorter rotation than previously believed and rely on their natural regenerative capacity as long as it took one crucial step: it had to educate its cutters to protect the "advance growth," the immature spruce already established at the time of the first harvest. This would allow these young trees to be released—and thus develop rapidly—when the cutting occurred. Moreover, the advance regeneration would crowd out unwanted competition from hardwoods, provide a seed source for additional spruce regeneration, and most importantly, permit the same tract of forest to be cut every generation or so. This rotation represented less than half the time contemporary foresters believed it would take northern forests to produce a new crop of spruce.

Some areas of the forest would simply not regenerate to spruce, however, and so remedial measures would be needed. Avery argued in favor of supplementing nature with a modest tree-planting program. To provide the seedlings for such an undertaking, he explained, it would be necessary to establish a nursery.[7]

Avery directed a major part of his forestry message at the team of managers who oversaw production at Spanish River's three newsprint mills. He had estimated that spruce made up, at most, 50 percent of the trees on the forestland the company leased from the provincial government; the rest of the tracts were covered with jack pine and balsam fir, species that had not traditionally been used to make newsprint. He therefore insisted that Spanish River begin trying to match its wood requirements with the actual composition of the forests on which it relied for fiber. Developing a means of processing jack pine and balsam fir—and not solely spruce—into newsprint would dramatically increase the volume of wood available and lower the costs of procuring it, and also decrease the presence of these species in the woods while creating conditions that favored spruce reproduction.

Finally, Avery's central message to Spanish River's top brass was to adopt professional forestry's defining mantra: to manage its timber holdings on a sustained-yield basis. Instead of allowing the mills' timber needs to dictate how much wood was harvested each year, the volume of spruce taken out from each "operating unit" should instead be limited to the increment that it could produce every year. To help his case resonate with the firm's accountants, Avery likened this approach to that of the contemporary banker whose job it was to protect his capital and draw off only the annual interest on his investments. He contended that Spanish River could make lasting progress in its timber management program only if it authorized him to do precisely what he had been trained to do as a professional forester—limit the company's harvesting to the forest's annual allowable cut, the volume of timber that could be cut perpetually without diminishing the forest's total growing stock.

COURTESY OF ROSEMARY AVERY

Benjamin F. Avery

OVERCOMING HURDLES

Like leading foresters in both Canada and the United States, Avery recognized full well that all the policy directives in the world would fail miserably if they were not embraced in the field. He shared their view that one of the biggest hurdles to any successful forest management program was the itinerant nature of the industry's labor force. Each season brought a new crew of woodsmen to the bush, and once work began, many of them "jumped" from one camp to another in search of better wages or conditions. The introduction of the piecework system in the wake of the First World War only exacerbated the situation by giving cutters incentive to maximize their incomes by increasing their productivity.[8] The crux of the problem was thus how to get the lumberjacks, whose reputation for independence and unbridled behavior was legendary, to feel that they, just like Spanish River, had a vested interest in preserving the health of the forests in which they were operating. Raphael Zon, a forest economist with the U.S. Forest Service and one of Avery's confidants, was adamant that this was indeed North American forestry's greatest challenge. At a Forest Service meeting in 1921, Zon had noted that "in the long run it is upon the attitude of the woodsmen that the success or failure of forest management depends. With hobo labor there can be no forest management."[9]

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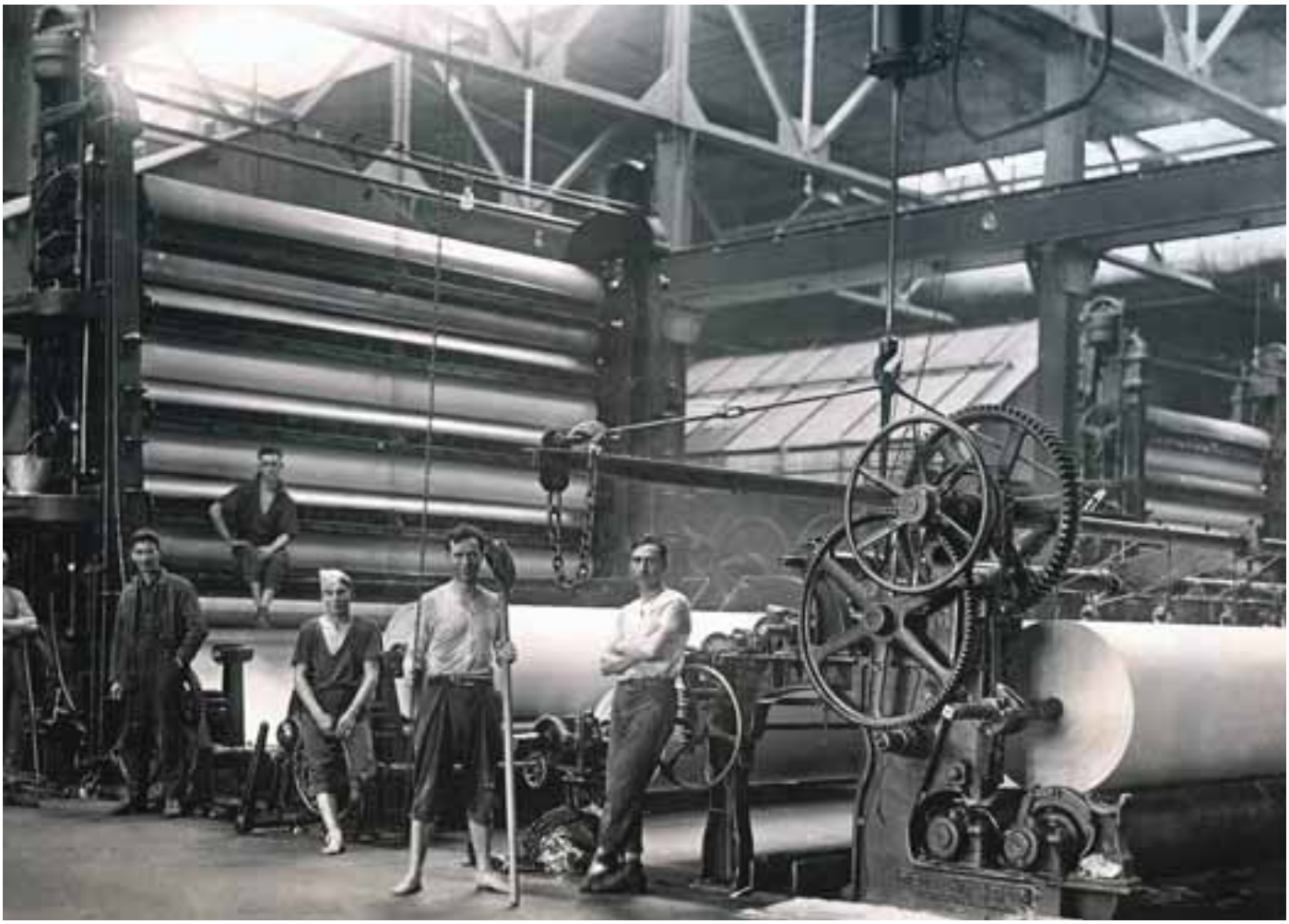
Mead ensured that Spanish River incorporated scientific principles into all aspects of its operations. Here, the firm's chemists are working on concoctions that would improve its mills' productivity.

To address this situation, Avery proposed a novel concept that had already been firmly embraced by the Forest Service's "progressive bloc": establishing permanent forest communities. These independent villages—they would not be "company towns"—would be built in the forest on each of the operating units that made up Spanish River's timber limits, and they would have the full range of services, such as schools, post offices, and churches, of any small town. The difference would be that the residents would rely year-round for employment on the woods that surrounded the community. Springtime work would involve river driving and tree planting, and the summer, fall, and winter would see the workers engage in fire protection, timber cruising, and harvesting. Avery, convinced that this was the panacea for the problem of a transient work force, shared his views with William B. Greeley, the Forest Service chief. The arrangement would provide permanent employment to the woodsmen, Avery wrote to Greeley, because "labourers whose homes are within or on the border of the forest where they receive employment will develop a sense of responsibility for the safety of the forest, and will be the best insurance of the successful operation of the plan."[10]

As Avery began presenting his ideas to Spanish River's senior administrators in the wake of the First World War, serendipity smiled on his campaign. Canada's Commission of Conservation (1909–1921) had been particularly active in investigating issues involving the country's forests. This aspect of its work was overseen by the newly appointed American dean of the University of Toronto's Faculty of Forestry, Clifton Durant Howe. Deeply interested in how commercial forests responded to harvesting, he had begun overseeing studies under the commission's auspices of how pulpwood tracts in eastern Canada were faring. Spanish River was keen to have just such a project conducted in its woodlands, and over the course of 1919–1920 it realized this aim. The commission's small team of foresters, namely E. F. McCarthy and C. R. Mills, investigated conditions on the Goulais River watershed, which formed part of the timber tracts leased by Spanish River's mill in Sault Ste. Marie.

Their study produced large volumes of data and insight that further buttressed the message that Avery had been preaching to Spanish River's management team, and it also added a few new ones. McCarthy and Mills noted, for example, how Spanish River's woodsmen had habitually cut trunks relatively high off the ground and did not use all the merchantable timber in the treetops. To illustrate just how uneconomic this practice was, they tallied up the thousands of cords of usable wood left to rot in the cutovers each year. Moreover, the commission's foresters validated Avery's avant-garde idea of protecting advance growth as the means to using natural regeneration to ensure Spanish River's future yields, and to do so on a rotation of roughly a few dozen years.[11]



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Ben Avery's forestry program included pushing Spanish River's three mills to develop processes for turning species other than spruce into newsprint, an endeavour in which they largely succeeded. The barefoot workers did not wear shoes in an effort to maximize their traction on the plant's wet and slippery floor.

And so, Avery's campaign to implement a comprehensive forest management program at Spanish River had now received the imprimatur of Canada's most esteemed body of natural resource management experts. Forces coalesced for an immediate effect. By the early 1920s the company had committed to managing "the woodlands upon which it holds cutting rights, on the principle of sustained yield." More importantly, it was actually practicing what it preached: it was limiting its harvest in each of its operating units to the annual allowable cut. This was an extraordinary accomplishment. Spanish River was probably the first company in Canada to take this approach to its forests. Meanwhile, the Ontario government—which owned almost all the woodlands in which Spanish River operated—was still a half century away from achieving this aim.[12]

Other evidence confirms that the firm had adopted—and was profiting from—Avery's forestry plans. During the mid to late 1920s, for example, Spanish River's forestry branch was spending $45,000 per year on its operations, a sum that represented a little more than two days' worth of production from one of the company's mills.[13] To assist Avery in realizing his goals, Spanish River now permanently employed a small cadre of graduate foresters and hired dozens of summer students who came from forestry schools across North America and beyond (including Michigan State, New York State College of Forestry, University of Toronto, Yale Forestry School, and Royal College of Forestry in Sweden). Their duties included overseeing timber cruising, drawing up harvesting plans, and helping educate the cutters about better harvesting methods; they also suggested and supervised work in both the company's new experimental forest and its commercial woodlands. In addition, Spanish River was operating its own forest fire protection service, which included manning its own fire towers and establishing wireless radio communication among the fire spotters; the system proved so effective that it even drew praise from government officials. Furthermore, the company had begun reforesting areas that were not regenerating naturally, such as cutovers that had been repeatedly burned, using seedlings from its new nursery for this purpose. By the end of the decade, more than a million seedlings had been established.

Spanish River also made great strides in developing ways to mill an increasing percentage of both balsam fir and jack pine. During the mid- to late 1920s, two of its mills reduced their use of spruce to less than 80 percent of their total fiber intake, and one was able to use at least 10 percent jack pine to make newsprint.

Avery was unable to make much progress on other fronts, however. Spanish River did not support his idea of establishing forest communities on its timber limits; he would realize this goal only after the Second World War, when he worked for another firm—the Kalamazoo Vegetable Parchment Company—that had

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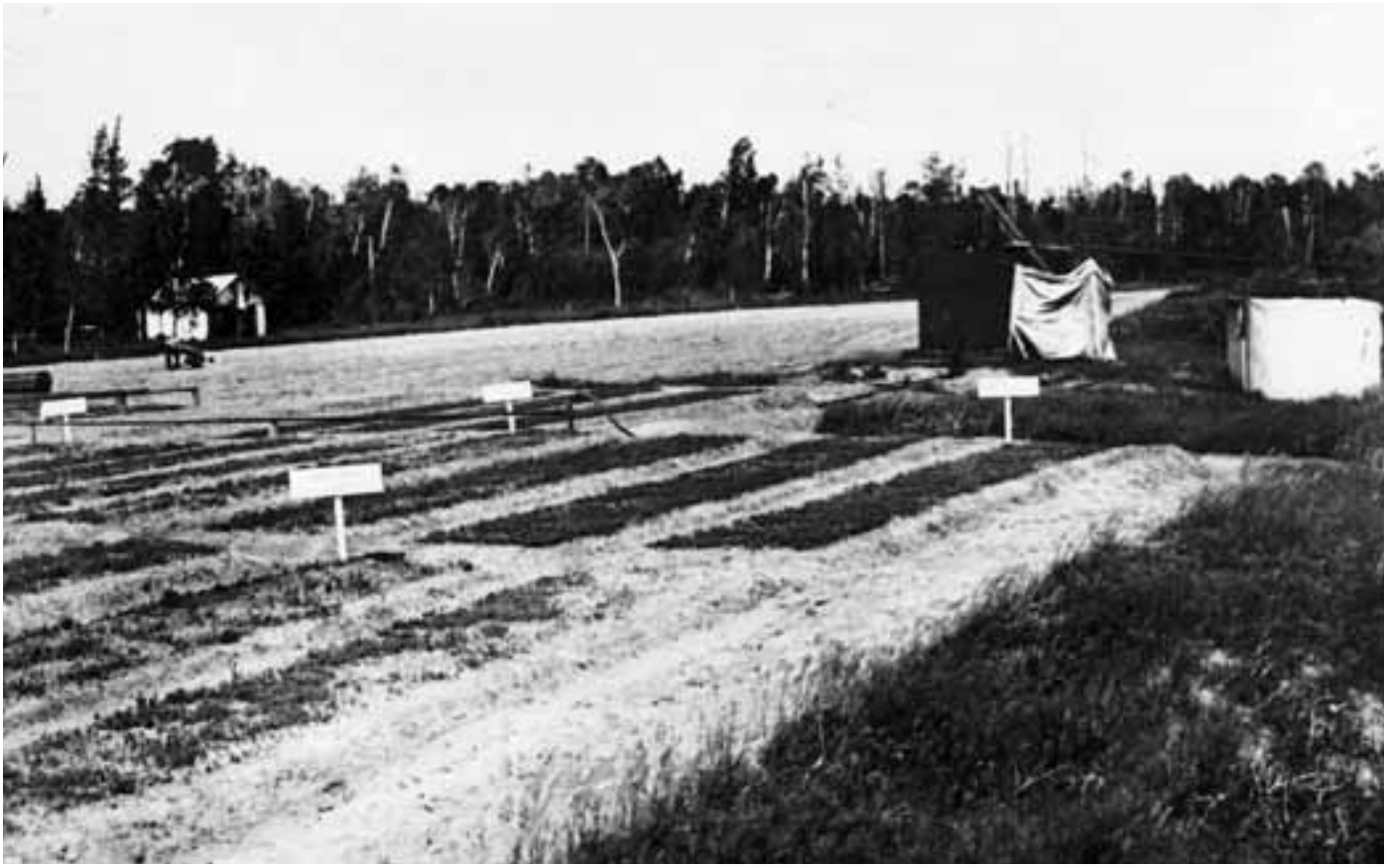
Contemporary technology played a major role in minimizing some of the progress a forestry program could make in maximizing the volume of fiber harvested from the woods. Even when there was no snow, the use of two-man crosscut saws often resulted in tree stumps that were unnecessarily high.



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This may be the only surviving photograph of the tree nursery Ben Avery established near Sault Ste. Marie, Ontario. It supplied the seedlings for Spanish River's reforestation program.

taken over some of Spanish River's timber limits. As a result, Avery was unable to build up a permanent, highly qualified, and forward-thinking gang of woodsmen who were open to his progressive ideas while with Spanish River.[14]

Moreover, climate and technology thwarted efforts to improve the efficiency of harvesting by cutting trunks low to the ground. Harvesting was done during the late fall and winter, when the forest floor was often covered in at least a few feet of snow, and downed trees and dead branches greatly limited how far down a tree trunk lumberjacks using two-man cross-cut saws could work. Many cutovers continued to be defined by the three-foot-high stumps they left behind.[15]

Nevertheless, Spanish River's ambitious and successful forestry program was attracting attention from many admirers. Royal commissions, professional foresters in both the public and private sectors, and financial analysts were applauding the firm for what the latter termed its "real scientific operation." Avery himself and his fellow employees were also deeply proud of what they were accomplishing. He delighted in providing Toronto's Clifton Howe with an update in 1925. "The company has expressed a policy… of operating for sustained yield," Avery explained, and "in every case excepting one, we are not cutting from the unit watersheds, more than that unit can yield, using a 60-year rotation and 30-year cutting cycle…. If the Government never does require pulp and paper companies to regulate the cut, this Company will, in carrying out its expressed policy, voluntarily undertake means of improving the stands." As Spanish River's solicitor had put it, "we are the pioneers in this business."[16]

COMING FULL CIRCLE

Unfortunately for Avery and Spanish River, the Ontario government proved uninterested in assisting its progressive initiatives despite compelling reasons for doing so. Officials from both the public and private sector, including Dean Howe and the government's own foresters, had repeatedly argued that because the province owned the forests in which companies operated, the government should at the very least share the cost of managing this renewable resource. It would, after all, reap increased timber revenues the next time the "treated" forest was harvested. But the politicians showed practically no interest in cooperating with Spanish River or any other firm in improving how it was managing "the people's forests." As a result, the great progress that Avery had made became a casualty of the austerity measures the newsprint producers began implementing as the Great Depression dawned.[17]

During the 1920s, other big names in Canada's newsprint industry were also engaged in similar efforts, even though historians have rarely mentioned them. For example, the Abitibi Power and Paper Company, which operated an enormous mill a few hundred miles from Spanish River's bailiwick, began the world's most northerly experimental tree-planting effort after the First World War. In nearby Quebec, the Laurentide Paper Company had been conducting a major reforestation effort since the early 1900s, and by the mid-1920s it was planting more than three million seedlings each year. Farther east, in Newfoundland—then still a colony of Britain and not part of Canada—the Anglo-Newfoundland Development Company's forester, John D. Gilmour, was conducting numerous projects, including prescribed burns in cutovers,

in an effort to foster natural regeneration in the woodlands where the mill's crews were harvesting. Other firms were engaged in similar projects, although on smaller scales, across the country.[18]

Perhaps the best testament to how historians—and foresters, for that matter—have overlooked Spanish River's early silvicultural work in particular was an initiative that came into vogue during the 1990s. Foresters managing pulpwood stands had been seeking a means by which they could reduce regeneration costs, operate in a more ecologically-sound manner, and crop the forest more quickly. The solution, they argued, lay in taking a "novel" approach to the woods. Instead of clearcutting a tract and then planting it to the desired species, they said it would be much more effective to protect the immature trees of the desired species that existed at the time of the initial harvest. Christening their approach CLAAG (Careful Logging Around Advance Growth), these "modern day" foresters did not appreciate that they were embracing the basic premise that had compelled Benjamin Avery to adopt the same system some eight decades earlier.[19] □

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NOTES

1. The most vociferous enunciation of this interpretation is Peter R. Gillis and Thomas R. Roach, *Lost Initiatives: Canada's Forest Industries, Forest Policy and Forest Conservation* (New York: Greenwood Press, 1986), chapter 4. As these authors declare on page 105, "unlike the Ottawa Valley men of the 1880s, their [the Ontario pulp and paper operators'] commitment to the forest seems to have been as small as their commitment to the balance sheets of their corporations was large. Because conservation appeared to involve increased costs, it was rejected." Others echo this view, including Donald MacKay, *Heritage Lost: The Crisis in Canada's Forests* (Toronto: Macmillan of Canada, 1985); and Paul Pross, "The Development of Professions in the Public Service: The Foresters in Ontario," *Canadian Public Administration* 10 (1967): 378.
2. In 1919 the chief forester for British Columbia delighted in informing a forestry professor at the University of Toronto that "support for forestry is coming from the industries, for business reasons." University of Toronto Archives [hereafter UTA], A72-0025, box 151, unlabelled file, M. A. Grainger to C. D. Howe, 31 December 1919.
3. Richard S. Hodgson, ed., *In Quiet Ways: George H. Mead, The Man and the Company* (Dayton, Ohio: Mead Corporation, 1970), 1–85.
4. Traditionally, historians have argued that the Ontario government acceded to almost every wish the province's newsprint producers (particularly Spanish River) made of it, including granting their requests for new pulpwood limits: see H. Vivian Nelles, *The Politics of Development: Forests, Mines and Hydro-Electric Power in Ontario, 1849–1941* (Hamden, Conn.: Archon Books, 1974), passim but particularly chapter 10; Peter Oliver, *G. Howard Ferguson: Ontario Tory* (Toronto: University of Toronto Press, 1977), passim but particularly 206–14 and 343–52. The evidence presented in Mark Kuhlberg, *In the Power of the Government: The Rise and Decline of Newsprint in Ontario, 1894–1932* (Toronto: University of Toronto Press, 2015), indicates, however, that this interpretation is in need of revision. For example, the government rejected almost every one of Spanish River's repeated requests for more fiber even though it agreed that these supplemental limits were needed. In fact, when Spanish River completed its "forest working plans" in the early 1930s for its plants in Espanola and Sturgeon Falls, it indicated that the "calculated allowable annual cut is insufficient to meet the maximum requirements of the mill[s]": St. Marys Paper Archives (Sault Ste. Marie, Ontario) [hereafter SMPA], A–1; file–Forestry 1933, Abitibi Power and Paper Company, "Forest Working Plan—Sturgeon Falls Concession," July 1933.
5. The summary of Avery's early years at Sault Ste. Marie is gleaned from Archives of Ontario [hereafter AO], RG 18-79, "Timber Commission Hearings," 9226–8; and from clippings/documents in the Honorary Degree Committee File, Laurentian University Archives, which includes an address by Stanley G. Mullins, the president of the university, on the occasion of Avery's death in 1965.
6. SMPA, A-1, file–Forestry 1911–1919, B. F. Avery to George Gray, 13 February 1918.
7. Ibid., A–2, file 6–6, Miscellaneous Reports, February 1920, "Report Re: Appropriation," by B. F. Avery. Avery had already presented most of these ideas to Spanish River prior to heading off to war: see ibid., A–2, file 6–5 Surveys, 27 April 1917, Avery to G.R. Gray; ibid., A–1, file Forestry 1911–1919, Avery to Gray, 13 February 1918.
8. Ibid., A–1, file–1921–B. F. Avery, Raphael Zon to B. F. Avery, 3 February 1922.
9. SMPA, A–1, file–1921–B. F. Avery, "Minutes of 959th Meeting of Service Committee, United States Forestry Service," 15 December 1921, 6.
10. SMPA, A–1, file–1921–B. F. Avery, B. F. Avery to W. B. Greeley, 24 January 1922.
11. Library and Archives Canada [LAC], RG 39, box 534, file 31-11, "Forest Regeneration Survey," *Goulais River Watershed*, townships 23 and 24, range 11, District of Algoma, 1920, 43.
12. SMPA, A–1, file–1921, B. F. Avery to George R. Gray, August 1921, "Working Plan for Goulais Watershed," 11–12.
13. SMPA, A–1, file–Forestry 1924, "Forester's Report for the Year Ending February 29th, 1924," 3 April 1924, 3.
14. Ian Radforth, *Bush Workers and Bosses: Logging in Northern Ontario, 1900–1980* (Toronto: University of Toronto Press, 1987), chapters 1–4.
15. Canadian foresters recognized the urgency of solving this problem: *Proceedings of the Annual Meeting of the Woodlands Section, Canadian Pulp and Paper Association* (Montreal: Canadian Pulp and Paper Association), 25–26 January 1928.
16. UTA, A72–0025, box 144, file – So–Sq, B. F. Avery to C. D. Howe, 18 March 1925.
17. SMPA, K–2, file–T–5–1 Timber Limits General, 24 January 1949, J. B. Matthews to D. J. Munro.
18. Mark Kuhlberg, "'We Have 'Sold' Forestry to the Management of the Company': Abitibi Power and Paper Company's Forestry Initiatives in Ontario, 1919–1929," *Journal of Canadian Studies* 34, 3 (Fall 1999): 187–209.
19. For example, Jamie Swift, *Cut and Run: The Assault on Canada's Forests* (Toronto: Between the Lines, 1983), 68–69, suggests that "perhaps the principal reason for the belief in the capacity of the forest to renew itself without human assistance was the fact that natural regeneration is cheap"; NA, RG 39, box 534, file–31–i–General, E. F. McCarthy and W. M. Robertson, "Investigation of Cutover Land for Pulpwood Production, 1920," 2–3, from which the citation is taken; Abitibi-Consolidated - Iroquois Falls Archives, unnamed file, c. 1926, notes by Professor O. Eneroth, forestry professor, Sweden.