In need of foresters to manage its timberlands, forest conservation leaders in the province of Quebec decided the best solution was a homegrown one: establish a school of forestry in Quebec City to train its own citizens to manage its forests. The school began with "two seeds thrown to the wind," which took root and transformed the landscape. The article is adapted from the book L'enseignement et la recherche en foresterie a l'Université Laval: De 1910 a nos jours (Teaching and Research in Forestry at Laval University from 1910 to the Present).

FORESTRY EDUCATION IN QUEBEC

THE FIRST 50 YEARS

he establishment of a school of forestry at Laval University in Quebec in June 1910 was the result of an unexpectedly long process—35 years after the adoption of three pieces of forest protection legislation: in 1868 a law established the minimum diameter for harvested trees; in 1870 a law regulated

fire use in or near forests; and three years later a corps of forest wardens was established. Yet more needed to be done to protect Quebec's working forests, which were publicly controlled but licensed to companies for logging. In 1882, a North American forestry congress held in Montreal spurred two projects dear to forest activists and preservationists: the creation of forest reserves and the adoption of incentive measures for reforestation. This same congress inspired the creation of Arbor Day in Quebec in 1882, an idea borrowed from the United States, which had been promoting the idea of forest management on public lands for several years. Tree planting and forest reserves were seen as essential elements by most congress participants. Others, however, were more critical. Partisans and promoters of the emerging science of forestry did not consider the adopted measures a sufficient response to the predicted timber famine.

Developments in Canada mirrored those in the United States in other ways. In the middle of the nineteenth century, forests were still abundant in both countries, although signs of potential shortages in some regions fueled the concerns of an eventual general depletion. By the end of the nineteenth century, some parts of each country had to import wood from other regions. Canadian stakeholders, too, wanted guidelines for logging companies to prevent abusive logging that would surely lead to the deterioration of the forest resource. They followed the Americans' lead by also setting aside lands for protection, introducing innovative forestry practices, and establishing forestry schools. From 1904 and 1908, Quebec began undertaking forest policy reform by creating forest reserves encompassing a total of nearly 430,000

BY CYRILLE GÉLINAS

square kilometers (about 106,000 acres). The Quebec Forestry Service, staffed by professionally trained foresters, was created during this time, too.

TWO SEEDS THROWN TO THE WIND

The forestry movement in Quebec, as in the United States, was originally led by amateurs. Motivated by good intentions, movement leaders were relatively well educated, though mostly in arboriculture and botany; they tended to see trees where they should have considered whole systems. Scientific forest management, introduced to this fertile ground, would correct this reductive approach.

In America, foresters Bernhard Eduard Fernow, Gifford Pinchot, Carl Alwin Schenck, and Henry Solon Graves introduced concepts taught by European foresters. Their knowledge went beyond topics of fire detection and suppression, diameter-limit harvesting, passive conservation through forest reserves, or expensive regeneration based on plantations. Their style of forest management would yield positive financial returns: "Conservation was simply good business," Gifford Pinchot often said.¹ They aimed to restore the commercial value of forests degraded by clearcutting. Their ideas filtered north to Canada, where they found receptive ears.

One listener was Joseph-Clovis-Kemner Laflamme, the rector of Laval University, a minister by training who was devoted to science. He had studied at Harvard University, had taught physics and geology at Laval, and was a member of several learned societies. Moreover, he was very interested in protecting Quebec's forests, had been active in the recently formed Canadian Forestry Association, and had a strong appreciation of the university-level training required of European foresters.

Some 120 miles away, in Montreal, was another receptive set of ears. They belonged to Gustave Clodimir Piché, a young man who had been thinking about the future of forests while he worked in a pulp and paper mill. There he had closely observed the consequences of industrial forestry practices. Piché had read some of Laflamme's articles on conservation, one of which argued that by organizing forest harvesting on a scientific basis, it would be possible to obtain greater yields from the forest rather than from a forest left unmanaged. Training young people to practice forestry soon became Piché's mission. In his member of parliament and in the premier of Quebec he found an amenable audience. LaFlamme and others had already persuaded a sympathetic Premier Lomin Gouin, who wished to place professional foresters in charge of Quebec's forests as a way to deal with the corruption that had plagued their administration, to sponsor two students to study abroad.² Shortly afterward, Piché and a fellow student, Avila Bédard, were sent to Yale's school of forestry to learn how to profitably manage Quebec's forests. The future of Quebec's forests now depended upon these two seeds thrown to the wind, in the hope that they would fall on fertile ground.

Though of opposite yet quite complementary personalities, they would form an efficient duo who would long reign over Quebec's forest world, Piché for 32 years and Bédard for 55. Piché was an ambitious, energetic jack-of-all-trades who generated projects at a fast pace. After only a few months at Yale, he was already bombarding the Quebec premier with scientific recommendations for how to restore the province's forests. On his own initiative, he began several plantations and experiments on the acclimatization of exotic tree species. He regularly sent the premier suggestions about books and journals to purchase for the legislative assembly's library. Between classes, he corresponded with numerous French, American, and Canadian foresters to expand his network of contacts and information. Shortly after graduation in 1905, he wrote a compendium of useful knowledge on topics like the perfect nursery and seed collection for his former employer, the Belgo-Canadian Pulp and Paper Company.

Toward the end of his studies, he made a series of visits to gather ideas that could be adopted in Quebec. His travels took him to the offices of the U.S. Forest Service and the forest products laboratory of Hermann von Schrenk in St. Louis, Missouri. Before coming back home and filling the positions awaiting them, Piché and Bédard spent a year touring Europe's forests. Piché returned with an extensive file of reforms to bring to the management of lands and forests.

In 1908 Piché emerged as a self-confident forester, perhaps a bit arrogant and power hungry for someone not yet 30 years old, loaded with responsibilities. With Bédard, he reorganized the province's Forest Service, promising rapidly improved revenues. Fully aware of the expectations of his benefactors, he knew that failure was not an option. Piché confessed to his wife 25 years later that he had lost sleep over this thought for three months.³

The senior employees of the Forest Service, who were now subordinates to the young newcomers, challenged their views and practices. The new foresters' work and ideas met a lot of criticism. This did not stop Gustave Piché. By the end of 1907, barely six months after returning from abroad, he had compiled a list of the province's indigenous trees and shrubs by both common and scientific name.⁴ Such initiatives contributed to his renown while bolstering the standing and reputation of a profession not yet firmly established in Quebec.

Piché continually reminded the premier of the urgent need to create a forestry school. During the autumn of 1908, as he was planning an inspection program for the next logging season, he suggested to his superior that he bring along some young people who had expressed interest in a forest engineering career, in order to expose them to the work of the forestry service. This idea was well received, in part because it involved no additional expenses. Having spent time in the forest himself, Piché was fully aware of the difficult life in this crude environment; he was hoping to discourage misconceptions about how easy the profession could be. In the fall of 1908, eight students traveled with him or Bédard throughout Quebec's forests. However, that was not sufficient to create a school.

Following his probation year, Gustave Piché wrote a memo in which he bluntly listed what was wrong with the forest administration. To stop the decline of this publicly held resource, he said, concepts of silviculture and scientific management based on solid forest inventories were necessary for forest operations. These changes, he argued, would take place only if the province invested in the creation of a forestry school. To force his superiors to act quickly, he raised the threat of competition. He informed the premier that timber companies were beginning to hire forest engineers to manage their concessions. These graduates were coming from Ontario, New Brunswick, the United States, and Europe, and one of them had already conducted the first forest inventory in Quebec. In addition to competing for the future graduates from Quebec, the situation would leave the agents of the Ministry of Lands and Forests at a disadvantage with private industrial interests seeking to influence policy in the province. As landlord of close to 90 percent of the province's forests, the



Two seeds in the wind: Gustave Piché and Avila Bédard, photographed while studying at the Yale Forestry School in 1906.

government had to be a leader on the subject, the logging companies being mere tenants on these lands.⁵

On June 4, 1910, the government adopted the law creating the school of forestry at Laval University. A month later, Laflamme, who had also worked tirelessly for several years to establish the school, died at age 60. The school opened its doors two months later. Bédard and Piché constituted the entire faculty.

THE EARLY YEARS OF THE SCHOOL OF FORESTRY

The forestry school appeared as a surprise in the overcrowded university. The frugal management of space and finances that prevailed in the institution was probably even tighter for the foresters, who had not been invited by the university but were ordered there by government. The agreement between the Ministry of Lands and Forests and the university stipulated that the latter would provide space and make its library, laboratories, and museum available to the students. The government would provide funding for the professors, books, and specialized forestry materials and cover the costs of forest outings, but in fact barely provided the funds needed for the training of its personnel—a situation that did not sit well with university officials.

This barely tolerable condition was inappropriate for a school hoping to compete with similar institutions on the continent. The rector increased his pressure on the government and was granted a few thousand dollars more. In return, the government expected that the school graduates collectively bring more than \$100,000 annually to the public treasury through their competence and vigilance on the job.⁶ The training of forest engineers was not simply for the pleasure of instructing them—it had to pay off.

The first two years of the school's operation were rough and awkward. In September 1910, when the school officially opened, its first students were employees of the Forestry Service and were required to leave the forest, where they had been working, for one or two years. Although now considered students, most of them already occupied important positions in the Forestry Service. Their functions covered a range of tasks from inspectors to district chiefs, but they lacked full qualifications for the positions.

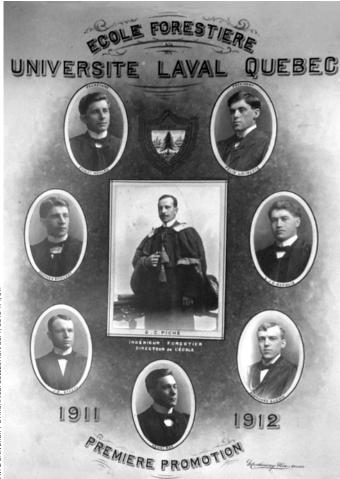
The next class found things to be easier than the previous. However, the ministry, which was the funding agency, did not hesitate to prematurely tap this labor reserve, once again without discharging them from their academic obligations. The arrival of the first graduates in 1912, all hired by the Forestry Service, satisfied the needs of the state, leaving the students in the following years with a more normal course of studies.

From 1911 on, first-year students were in the classroom during September and October. In November they would leave the school and spread out across the province's logging territory, paired with an experienced forest warden in order to learn about the various tasks they would be expected to perform after graduation.

They would return to Quebec City in April for a short period in the classroom, and then leave again for their seedling production training at the Berthierville tree nursery, another project of Piché's. Piché and Bédard, the only two forestry professors, would take them to the forested part of the nursery to teach them dendrology, tree measurement techniques, and silviculture. To complete the year, students would spend the summer months doing forest inventory.

The second year started with practical work in the forest. November would see them back in classes taking a variety of mathematics and science courses, ranging from chemistry to geology, intermingled with forestry courses.

The last year would be devoted to deepening their understanding of forestry matters. Was it sufficient? Yes, without a doubt for the main employer—the government—given the nature of the



LAVAL UNIVERSITY'S ARCHIVES. COLLECTION U571, COTE 474/01

The first graduates of the Laval University's School of Forestry. Founding director Piché is in the center.

tasks they were expected to perform after graduating. They fared well in the field and they were able to hold their own in their dealings with the forest companies, although loggers thought they should receive more training in the practical aspects of forest operations, particularly engineering. Improvement in resources and criticism from the industry led to gradual adjustments to the training programs. In the beginning of the twentieth century, the profession was new and was responding to the needs of industry and a rapidly evolving government administration.

The array of responsibilities for the first generation of forest engineers was a heavy burden for inexperienced young men. Fresh out of school, they were entrusted with the management of forest districts, exploration and inventory of remote territories, and resolving administrative and silvicultural problems as they went. They were put in charge of forest wardens, canoeists, *portageurs*, loggers, aboriginal guides—all well adapted to the life in the forest, who took pleasure in testing their young bosses. In the shanties, they had to earn the respect of the local workers who were full of prejudices toward these students, and considered city dwellers to be clumsy, inexperienced, and unadjusted to life in the woods. They were the victims of ridicule and countless jokes; they were openly laughed at, their knowledge deemed useless.

THE MERGER

Because of limited funds, the board of the Forest School arranged with the School of Land Surveying for courses common to both curricula. From 1916 onward, the two schools functioned together. The provincial government was increasingly conscious of its limited knowledge of the forest inventory under its jurisdiction. When selling timber concessions, which were awarded on an annual basis, government employees could not accurately inform potential buyers about the timber stands. A buyer had to conduct its own inventory or trust the limited information provided by the Ministry of Land and Forests, which was often based solely on surveyors' estimates, and thus risk purchasing a poorly forested lot. The school was still graduating too few forest engineers to handle the workload.

The answer to the problem stood right in front of those seeking a solution. Why not make better use of the surveyors who were sent to explore, delineate, and map the province? These men were accustomed to recording the characteristics of the forest stands they examined. The minister of Lands and Forests decided that these surveyors could learn at least the fundamentals of the forest sciences so that they could identify forest species and provide estimates of forest stands' wood volume.

The school directors developed a three-year curriculum, with some common courses for the two professions. At the end of the second year, the school granted a diploma of surveyor. An additional year was required for students wishing to obtain a forest engineer diploma. This dual qualification would increase the chances for forestry graduates to find employment.

The recruitment of students at the School of Forestry started smoothly. At the opening of the first class in 1910, 12 students enrolled. As the program led to strong employment opportunities, it became more popular. Within two years, 40 students were in attendance. The war and the decline of interest from industry, however, slowed recruitment and registration. In September 1915, the total attendance was down to 21 students, half the 1912 number. During the war, enrollment leveled off and the number of students spread across the three program years varied between 15 and 18. At the end of the war the forestry school did not regain its former popularity. Between 1917 and 1928 it granted only one or two diplomas per year, three in exceptional years, and none in 1926.

A SCHOOL IN DIFFICULTY

Combining surveying and forest engineering was expected to bring new life to the forestry school. The end of the war was expected to be favorable as well. The forestry graduates would finally find the anticipated jobs in an industry undergoing strong expansion. The reality was dramatically different and disappointing. At a time when the state intervened very little in the economy, except through limited incentives, the government reluctantly began forcing industry to hire these professionals. In 1926, it threatened the paper industry by introducing legislation to withhold 90 percent of the provincial timber concessions, to force the timber industry to contribute financially to a school that was of particular benefit to their future. The politicians did not in fact enforce this law; they appeared satisfied with giving notice via this so-called education tax on pulpwood. The 1929 economic crisis postponed any recourse to coercive financial measures.⁷

At the same time the school directors launched a review to determine what was wrong. They decided to make their graduates more attractive to employers, who, according to their analyses, were hiring a few graduates, demonstrating at least a budding interest in professional foresters. The school board presented a brief to the minister of Land and Forests, identifying the most obvious gaps. The annual budgets were not sufficient to provide for integrating new fields into the program. As a result, the authors of the report asked how graduates could compete successfully with the technicians coming from better-funded schools. The government could not unduly delay setting up laboratories to study wood properties, soils, and forest flora. The teaching of entomology and pathology had to be enriched. The report judged that the time spent in the forest was insufficient. The school could not continue to advertise that it was providing quality training unless it had tenured faculty members, and more of them. The museum could be enriched with more plant collections, and the library was seriously lacking. If the minister agreed to correct these problems, he would ensure "the place it deserves and make it better than all similar schools in Canada."8 The financial crash of 1929 momentarily postponed their hopes, however, and gave the politicians justification to maintain the status quo.

The improvement in the economy during the subsequent years did nothing to change the industry's mindset. Laval professors and government officials remained irritated by the knowledge that companies doing business in Quebec and in America were making contributions to universities in America but not supporting the forestry school at Laval. On November 30, 1940, a newly elected government implemented the education tax. The measure angered manufacturers, but with business thriving during the war, protests were of short duration. The tax turned the tide. In 1924, 23 French Canadian forest engineers from Laval were employed in the forest industry, compared with 27 English-speaking ones from non-Quebec-based universities.⁹ Seventeen years later, 65 came from Laval and 142 from non-Quebec universities.¹⁰

THE REFORM PERIOD

In December 1941, the minister of Lands and Forests added \$20,000 to the annual grant given to the School of Forestry. There would be no looking back. Each year, the government increased its contribution. It was a period of spectacular developments made possible by an economy boosted by the war and the revenues from the education tax. The growing budget triggered the long-awaited transformations. Starting in 1940, the ministry allocated \$10,000 annually for students deemed qualified to register for graduate studies at American or European universities. The minister wanted this investment to help his department obtain the properly trained personnel needed to establish a forest research center and strengthen the faculty of the school he was supporting financially.

The increase in registrations starting in 1937 and more consistent financial support helped the school to attain the status of a faculty. On November 14, 1945, the school became the Faculty of Surveying and Forest Engineering and moved into a new building built expressly for it.

The additional funding permitted the compressed three-year program to spread over four years. All students took the same courses for the first three years, after which those choosing surveying graduated immediately. An additional year was necessary for those choosing forest engineering.

In 1935, registration was on the rise. The school had a total of 35 students, 44 in 1936, and then 58 in 1937. This time the momentum was real and sustained. However, where forest engineering was concerned, it was not until 1936 that the graduation rate improved beyond a trickle. In 1937 and 1938, respectively, 10 and 12 students graduated in forest engineering. Between 1945 and



Avila Bédard served as a professor from 1910–1954, director of the school of forestry and surveying (1918–1945), and first dean of the Laval University Faculty of Surveying and Forest Engineering (1945–1954). The photograph was taken circa 1924.

1954, the faculty presented annually between 14 and 20 diplomas in this specialty. $^{\rm 11}$

For practical training, the faculty had access to permanent facilities in the Duchesnay Forest Experimental Station, together with government scientists. The library and museum were enriched through purchases and donations. Of particular note, Yale University donated 2,000 forestry volumes in the mid-1940s thanks to Henry Graves, former dean of its forestry school.

The renewed and improved program inspired some to pursue graduate studies in American universities. This became a good test of the quality of their education at Laval. The dean of the Laval forestry faculty was comforted by what he read in the report from American colleagues on recent students who had undertaken graduate studies abroad. "If, in the future, you have other men as good as these two," wrote C.-L. Metcalf, dean at the University of Illinois, "we shall certainly be pleased to welcome them to do graduate work in the department."¹²

From Duke University came another confirmation: "Matte made what we consider to be an exceptional record. I doubt if anyone has made a correspondingly good record since our school has been established... We sincerely hope that Mr. Matte can be back with us again this coming year for he is the type of man that we like to have as students."¹³

Samuel Trask Dana from the University of Michigan, David H. Linder from Harvard, S. A. Wilde from the University of



Wood-technology training was part of the curriculum. Pictured are students in a class on veneer and plywood production under the direct supervision of Professor Marie-Albert Bourget, circa 1950.

Wisconsin, and others provided similar comments. When critics attacked the school, Avila Bédard, who had succeeded Piché in 1918 as director, quoted these flattering testimonies.

STUDENT ENROLLMENT GROWS

After World War II, the positive outlook for forest products resulted in improved job opportunities. The rebuilding of devastated countries caused the demand for wood to soar. Growing wealth in North America raised internal consumption accordingly. Governments and industry became significant employers of forest engineers.

The 1960s marked the end of an era and the disappearance of certain ways of doing things. Technocrats landed in ministries and eliminated the remnants of former administrations. So was it for the Ministry of Lands and Forests. The number of services and personnel substantially increased and Crown land management evolved toward a focus on the public good. The federal government increased its presence in forest research in Quebec, enabling several graduates to find employment in that field. The faculty benefited from these flush times, and the number of professors increased. All in all, the sun was shining in the world of foresters.

In 1960, the undergraduate and graduate programs welcomed 266 students. It was a marked improvement from the 60 or so attending 10 years before. In 1965, students hoping to graduate with a diploma in either geodesy or forest engineering numbered 358, including 49 pursuing studies at the master's or doctoral levels.¹⁴ That latter number was double the enrollment in 1961.¹⁵

THE PROGRAMS OF STUDIES

Better off financially, the faculty increased its course offerings and the number of professors on staff. The changes in the program during the 1950s were just at the beginning of a period of rapid change. Some subjects took on more importance and new ones entered in the program: wood technology, photogrammetry, multiple-use management, economics, and logging. Ecology found its way in most of the biology-related courses. Gradually, on a trial-and-error basis, the faculty council introduced specialization in the last year of studies. This question was central to all universities: should they stay the course and provide for a general training or boldly move ahead of industries and train "readymade" specialists? The debate raged for years before being resolved.

Imperceptibly, land surveying moved away from forest engineering. The two groups still shared common courses. However, at the beginning of the third year, students had to select one of the two professions; the dual diploma lost its *raison d'être*.

The master's program began in 1946 and grew rapidly. By the mid-1960s, doctoral studies were being offered. Foreign universities

remained attractive, however, although expensive. Still, the faculty was able to train specialists on site and, in effect, regenerate itself. To meet this demand, the size of the faculty expanded from 43 in 1955 to 77 ten years later.

RESEARCH

In the 1930s, the state established a research organization within the Forestry Service. Its introduction in the forestry school was more timid, waiting until the end of the 1940s and for the return of the graduates with doctoral degrees from American universities. The establishment of the graduate program in 1946 was an important step forward.

In 1954, the Canadian International Paper company donated \$100,000 to help fund research by faculty. The funding was channeled through a newly created organization, the Laval University Forestry Research Fund. In the beginning, this organization funded six projects covering a broad spectrum, from forest fire behavior to vegetative reproduction of commercial species, including also birch mycorrhizae and forest management of private woodlots.¹⁶ At the time, fundamental research was favored. This preference was questioned during the next decade by the funding organizations, which were looking for more immediate returns from the research. The acquisition of woodlands by a group of professors in the mid-1950s for research and educational purposes, followed a few years after by a government grant for a real and large experimental forest, helped facilitate the move toward applied research.

During these exciting and decisive years, the professors began to publish results of their investigations in journals and other scientific publications outside the province, and their articles were well received. What happened in publications was also happening at scientific conferences. During the 1930s, two lecturers, one in pathology and the other in entomology, participated regularly in their specialized American scientific associations. They made well-received contributions to the research community. Twenty years later, it was no longer unusual for Laval professors to make presentations at scientific conferences in various fields of forestry. By the 1960s a faculty member would occasionally cross the ocean to participate in a European forestry meeting. They felt at ease in their dealings with colleagues from other countries. Their work was at an equal footing with that of others and they were confident in submitting it for peer review.

The two seeds thrown to the wind a half-century before had indeed found fertile ground and took firm root. In 1965, the school name was changed to the Faculty of Forestry and Geodesy. Today the Faculty of Forestry and Geomatics at Laval University is the only school of its kind in Quebec, and is the largest one in all of Canada.

Cyrille Gélinas is a freelance historian in Quebec. The author would like to thank Jean-Claude Mercier and Marie Coyea for providing translation to this article, originally written in French.

NOTES

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- R. Peter Tillis and Thomas R. Roach, Lost Initiatives: Canada's Forest Industries, Forest Policy, and Forest Conservation (Westport, CT: Greenwood Press, 1986), 118.
- 3. Gustave Piché to his wife, September 4 1932, SHFQ archive fund.
- 4. Gustave Piché to the minister of Land and Forests, December 30, 1907, BANQ, MTF, E21, S10, General Correspondence, 1846–1954, 1960-01-039/3. Also in: RMTF, DS, vol. 1, no. 3, 1908, appendix 28.
- 5. In Quebec, the provincial government owns most forestland. According to a system established in 1826, the land was subdivided in blocks of variable sizes. Known as forest concessions, these tracts were granted through auction to forest companies and subject to an annual rent and cutting rights imposed on each log extracted from felled trees. The lease was renewed each year, provided the users had met the conditions of the concession. This system remained in place, with very minor modifications, until 1986.
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- 13. C. F. Korstian to Fernand Boutin, June 29, 1943, AUL, U571/15-16.
- 14. Annual report, Faculty of Surveying and Forest engineering, 1964–65, AUL, U571/17/1.
- 15. Ibid., 1960–1961.
- 16. A. M. Parent to Vernon E. Johnson, December 20, 1954, U502/23/4, BA 114.11.