artifacts are often not that obvious and not easily removed algorithmically." Emotiv declined to show us the raw EEG data collected by its device, citing proprietary concerns, so it was impossible to determine whether the headset and analysis software were truly filtering out noise and measuring brain activity consistently.

While Gevins acknowledges that for a gaming system, it doesn't matter what kind of signals the device is using, he worries that overstating the ability of EEG to "read your mind" could damage the technology's reputation. "They are way out on a limb with the labels they are putting on things," he says.

Others hope that the EEG devices could have medical applications. Lesco Rogers, a pain management specialist at Duke University Medical Center in Durham, NC, has been in talks with Neurosky about testing its device for use with stroke patients. Rogers is considering very simple uses of the technology, such as allowing disabled patients to turn on a television. "What makes the technology interesting for me is the price point," he says.

Meanwhile, EEG's ability to measure alertness and arousal could add an interesting new layer to video games: in an unintended display of one of the Epoc's features, the sky glowed bright orange as Della Torre, still wearing the headset after a demonstration, argued with a skeptical scientist. But the technology still seems too limited to have the transformative impact of the Wii. It's true that Emotiv's and Neurosky's devices can, on a very simple level, read your mind—and lifting that plane with the powers of concentration felt very impressive. But the novelty of the devices is likely to wear off fast, and game players expecting the ability to exert precise mind control are likely to be disappointed. TR

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WWW Noted neuroscientist Alan Gevins explains how EEG works: **technologyreview.com/eeg**

RISK CAPITAL

Founding Father

A NEW BOOK DESCRIBES THE MAN WHO CREATED MODERN VENTURE CAPITAL.

By MARK WILLIAMS

Although it's a popular story, it is untrue that President George W. Bush once said, "The problem with the French is that they have no word for entrepreneur." Still, a common prejudice in Anglophone nations holds that the French are less entrepreneurial than we. *Creative Capital: Georges Doriot and the Birth of Venture Capital*—a biography of the French-born Harvard Business School professor who practically created modern venture capitalism—is a reproach to that assumption.

CREATIVE CAPITAL: GEORGES DORIOT AND THE BIRTH OF VENTURE CAPITAL
By Spencer E. Ante
Harvard Business Press, 2008, $35.00

That said, as *BusinessWeek*'s Spencer Ante makes clear in his new book, Georges Doriot was an unusual Frenchman. He studied the sciences at his Parisian *lycée*, to which—after gaining his license at 15—he drove through the boulevards of a capital by then hunkered down for World War I. At 18 he passed from that *lycée* to the charnel house of the Western Front as an officer in an artillery regiment; at war's end heeded his father's counsel that the shattered state of France made the New World his wisest option.

So Georges Doriot came to the United States at 21 with neither family nor friends, nor much money, but with the intention to enroll at MIT and with a letter from a friend of his father introducing him to A. Lawrence Lowell, president of Harvard. At Lowell's suggestion he studied at Harvard Business School rather than MIT, and in his first job at an investment bank he befriended a young Lewis Strauss, who would later be the chairman of the U.S. Atomic Energy Commission and a dispenser of federal benifices on an enormous scale. Even in Doriot's earliest years in America, then, its future eminent men were familiar to him—though still strangers to most of their countrymen—and this pattern intensified after Harvard Business School hired him in 1925: his former students frequently attained high positions in business or government. During World War II, having become a U.S. citizen, Doriot joined the army, became director of the Military Planning Division, and received brigadier general's rank in the Quartermaster Corps after William Donovan, soon to be head of the OSS (forerunner of the CIA), recommended him to President Roosevelt. His military superior in the war was a man who in the 1920s had attended his lectures on the virtues of the goal-oriented campaign and the collective wisdom of the markets.

On that latter subject Doriot felt strongly. In speeches and articles, he opposed both the *dirigiste* political economy of his native France and the tax hikes and anticompetitive laws enacted in the United States under the New Deal. Such regulations, he maintained, arrogated to bureaucrats the function of the markets; their worst feature was that they let government lend money to failing businesses. Ante notes that a former colleague of Doriot's, James F. Morgan, recalled him as "the most schizophrenic Frenchman I've ever met"—devoted to his original land's wine, cuisine, and language even as "the French capacity to make very simple things complicated drove him nuts." However atypical a Frenchman Doriot was, his pro-entrepreneurial philosophy—alongside his vast experience serving on dozens of corporate boards in the interwar years and running much of U.S. military procurement during World War II—made him the natural choice for the role of company president when in 1946 a

group of Boston's leading citizens set up the American Research and Development Corporation (ARD) as the first publicly owned venture capital firm.

By the time Doriot called it quits in 1972 by merging ARD with the conglomerate Textron, his firm had invested in 120 companies, most of which had proprietary, innovative technologies in areas including isotope conversion, water desalination, electronics, data processing, scientific instrumentation, and electrical generation. It's an impressive list of investments, containing names to conjure with—if your taste runs to conjuring with Zapata Off-Shore, a company headed by George H. W. Bush that had a novel mobile oil-drilling rig, or Digital Equipment Corporation (DEC), which Doriot funded with an initial $70,000 in 1957 and which returned more than $400 million when ARD liquidated its stake in 1972.

With DEC, a legendary company from the dawn of the computer age, we enter a landscape that more closely resembles our own. Doriot left his mark in other realms—principally as an early advocate of globalization, by founding a European-based counterpart of Harvard Business School called the Institut Européen d'Administration des Affaires, or INSEAD. Yet his chief legacy is his quarter-century at the head of the first organized venture capital firm to raise its funds from institutional investors and the public. Contemporaneously with ARD's watershed investment in DEC, others began walking the trails Doriot had blazed: Arthur Rock (a student of Doriot's in the Harvard class of 1951) backed the departure of the "Traitorous Eight" from Shockley Semiconductor to form Fairchild Semiconductor in 1957, then funded Robert Noyce and Gordon Moore when they left Fairchild to found Intel; Laurance Rockefeller formed Venrock, which has since backed more than 400 companies, including Intel and Apple; Don Valentine formed Sequoia Capital, which would invest in Atari, Apple, Oracle, Cisco, Google, and YouTube.

Creative Capital is not a yellowing evocation of a vanished era of business. Nor does it suggest that there are, or once were, more systematic, less speculative ways of investing in technology startups. But if one is struck by how little Doriot's venture capitalism differed from that of today's Silicon Valley, Ante's book does show how the structure of venture capital has evolved. At the 1960s' end, for instance, when Doriot sought a successor at ARD, he favored one of his former students, Thomas

IN A HURRY Georges Doriot in 1931 on the luxury liner *Ile de France*, 10 years after his arrival in the United States from France.

Perkins, who'd made a name for himself as administrative head of the research department at Hewlett-Packard. Perkins found polite reasons to decline Doriot's offer, but his real motive—as he told Ante—was simply that "there was no way to make significant money because of the structure of ARD." Doriot endured bureaucratic regulators who did not understand or care how a venture capital firm differed from other investment companies. ARD suffered because, since it was incorporated as a publicly traded investment company, its employees could not generally receive stock options in its portfolio companies, despite Doriot's ceaseless pleas to the U.S. Securities and Exchange Commission.

The reality that Doriot's company faced from 1959 onward was that a new organizational form—the limited partnership, born in Texas's oil-wildcatting industry—was being adopted by newer VC firms. Ante quotes a former ARD executive who recalled that after he supervised the IPO of one portfolio company, the net worth of that company's CEO "went from 0 to $10 million and I got a $2,000 raise." A VC limited partnership, by contrast, gave its general partners not just management fees but also portions of its capital gains; additionally, it permitted profits to be passed on to its investors without incurring corporate taxes, and it mandated that limited partners stand clear of management. Small wonder that when Perkins helped found Kleiner Perkins Caufield and Byers in 1972, it was as a limited partnership. When Doriot finally accepted the SEC's intransigence, he deemed ARD "not competitive anymore" and sought the merger with Textron.

Similar disagreements continue between government and industry. After the dot-com and telecom crashes, Washington passed the Sarbanes-Oxley Act and new accounting rules for expensing stock options, despite the predictions of many technology executives and VCs that regulation would undermine innovation. John Doerr at Kleiner Perkins, for one, believes that that happened: "Sarbanes-Oxley did have some chilling effects on technology startups in terms of the cost of being able to go public."

What verdict should we award Doriot and ARD? David Hsu, a professor of management at the University of Pennsylvania's Wharton School, says that while ARD suffered from fatal organizational flaws, it made a lasting imprint on the practice of venture capital. Indeed, writes Hsu in a paper he coauthored, by the time Doriot sold the firm to Textron, "venture capital had become a part of the economy, and ARD simply slipped out of existence with its historical mission accomplished." TR

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