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THE MARGARET CHASE SMITH ESSAY

Natural Advantages Are Key to Achieving a Vibrant Innovation Ecosystem in Maine

by David J. Kappos

Maine is perhaps the most singular state in our union—occupying the far northern corner of the country, bordering as many foreign countries as united states, larger than all other New England states combined but very sparsely populated, enjoying natural advantages including stunning beauty and plentiful resources. I grew up in California, having an impression of Maine as an exotic destination with beautiful harbors, stunning coastline, and scenic lighthouses.

Said differently, in my mind, as in the minds of many millions of Americans and perhaps billions of people around the world, Maine has a positive, if misunderstood, brand. A brand that transcends natural beauty, to include work ethic and understated style. And a brand that includes innovation. In the decade plus that I have had a home in Maine and spent substantial time in the state, I have come to understand a simple truth: in many respects, Maine punches far above its weight. This essay will not attempt to explore all of the ways in which Maine excels, rather it will focus on recounting Maine's unique stake in our nation's innovation economy, observing the natural innovation advantages Maine enjoys and considering what it will take to turn those advantages into marketplace outcomes that suit Maine's culture and style.

A BRIEF HISTORY OF BORN INNOVATORS

Maine is no stranger to innovation. It was John Ruggles—a Skowhegan- and Thomaston-area lawyer, Supreme

Judicial Court justice, and senator—who framed the bill that fundamentally restructured the U.S. patent system and the U.S. Patent Office in 1836. It is no wonder that the people of Maine have a rich history of inventive problem solving. Maine's unforgiving environment and geographically dispersed population combined to make innovation not a luxury but a necessity. Indeed it was necessity—the mother of invention—that produced the Maine inventor and statesman remembered as the “father of the U.S. Patent Office.” The first patent issued under the 1836 regime (U.S. Patent No. 1) on an improved locomotive steam-engine designed to combat “the evil effects of frost, ice, snows, and mud” and traverse the “obstacles met within ascending inclined planes” was granted to none other than Ruggles himself.

The Yankee work ethic with which Mainers have customarily met their rugged surroundings has been passed down from generation to generation, producing a tradition of inventiveness born of demanding labor and harsh climate. The patent office contains ample evidence of enterprising interactions between Maine's people and its environment. Silas Taber, a Houlton blacksmith, set out at the dawn of the twentieth century to solve a problem presented by the topography of Aroostook County: a low platform for wagons was ideal for loading potatoes but large wheels were necessary to traverse the uneven terrain. In 1903, Taber was granted U.S. Patent No. 719531 for his drop-axle wagon, which solved the problem and became a popular item on New England farms for

as long as horse-drawn wagons remained in use. Chester Greenwood, the son of a Farmington bridge builder, was still a teenager when, in 1877, he was granted U.S. Patent No. 188292 for his “improvement in ear-mufflers.” By 1936, the year prior to his death, Greenwood's Farmington-based company was producing and shipping 400,000 earmuffs annually.

Maine's work ethic extended indoors within its mills as the Industrial Revolution took hold. And so too did Maine innovation. Proving that invention was not just a man's prerogative, two of the most prolific Maine-born inventors at the turn of the twentieth century were women. Margaret Knight (of York) and Helen Augusta Blanchard (of Portland) combined to obtain at least 50 patents that fueled advances in the textile, paper, and other manufacturing industries. From the fields to the mills, the men and women of Maine met their challenges with a remarkable penchant for invention.

MAINE'S NATURAL ADVANTAGES TODAY

I find myself regularly impressed by modern expressions of Maine's unique innovative spirit, which I encounter as I spend time in the state. Not long ago I met a Mainer who created a new portable power generator for use in remote areas. This remarkable invention uses a power generation/storage unit connected by a flexible shaft to a propeller. The entire device is placed in a stream and can generate electricity in water of just a

few inches depth. This is invention in its purest form—encountering a problem firsthand and working out a solution, largely through trial and error.

We imagine such feats of engineering innovation as the exclusive province of full-time scientists with Ivy League Ph.D.s, working in highly controlled research facilities. While institutional research plays a significant role in innovation, there is simply no substitute for native understanding—understanding that comes from doing. It is abundantly clear from my travels that Maine is a “doer” state. And Maine does innovation.

The people of Maine have the inherent qualities necessary to thrive as innovators. The state can and must embrace its predisposition toward innovation—but on its own terms. Maine’s future as a player in the twenty-first century innovation landscape relies on leveraging its natural strengths. Ironically, the elements that discouraged heavy settlement centuries ago are responsible for Maine’s attractiveness today; the remarkably unspoiled country Maine has to offer makes it a place where people of all stripes want to be.

The people Maine attracts and retains represent the state’s greatest natural resource in fostering innovation. Among those who choose to spend significant time in Maine are large numbers of industry leaders who have built successful careers in Maine or elsewhere and are drawn to the state for its idyllic surroundings. These are senior people in their fields (some still active in the work force and others in active retirement) with rich and varied business experience—people from whom much can be learned. People who have been there and done that, and have the gray hair to show for it.

In my former role in the federal government as undersecretary of commerce and director of the U.S. Patent and Trademark Office, I had the opportunity to speak with innovators the world over.

Both globally and in America in particular, the innovative spirit is alive and well. But the single greatest challenge facing innovators isn’t generating great ideas; it’s turning those great ideas into successful marketplace outcomes. And the number-one reason great ideas fail to reach the marketplace is not a lack of drive to move them forward or a lack of capital; it is, in fact, a lack of access to mentorship. Time and time again, in every corner of the world, I found a near vacuum of senior stewards available to guide the next generation of smart, energetic innovators with tomorrow’s big ideas. The result: frustration and failure, as inventors unguided repeat the mistakes of the past, groping in the dark, expending energy and talent in wasted effort.

Reenter the state of Maine and connect the dots. Maine enjoys an abundance of just the missing ingredient most other communities lack: potential mentors. Its special attractiveness to successful industry leaders is simply the key ingredient to a thriving innovation ecosystem. To these leaders, Maine is more than *Vacationland*—it is an environment where leisure and peace of mind can be complemented by opportunities to serve as mentors for future innovators. When connected to the next generation of talent, this reservoir of experience unleashes our one inexhaustible resource—innovation—at a level of efficiency few other communities can match. For Maine’s innovation scene, in other words, gray is a good look!

Beyond its attractiveness to those of us from away, Maine has a lasting appeal to its native-born residents. Importantly, it is an affordable and beautiful place to raise a family and build a business. Invaluable to Maine’s ability to thrive as a center for innovation is that people who know Maine want to be here and want to stay here. So long as jobs are available in the state, why would a Mainer want to go anywhere else? The key to building

innovation infrastructure is thus to provide a steady stream of jobs in the innovation sector by honing those industries for which Maine is ideally suited.

THINKING OUTSIDE THE BOX —AND OUTSIDE THE STATES— WITH AN EYE TOWARD BIG DATA

As was true for Maine innovation in centuries past, the state’s distinctive natural environment will likely shape Maine’s innovation future. Its circumstances are unique—trying to duplicate in Maine the successful patterns of innovation in other states or regions would be misguided. In identifying a more fitting model, Maine would be wise to think Nordic. The Nordic countries, with their densely forested terrain, ready access to renewable resources, predominantly rural populations, rich maritime culture, and cold climate punctuated by pleasant summers, in many ways have more in common with Maine than even the state’s New England neighbors.

Northern European countries (specifically Sweden, Finland, and Norway) have successfully leveraged their geographically distinctive features to become serious players in the rapidly ascending data server industry. The explosion of goods and services marketed over the Internet and vast increases in bandwidth available over the Internet have led to increased demand for the storage, analysis, and movement of data. So-called server farms are increasingly used to fulfill the ever-increasing needs of big data. The enhanced capabilities of server farms, however, are accompanied by major cooling costs. Server farms use tremendous amounts of power and generate concomitant heat—anathema to computers, which are particularly vulnerable to overheating. Thus the growth of server farms is slowed by the high cost of cooling.

Maine’s proximity to the Arctic Circle makes it a viable North American

surrogate for the role the Nordic countries play in Europe. Its cold climate makes Maine an excellent sanctuary for computer servers. Furthermore, as was true during the Industrial Revolution, Maine's proximity to the ocean adds value in this new wave of digital industrialization, especially through Maine's leadership in renewable wind technology. Add to these strengths the security benefit offered by low population density—with its related low levels of anonymity—and Maine is a natural candidate for hosting North American server farms.

Maine has already demonstrated its commitment to building data transfer infrastructure with the completion of its 1,100-mile Three Ring Binder fiber optic network. I applaud Maine's forward-thinking leaders for investing in this project to position the state as a player in the data revolution. Policymakers must build upon the state's success in this area and explore ways to create incentives for web service providers to make Maine not just one, but the server farm provider of choice for U.S. web traffic. Looking to the Nordic countries is by no means an invention to Mainers—the state has been doing this for ages. Let's run that play again, informing Maine's leadership toward leveraging the state's natural advantages to achieve sustained success in innovation.

DEMOCRATIZING YANKEE INNOVATION

Maine's potential to develop a world-class innovation environment has never been greater than it is today. Advanced manufacturing technologies are having a profound equalizing effect on the process of turning ideas into products. Maine's relative lack of access to large-scale manufacturing—a longstanding impediment to innovation success—is offset by the advent of micro-manufacturing. A pronounced decrease in tooling costs greatly reduces the necessity of major

manufacturing facilities. And while in its infancy, additive manufacturing (also known as 3D printing) promises even greater opportunity for highly adaptive manufacturing in the future. Democracy in manufacturing is a boon to a state that already counts among its assets a population of doers, scenery that acts as a magnet to mentors, and proximity to renewable energy resources. The world, in my estimation, has caught up to Maine's advantages.

Continued promulgation of fabrication labs is crucial to Maine's ascent in innovation. The University of Maine has wisely made bold investments in such facilities. In addition to large-scale projects that promote industry partnerships, Maine would benefit from an increased number of smaller-scale "maker spaces"—shop floors equipped with the tools needed for Maine's innovators to test their inventions. Localizing access to manufacturing will allow Maine's natural-born doers to build prototypes and turn their ideas into marketplace outcomes. Increased maker space represents a key addition to Maine's innovation regimen, necessary to enable the relatively under-sized state (population-wise) to punch well above its weight. For those who long ago wrote off Maine as a hub for manufacturing, I say, "Not so fast!"

CONCLUSION

Maine is well positioned to play a significant role in American innovation in the twenty-first century. Its historical "disadvantages" inspired inventiveness and instilled in the Maine character a work ethic that will be crucial to its future role as an innovator state. Critically, those former disadvantages are sources of distinct competitive advantage today. Maine's pristine beauty provides leverage to attract mentors aplenty that are in such short supply elsewhere, and its cold climate can be leveraged to attract one

of the hottest sectors in the world today: big data. Maine has much to celebrate in its history of innovation and—more importantly—much to look forward to, provided it plays thoughtfully the high hand it has been dealt. Personally, I am excited to be a small part (from my own Otis Point perch) of the flourishing innovation I am confident lies just over Maine's remarkable horizon. 🌊



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