A Brief Shining Moment

The History of the Internet in Nova Scotia

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Prologue

Mike Martineau is sitting in his office in Ottawa. I'm in my basement in Halifax. It's late September 2011 and we're talking face-to-face this afternoon, thanks to the magic of the Internet and our video-camera equipped computers.

In 2011, of course, this is no big deal; it's so commonplace, in fact, it has its own name—Skyping. But back in the late 1980s and early 1990s—which is the era Martineau and I are reminiscing about today—there was no such verb as "to Skype." Or to Google, Facebook, or tweet.

While it is more than just a stretch to suggest we do all those things today because of a fortuitous collision of people, events, ideas, circumstances and coincidences that came together back in Nova Scotia at that time, it is far from immodest or unreasonable to note that, for one brief, shining moment, Nova Scotia really was one of the centres of the fledgling Internet universe.

"At one point," Martineau recalls proudly, "Nova Scotia had the highest use of the Internet on a per capita basis in the world. We knew in our hearts we were doing something that was fundamentally game changing. This was going to change the world."

The world did change. And Nova Scotia did play its small part in changing it.

A brief shining moment

One can begin a broader history of the Internet at any number of arbitrary moments in time.

We could start, say, in 1961 when a doctoral student in electrical engineering and computer science at the Massachusetts Institute of Technology named Leonard Kleinrock published a paper entitled "Information Flow in Large Communication Nets," which essentially established a "mathematical theory of packet networks."

Or perhaps two years later, when a computer scientist named J.C.R "Lick" Licklider wrote an obvious-to-us-now memo to the "Members and Affiliates of the Intergalactic Computer Network," in which he suggested it might make sense to join computers together in a network so they could share information, and described something similar to what we now know as the Internet.

Or we could begin on that day in 1971 when a young computer programmer named Ray Tomlinson sent a test message to a colleague using a program called SNDMSG he'd tweaked while he was supposed to be working on some other, more important assignment. His simple tinkering made it possible for the first time to send text messages to users at different computers by using the "@" sign in the address to indicate that the user was at a certain computer. And thus, email was born.

Or how about that that day in July 1977 when a group of grad students at the University of California sent "packets" of digital information from a van along the San Francisco Bay Freeway on its faster-than-a-rocket, 94,000-mile satellite-landline-network journey across the Atlantic to Norway and London, then back to West Virginia and on home to Southern California in order to demonstrate a new communications protocol they'd developed called TCP/IP.

Or on January 1, 1983, when computer engineers finally officially made the switch to TCP, adopting the protocol that allowed the network to expand exponentially.

The reality is that none of those now historically defining moments in Internet history seemed quite so momentous at the time.

The same can be said of the beginnings of what would become that brief shining moment of the Internet in Nova Scotia.

While there are any number of potential entry points here too, let's begin our own story back in 1984 with a telephone call from Janet Wright to Peter Jones. Wright was one of the country's best known corporate headhunters; Jones was her quarry. Her client was Dalhousie University in Halifax, Nova Scotia, which was in the market for someone to reorganize and run its computer department. Wright thought Jones would be ideal for the job.

Jones, a British-born mathematician, was intrigued. He'd started his career at Rolls Royce where he was part of a team of 10 mathematicians working on an "electronic brain" project, but had switched to teaching—"I always knew I ultimately wanted to get into academics"—when Warwick University opened its doors in Coventry in 1965. Jones became the first Director of its Computer Centre as well as a Senior Lecturer in Computer Science. Twelve years later, he came to the U.S. on a sabbatical and decided to stay. After two years enduring American "immigration hassles," however, he opted to settle in next-door Canada where he landed a job as Computer Services Director at the University of Western Ontario.

While at Western, Jones had become a key player in a consortium of six Ontario university computer services directors who developed OUNet—Ontario Universities Network—a cost-shared computer network to connect those universities to one another. But it was an article he'd written while at Western—about the potential for students to communicate online with their professors—that piqued Dalhousie's interest and led Wright to ask Jones if he might be interested in a job in Halifax.

"She asked me in a roundabout kind of way," Jones remembers today. "Dal did not seem to have its act together at the time, and this seemed to be a new job with wider scope than usual. So it would be a good challenge." The clincher: Dalhousie "was located beside the sea." Jones took the job.

His first task was to reorganize existing computer facilities and services under a newly minted umbrella known as University Computing and Information Services.

While Jones understood that one of his key longer-term objectives would be inter-university connectivity, he says his initial focus was simply on "good communications within the university," connecting labs of PCs to the mainframe and developing central support of distributed computers.

One of his first—and most important—hires was John Sherwood whom Jones plucked from the lab at the medical school to become his Director of Communications and

Hardware Services. "He was bright, able and he had a good background," Jones remembers.

Sherwood had been working at Dalhousie for 16 years, ever since he'd landed a summer job in the Biophysics lab while still an undergraduate. After graduation, he'd joined Dal full time, working in a medical lab that had become a world leader in heart research. Sherwood's role in the lab was as "programmer, designer, gadget maker."

As interesting as that job was, Sherwood had been at it for many years and "it was just time to try something else." After Jones arrived, Sherwood had helped him with the initial set up of the new UCIS and "the more I worked with [Jones] the more I wanted to be involved."

It was a time of rapid technological change, which meant the demands for communications and hardware services were intense. Sherwood was responsible for everything from the university phone system—"We went from a single secretary who was answering all the phones and converted to direct-in dialing"—to acquiring and installing the university's first fibre-optic cable. "At that time, I knew little about networking and nothing about fibre-optic cabling. You couldn't go to Google to find out what you needed to know, so we went the manufacturers, Nortel and Digital Equipment, and eventually figured out what we needed."

At the time, there were small, standalone computer centres in many university departments—the Business School, Computer Science, the Medical School—and Sherwood set about connecting each of them back to the main computing hub in the basement of the Killam Library. The more departments he connected, of course, the more "other departments became anxious to get the same." In 1987, Dalhousie introduced a campus-wide email system.

That, inevitably, led to demands for better communications with other universities. By 1985, NetNorth—the evolution of the OUNet system that Peter Jones had helped launch while at Western—had gone national connecting 65 institutions across the country, almost all of them universities. The network also reached into the United States via BITNET, a four-year-old co-op network of American universities.

It was a cumbersome, clumsy system. Dalhousie was the Nova Scotia hub, with slow links out to the Technical University of Nova Scotia, Saint Mary's and Mount Saint Vincent universities in Halifax and Acadia in Wolfville. Dal's own link to the larger network snaked through the University of New Brunswick. And so on and so on. Because the network used a store-and-forward system, "a message, say, from Ryerson Polytechnic in Toronto, bound for Acadia University in Wolfville would be routed in its entirety to the University of Toronto, then to the University of Guelph, on to the

University of New Brunswick, down the pike to Dalhousie University, and finally to its destination at Acadia."[1]

While it may not have been an ideal system, the fact costs were shared according to size, John Sherwood notes, "made it affordable for Nova Scotia because central Canadian universities were paying more."

But the BITNET network was already being overtaken by something called the Internet and its new Internet Protocol Suite known as TCP/IP. Developed at Stanford during the 1970s—those grad students I mentioned earlier, under the direction of Internet pioneers Robert Kahn and Vinton Cerf—its purpose was to make it possible to connect almost any network, regardless of its individual characteristics. In 1982, the US Department of Defence had made TCP/IP its gold standard for military computer networking. Three years later, the Internet Advisory Board, an organization set up to oversee the technical side of the Internet, began touting TCP/IP as the way of the future for the entire computer industry.

"There was a real sense that the Internet was going to be big and that we needed to be in on it," Sherwood remembers. Not that anyone had any clear idea of how it might unfold. "What will this ultimately mean? What will industry do with it? We didn't know the answers to those questions but there was a sense… Build it and it will be used and become an important part of the infrastructure."

They weren't the only ones building. Or imagining.

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"What's my husband going to do—fish for lobster?" Lise Manchester asked when the recruiter from Dalhousie University called her in British Columbia to invite her to interview for a job in Halifax.

"What's he do?" the recruiter asked.

"He's a UNIX systems manager."

"Tell him to come along. We'll interview him too."

[1] This quote comes from Alexa Thompson's *The History of the Internet in Nova Scotia*, published in 2005. Thompson's helpful report provided the information backbone for this narrative.

And that was how, in November 1986, Lise Manchester's husband, David Trueman, landed a job in Dalhousie University's 's Mathematics and Statistics Department.

It had been a long strange journey. Born in Peterborough, Ontario, in 1958, he had played academic hopscotch through the University of Toronto, enrolling first in Physics before deciding it was "too abstract;" considering Music before realizing "I had neither the talent nor the background" for it; discovering a fascination with Biology, which would eventually become his major, during a summer job as a Research Associate on a black fly project in Algonquin Park; and then, finally, going on to study for his Master's in Zoology. He'd completed all the course work and research for his project—on mosquitoes—before realizing the university's computer programs weren't up to the task of analyzing the reams of data he'd collected. So he decided to write his own.

"I had no background in computers," he allows, "but no one knew much then, so I just did it. And then, I got more and more interested in computer systems."

Although Trueman did eventually complete his Master's, he'd by then landed a job as an Assistant Systems Manager in the University of Toronto's Computer Department.

"Those were the early days of UNIX," he recalls. "Every evening at 6 p.m., after the long distance rates would go down, we'd dial up Duke University and get our daily fix (of news and information)."

When his wife got a post-doc position at the University of British Columbia, he followed and landed a job as UNIX systems manager there. A year later, they moved back across the country to Halifax.

Trueman still remembers his introduction to his new city. "When we came for the interview, Halifax was stuck in fog and the plane couldn't land. So we ended up going to Moncton and then taking a three-hour bus ride. Welcome to Halifax!"

But he quickly took a shine to the city—and his job as the Assistant System Administrator in Math and Stats. "We were involved in the nascent days of the Internet," he recalls.

He also inevitably became involved with the local UNIX users group, known as UNIFORM. Its members included techies from local computer companies like Dymaxion and Maritime Telephone and Telegraph, government researchers from organizations like the Defence Research Establishment Atlantic and the Bedford Institute of Oceanography, other local university systems geeks like Daniel MacKay and Trent McDougall and… an unlikely, unaffiliated guy named David Murdoch.

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David Murdoch, who was born in Portsmouth, England, had ended up moving to Canada in 1968 for no better reason than he was "looking for something different" to do with his life. "I wasn't much of a scholar," he recalls. In England, he'd worked mostly as a surveyor.

When the Canadian immigration officer asked him if he knew anyone in Canada—which would have given him extra points on his application form—Murdoch allowed that he didn't. But his father had sailed on the North Atlantic supply convoys during World War II, he offered, so his father had spent some time in Halifax. The immigration dutifully wrote down that Murdoch knew people in Halifax, which is how he ended up in the city.

In 1970, he decided to study engineering at Dalhousie, but "I got scared off by the chemistry." Instead, he graduated with an undergraduate degree in mathematics and a minor in English. For his Master's degree, he switched to business, not so much because he was interested in business but because his math professor-mentor—Michael Kirby—had switched departments and Murdoch followed. Their focus was operational research—a discipline that deals with the "application of advanced analytical methods to help make better decisions"—a then-increasingly popular, pragmatic sub-discipline of mathematics.

Soon after graduation, however, "I had a nervous breakdown," Murdoch recalls. "After that, I couldn't cope with stress and I wasn't able to take jobs where I would have had serious responsibility." He drifted through a series of relatively menial positions—he was a postal worker, a locksmith—before landing a permanent position as a storesman in the Ships Repair Unit at the Halifax Dockyard in 1986.

Eventually, he'd saved enough to buy his own first personal computer, an old IBM 286, but he wasn't comfortable with its Windows operating system. "During university I'd worked primarily with mainframes running UNIX, so I installed a UNIX look-alike program called Coherent that came on three 5 ½" floppy disks. Later, I discovered there was this UNIX users group and I began going to meetings. It was intimidating. I was in way over my head. But I started asking some very basic questions. That was how I met David Trueman."

Eventually, Trueman allowed Murdoch to use a "back door" from the Math and Stats department into the Internet. "I'd dial into the modem, get my news and email using UUCP, UNIX-to-UNIX communications, transfer the data to my home computer, hang up and read it offline."

It was primitive, "but it gave me the chance to participate at another level," he says. And to imagine possibilities.

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What we now know as the Internet—that massive, interactive digital storehouse of everything everywhere now used by nearly 2.3-billion of us and growing[2]—originated primarily as a private vehicle for the U.S. military and its researchers and scientists at far flung universities and research institutions to get access to the most powerful research computers, wherever they were located, and to communicate with each other efficiently and securely.

While the goal wasn't—as later folklore had it—to design a network that could survive a nuclear attack, it had to be built in such a way that it could keep operating even if parts of the network were compromised.

By late 1969, the Defence Department's ARPANET—Advanced Research Projects Agency Network—had become the world's first working packet-switching network. Packet switching—essentially breaking data into smaller chunks and sending each packet along whatever route is available and fastest, then reassembling the pieces back into its original whole at its destination—was more secure, less error prone and made more efficient use of the network.

As ARPANET expanded in the U.S. during the 1970s and early eighties, Canada's Department of National Defence had begun looking at establishing a similar network that could not only link its own scientists together but also connect them to their American counterparts through ARPANET.

After a number of false starts and disappointments, the Communications Research Centre, the federal government's "primary laboratory for research and development in advanced telecommunications," created a pilot project in 1985 for what would become DREnet—the Defence Research Establishment Network.

DREnet initially linked researchers at the Defence Research Establishment Atlantic (and later the National Research Council) in Halifax, Nova Scotia, with the CRC in Ottawa and, through Ottawa, to ARPANET in the United States. The decision to hook up

[2] According to NewMediaTrendWatch—http://www.newmediatrendwatch.com/world-overview/34-world-usage-patterns-and-demographics—"there were an estimated 2,267,233,742 internet users worldwide at year-end 2011… This represented about 32.7% of the population worldwide and a 528.1% growth compared to 2000."

Halifax first was practical; researchers there were working with their counterparts at Stanford University in California on an artificial intelligence project and needed access.

The new network was developed by a post-doctoral fellow at CRC named John Robinson and a young computer whiz named Mike Martineau, who worked for Software Kinetics, an Ottawa-based defence contractor.

Martineau, who was to become central to the development of the Internet in Nova Scotia, was an unlikely amalgam of artsy-computer-geek-engineer-capitalist-salesman.

When he was still in high school, Martineau's dream had been to be a writer. Writing, he explains, was infinitely malleable, a chance for a bright, ungainly kid who wasn't good at sports and "couldn't draw a straight line or cut a piece of wood on the line" to express his creativity.

But his practical "I'm-a-capitalist-at-heart" side knew writing wouldn't likely fulfill his material ambitions. "I wanted to have the money to do what I wanted to do when I wanted to do it. And I had promised myself I wouldn't let what happened to my father happen to me."

Martineau's father, whose French-Canadian family had migrated to the US early in the century to find work in the New England textile industry, eventually became a manager for the Singer Sewing Machine Company in New York and later Montreal. But he was frequently passed over for promotions "because he didn't have an MBA."

Young Martineau decided he would make pragmatic educational choices. And since he knew engineers were in high demand, he decided to abandon writing for the more prosaic but more rewarding life of an electrical engineer.

But the summer before he registered at the University of Toronto, he took a free computer course offered by his local CEGEP, the Quebec equivalent of a community college. "I was hooked," he remembers now. Though he says he wouldn't describe the moment as a "religious experience… I did know immediately that *this* is what I wanted to do with my life."

To Martineau, the computer — "infinitely malleable, you can build castles in your mind and actually see them on the screen" — was more than just a collection of hardware and software. It was an opportunity to make sense of the conflicting thoughts and ambitions running through his 19-year-old brain.

Computing not only provided an outlet for his creativity but the field itself was exploding with career opportunities. "I knew then that whatever I did was going to have something to do with computers," he says.

Despite that, he also made a "conscious decision" to stick with engineering rather than switch to computer sciences, partly because he wanted to learn the discipline of engineering and partly because "I decided engineering was the best way to learn exactly how computers really worked from the inside out."

Still, he took as many computer programming electives as he could and, even before he graduated in 1981, was recruited by Honeywell, the giant computer firm.

Between his recruitment and his arrival on the job, however, the economy took a nosedive. Honeywell began cutting back "and it quickly became clear there was nothing for me to do." He also discovered he didn't like the bureaucratic culture of a big company — he was reprimanded once for failing to go through proper channels to get a defective computer modem replaced, and warned that "if it happens again, we'll have to take away your terminal."

To make matters worse, he and his then-wife Merrilyn — an Anglo-Quebecker he'd met while attending CEGEP and married during university — decided they didn't like living in Toronto either. "It was too big, too expensive."

So they decided to move to Ottawa, a burgeoning high tech community within driving distance of her family in Montreal. Martineau took a job as a project engineer for Gandalf, a high-flying high-tech firm and then switched three years later to another young Ottawa technology company, Software Kinetics. Martineau's boss, Tim Symchych, had been largely responsible for the firm landing its DND contracts. As the company's senior software engineer, Martineau had gotten the opportunity to work on projects ranging from upgrading the Indonesian telephone system to developing software for the Department of National Defence.

It was a DND project, in fact, that first brought him to Halifax in the summer of 1988. "It was August and Ottawa was melting at 38 degrees Celsius," he says with a laugh. "Halifax was just 29. The weather was great, the place was great, the people were great. I loved it here."

Back in Ottawa where his bosses were already thinking of setting up a branch office in Halifax in order to qualify for more military contracts, Martineau's enthusiasm made him the prime candidate to head up the operation.

It made good business sense. Software Kinetics was a defence contractor. Halifax had a significant defence establishment. "My job was to chase software support work in Halifax," he recalls. "The original expectation "was that it would be a small branch office with a maximum of 10 or 15 people on staff."

But then, "literally a week after I arrived in Halifax, I got this phone call from Peter Jones."

The call changed everything.

For everybody.

And would soon put Halifax on the Internet map.

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The dream of creating a province-wide computer network wasn't new. In the mid-eighties, the Nova Scotia CAD/CAM Collegium and the Nova Scotia University Computing Centre Directors had even submitted a conceptual proposal to the provincial government for what it envisioned as a network for the province's universities and colleges, with some minimal industry involvement. But that pitch had disappeared into a government-proposal black hole.

Another version re-emerged in 1988 after Premier John Buchanan—gearing up for a provincial election—announced grand plans to spend $12 million to "enhance communications" in the province. The initial vague idea was to buy a supercomputer with $2 million set aside for what Martineau describes as "the communications infrastructure to support access to the supercomputer."

Recognizing an opening, Dalhousie's Peter Jones successfully lobbied to put flesh on Buchanan's bare-bones promise by earmarking $2 million of it to create a Nova Scotia-wide Internet connection.

The government commissioned SHL Systemhouse Inc., a consulting firm, to do a cost-benefit study. In September 1989, the consultants recommended the province create "an organization, which we will call the Computer Network Group (CNG) … to operate the Nova Scotia Technology Network… connecting industrial, university and government organizations."

Once it was up and running, the report said, the new network would be expected to pay for itself through what it called "usage and other fees."

By investing $1.5 to $2 million over the first three years, Systemhouse suggested, "government can act as a catalyst in achieving significantly increased benefits"—creating a communications infrastructure for industry, researchers, engineers and businesses to collaborate with each other and with their customers, as well as with

universities and government labs here and elsewhere. Having our own province-wide network would help ensure that "Nova Scotians become early adapters and developers of advanced telecommunications hardware and software, one of the few new technologies in which Canada is an international player."

On January 7, 1989, the province issued a request for proposals. By the end of the month, the government had whittled the long list of six to its preferred shortlist: Dalhousie University, Software Kinetics and DMR Consulting.

Dalhousie should have had the inside track. It already had, as it noted in its proposal, "experience, unique in this region, in the management of multi-institutional networks. Dalhousie is the Nova Scotia hub of the NetNorth network and manages both technical and fiscal issues relating to the network. We are also a major hub and ad hoc manager of the Metro area DECnet, which connects the Applied Microelectronics Institute, Defence Research Establishment, Digital Equipment Canada and all the local universities. As well, we are responsible for the operation of the NOVANET library automation network."

Dalhousie also had in mind to partner with Maritime Telephone & Telegraph, the monopoly provincial phone company, which could not only supply needed communications facilities but also help out with marketing, remote maintenance and security.[3]

When the call came on January 27, 1989, however, there was good news and bad news for Dalhousie. While the university had been shortlisted, the government had concerns about its proposal. "Not enough on the marketing side," Peter Jones scrawled on a piece of paper as he listened to the provincial official at the other end of the line. "Not a business enough proposal." He wasn't completely surprised. After meeting with officials during the preparation of the Systemhouse report in the summer of 1988, he had written to John Sherwood that the politicians "have changed the direction… They are looking for much stronger private sector involvement."

[3] It wouldn't be the last time someone tried—and failed—to interest MT&T in the Internet. The phone company, in fact, had been less than enthusiastic about the government's call for proposals. "They feel it is their area and that they are meeting the needs of industry in Nova Scotia," Peter Jones noted in one memo following a meeting with government and Systemhouse officials to discuss the consultant's recommendations. "I strongly made the point that the carriers are primarily in the business of providing the lower layers only and probably do not even understand the total network concept." John Sherwood also recalls another incident around the same time when he and Don Warner, an account manager at MT&T, flew to Troy, New York, to chat with technicians and executives from NYSERnet, a leading network provider at the time. "John," notes Alexa Thompson in her *History of the Internet in Nova Scoti*a, "was there to learn the nuts and bolts of running a network, but he also hoped the trip would enable MT&T to see the advantages of such a system. Unfortunately it didn't."

While government officials clearly wanted the contract to go to a private operator, they didn't want to lose Dalhousie's expertise either. Instead of trying to go it alone—and getting left out entirely—provincial officials encouraged Dal to go into partnership with one of the other two bidders as a sub-contractor.

In early February 1989, Peter Jones called Michael Martineau to ask Software Kinetics' new Halifax manager if he'd like to meet.

He made a similar call to officials at DMR, of course, but it quickly became clear he was more comfortable with Martineau. It didn't hurt that Martineau was not only a businessman but also an engineer. "I got on well with Mike," Jones says today. "He was a very 'go-ahead guy.' And I could see he had the expertise to do what he said he was going to do."

By the end of February, the two sides had the makings of a deal. Dal would have "prime responsibility" for operations, Software Kinetics for marketing. They would share responsibility for design and development. And they wouldn't get hung up on the notion that prime responsibility meant "exclusive responsibility… It was important for both of us," Jones noted, "to have full participation in the whole project."

Software Kinetics would set up a wholly-owned subsidiary to manage the business and marketing side. While they toyed with whimsical brand names like Fish Net, as well as Net Nova (the flip of NOVANET, which was the name they really wanted but which had already been taken by the library system's online catalogue), they ultimately settled on the prosaic Nova Scotia Technology Network, or NSTN, as the name for their new venture.

Under the terms of the agreement, NSTN would sub-contract Dalhousie's University Computing and Information Services to host the new Network Operations Centre, "configure and install network equipment, operate and maintain the network, and provide the main technical point of contact with clients." NSTN agreed to fund four Dalhousie positions: Peter Jones would act as a consultant to NSTN; John Sherwood would become Network Manager; and two new positions would be created, one to manage the Network Operations Centre and the other to act as the Chief Technician to install and maintain the equipment.

After nine long months of t-crossing and i-dotting, Elmer MacKay, the federal minister responsible for the Atlantic Canada Opportunities Agency, and Donald Cameron, the provincial minister of Industry, Trade and Technology, announced they had chosen "a team headed by Software Kinetics Limited to design, install and operate a technology data communications network within the province. Dalhousie University will be subcontracted to install equipment and manage the technical operations of the network.

"High speed, economical and reliable data links will serve to encourage mutual co-operation in technology development and will provide a readily accessible test facility for new communications services and products," the press release claimed. "More significantly, the network will provide Nova Scotian industry and institutions access to other North American and world-wide research networks, making Nova Scotian technology available world-wide."

No mention anywhere of Google, Amazon, Facebook or any of the other thousands of not-yet-a-gleam-in-the-eyes-of-yet-to-touch-a-keyboard inventors and dreamers.

But what the $1.95 million dollar infusion of government funding did make possible was for tiny, traditional technological backwater Nova Scotia to join the ranks of the country's three largest and most powerful provinces—Ontario, Quebec and British Columbia—and boast its own province-wide computer network linking to the Internet.

"This cooperation between Dalhousie University and Software Kinetics," touted the press release, is "an example of the benefits of combining the technical expertise of a major university with the marketing and entrepreneurial skills of private industry."

In a note to John Sherwood after the signing, Peter Jones wrote: "All we have to do now is make it work!"

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NSTN spent most of its first few months in business simply "getting our feet wet," in the words of Sherwood.

Thanks in part to a nearly nine-month delay between the initial NSTN-Dal agreement in principle the previous spring and final sign-offs from the federal and provincial funders in early November 1989, both Software Kinetics and Dalhousie had been forced "to make other plans for the personnel who were to be assigned to the NSTN project."

An early, sunnily optimistic version of NSTN's Network Implementation Strategy put together soon after the initial NSTN-Dal agreement in principle had called for "finalizing the architecture and topology of the network and its backbone, and selecting vendors for the nodal equipment, modems and central computer" by the end of December 1989.

Instead, by July of 1990, Dal and NSTN were still debating which routers to use. "As we near the final selection for the backbone routers," John Sherwood wrote in a July 3 memo to Michael Martineau, "I would like to state that Dalhousie will do its best to

make whichever unit is chosen work properly. However, in the spirit of our teaming agreement under which technical matters are a joint decision between NSTN and Dalhousie, I would like the following concerns about the Newbridge proposal to be considered by the officers of NSTN."

He then proceeded to list nine specific concerns about the plan by Newbridge Networks, an Ottawa-based networking company Ottawa-based Software Kinetics had chosen as a subcontractor, to use Wellfleet routers. "We have difficulty getting answers from Newbridge to even straightforward technical questions, to the point we no longer have any faith in their ability to support us!" Sherwood noted, adding: "If we must use the Wellfleet routers, we will likely bypass Newbridge and deal directly with Wellfleet." Worse, "neither Wellfleet nor Newbridge have Internet access, nor do they even have registered IP net addresses. This indicates at best a lack of experience and at worst a lack of commitment to the Internet protocols."

That's not to suggest Dal and NSTN hadn't made progress.

As an interim measure, Dalhousie had created a low-speed, 19.2 kbps link between Dal's internal TCP/IP network and McGill University in Montreal. Since McGill already had its own connection to the Internet in the United States, NSTN was officially now hooked up to the Internet too.

By 1990, however, NetNorth—née OUNet—had spawned CA*Net. The National Research Council, which had $2 million to contribute toward a network to link its astronomy research networks labs in Ottawa and Victoria, was prepared to team up with various universities on a network using TCP/IP. During what Sherwood and Jones remember as a "quite confrontational" meeting in Victoria,[4] the universities eventually agreed to join with NRC's proposal instead of going along with a competing Industry Canada plan that would have used a different Internet protocol.

Dalhousie became the Nova Scotia host for the new network. "That was our Internet connection," John Sherwood recalls. "IBM PC/RTs, an offshoot of IBM PC with a different processor to run UNIX. A couple of those set up to run a router and that was our connection—56 kbps."

They were building their network but who would use it? And how?

[4] Mike Martineau says the Victoria meeting was "actually the culmination of many increasingly acrimonious discussions led by Digby Williams from Industry Canada. We had many internal discussions at CA*net regarding Industry Canada's plans, which included adoption of a networking standard other than TCP/IP. Within the CA*net community we referred to Industry Canada's vision as DiggerNet. There is an entire subplot to the Canadian and NS Internet story that would make for interesting reading, filled as it is with ambition, egos, and heated verbal and written exchanges."

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Jay Parsons knew where she didn't want to be. Toronto. She'd just graduated in marketing from the Commerce program at Memorial University in her native Newfoundland, and, after three work terms at IBM in Toronto, "I knew Toronto wasn't where I wanted to settle down."

She wanted a job in a more familiar setting where she could find a balance between life and work. "So I got out my résumé and I wore out my shoes. It was not a great time. There weren't a lot of jobs around."

Finally, through a friend of a friend of her father, the founder of a successful St. John's engineering firm, she managed to get her name in front of "someone in the Nova Scotia government," who passed it on to Mike Martineau, who invited her to come in for an interview at NSTN's new offices in the Burnside Industrial Park in Dartmouth.

NSTN? "There was no Internet in those days," Parsons recalls, "and NSTN was just starting so it was hard to find out any information at all. I did some checking around, made some phone calls. My father was on the National Research Council, so I was able to find out about CA*Net and I became intrigued by the possibilities. I also liked the idea it was a startup because I remembered when my father was starting his business—those were exciting times—and I thought, I want to be involved in a small start-up."

Martineau quickly hired Parsons—"I was the first person to be employed at NSTN"—as Marketing Coordinator. Her duties would include writing press releases, producing brochures, manning booths at trade shows, lining up interviews for Martineau and generally "educating the public" about this strange new thing called the Internet.

Educating the public, in fact, was crucial to Mike Martineau's conception of the task ahead. "We had government start-up money to get it up and running, but then we had to make a go of it. We realized early on that, after we got the universities and a couple of institutions like [the Bedford Institute of Oceanography] on board, we were going to have to find commercial customers if we were going to make a success of it."

The problem was that, to many in the tight-knit academic and research communities who'd originally laid the groundwork for the Internet, the idea of commercializing it in any way was a non-starter. "We were kind of the bad boys of the community," Martineau acknowledges with a certain relish today. "It was supposed to be non-commercial but there was a 'loophole.' The rules didn't actually *prohibit* us from doing commercial things… so we took advantage of that."

But, once his company got past plucking the ripe hanging fruit—"engineering companies like Whitman Benn that wanted access to the defence community"—Martineau understood he would need to create a demand for access among businesspeople who didn't yet know anything about the Internet, let alone that they wanted access to it. And, of course, ultimately, among the general public too.

Which is why he hired Jay Parsons.

"I had an advantage in not being a computer programmer," Parsons says today, "because I was able to relate to people who were new to technology… And, of course, I asked a lot of questions."

***

"You know you're hawking old technology, don't you?" Daniel MacKay baited. MacKay was partly serious, partly just putting in time between freelance tech support gigs. There had been a couple of hour-long holes in his daybook for that day in early February 1990, so he'd decided to wander through an IT trade show at Halifax's World Trade and Convention Centre.

Mike Martineau was there. He'd taken a booth at the show to evangelize his barely-born NSTN to an audience of IT cognoscenti, most of whom didn't have a clue what he was talking about.

Daniel MacKay did. Or thought he did. As he watched this "swarthy and hypnotically smiling [man] prancing back and forth, offering pamphlets and rhapsodic prose about how TCP/IP was going to lead Nova Scotia kicking and screaming into the 21st century," MacKay couldn't help but challenge him. "It was a time when X.25 [another networking protocol suite] was king and ISO heir apparent," he remembers now. So MacKay took up a position opposite Martineau and began disputing his every claim.

If Nova Scotia really was going to be dragged kicking and screaming into the 21st century, he insisted, *a 20-year-old technology like TCP/IP was hardly the way to go.*

MacKay laughs. "Instead of drop-kicking me and having me dragged away by Security," he says today, "Martineau asked for my résumé."[5]

[5] Martineau had a habit of hiring people who criticized him. In 1992, Mark Earhard, a contractor working for Nova Scotia's Department of Economic Development, remembers going to Martineau's office to complain about NSTN' s poor service. "I simply cut loose and railed on Mike about how horrid NSTN's customer support was, then proceeded in the most arrogant of terms to tell him how it should be run… In the hallway after the meeting, Mike offered me a position running customer support for NSTN!"

Daniel MacKay's résumé was… eclectic.

Born on Nova Scotia's south shore, MacKay had been a member of the first-ever graduating class of Parkview Education Centre, a forward-thinking public high school that had opened in Bridgewater in 1981.

Partly because his brothers worked as researchers for the Defence Research Establishment Atlantic in Halifax—"finding patterns in the underwater hum and buzz… '*Oh, that's the Ojibwa travelling at seven knots*'"—he initially enrolled in Computer Science at Dal.

He dropped out a few years later—"I don't remember why"—before returning in the late 1980s to complete his degree.

After graduating in the spring of 1989, MacKay set up shop as a freelancer with an eclectic collection of mostly small-to-smaller clients: "Service for Sexual Assault Victims, Lavalin, Rosovsky Law Office, Nova Scotia Museum, a company that I've totally forgotten called LASMO in Founders Square, Critics' Choice Video, the Linda Joy Busby Media Arts Foundation, Geotechnologies, Sunrise Lighting…"

He usually worked for no more than a few hours each month for each of them, answering questions like: "Which version of kermit do I use to move this file to our Calgary office?" "Can you make us a cable from this computer to this printer?"

After their trade show debate, MacKay immediately sent Martineau his résumé. Following an initial interview, Martineau arranged for MacKay to meet John Sherwood[6] and David Trueman, by then the Systems Manager in Dal's Math, Statistics and Computer Science Department, for a more in-depth interview. Two days after that—on February 22, 1990—Daniel MacKay was hired as the Manager of Dal/NSTN's new Network Operating Centre.

The only complication? MacKay had already scheduled a two-week vacation to Hawaii and couldn't start until after he returned. Jokes MacKay today: "I wanted to get back from that vacation more than any other in my life!"

[6] MacKay quickly became a Sherwood admirer. "The guy has superhuman powers," MacKay says today. "Give him a column of numbers and he can tell you the bottom line wasn't right in two seconds. And a photographic memory! He'd memorize usage patterns, those little squiggles [on a report], and he'd be able to tell you that there was a bump in Chemistry [usage] at such and such a time. 'They didn't run a back up.' Call them…" Perhaps more importantly, "John thinks three to four years into the future. In our industry, that's unheard of."

***

"St FX is on the air!" read the upbeat subject line in the August 24, 1990, email message Daniel MacKay had sent to John Sherwood. The reality—and most of the rest of the message—belied that optimism.

Part of MacKay's duties involved creating points of presence—POPs—to link to the Internet around the province, starting with existing connections at universities, technical schools and libraries.

Most university libraries were already linked to one another through a network called NOVANET.

NOVANET had been the good-news result of a very bad-news late summer electrical storm back in 1985. The lightning triggered an electrical malfunction that ignited a blaze inside Dalhousie University's Weldon Law Library. The fire not only destroyed or damaged hundreds of valuable books but it also wiped out the library's entire card catalogue. Rather than try to reconstruct a paper replacement system, Dal quickly decided to replicate its lost catalogue digitally. It hired GEAC, one of the world's largest suppliers of library information systems, to handle development of its new system.

Coincidentally, Halifax university presidents and librarians had been meeting for close to three years to talk about how to create and manage an integrated automated library system that could handle the ordering, cataloguing, circulation, and bibliographic control of the total holdings of the cooperating institutions.

The fire goosed that talk into action and, by 1988, NOVANET was up and running.

Now all MacKay had to do was convince librarians to let him piggyback his flaky new Internet on their perfectly dependable NOVANET connections. It wasn't always easy. "They were happy with what they had," MacKay remembers.

Once he'd talked them into allowing him to have his way with their connection, MacKay would set up the equipment "on the bench" at Dal to make sure it worked. After that, Marc Dooley[7]—who'd been hired to fill the Chief Technician's job for Dal-NSTN—would handle the actual on-site installation. "You had to boot it over the network," MacKay recalls, "and if it was misconfigured, it wouldn't work. But booting it took 18 minutes. Downloading, booting, waiting and hoping…"

[7] Dooley, an electronics technician who'd just returned from working out west, says he saw the ad in the newspaper for a Chief Technician. "As soon as I read that ad," he says today, "I knew this was the job for me." He laughs. "And it must have been because I'm still here."

Often—as was the case that day at St. Francis Xavier University in Antigonish—things needed tweaking. MacKay had immediately follow up his email subject line—"St FX is on the air!"—with the more complicated details.

"Well, not perfectly smoothly," he wrote in the message. "The data unit wouldn't dial. DTR [Data Terminal Ready] wasn't up. PC/Route wouldn't boot. We removed the write-protect tab from the PC/Route disk and rebooted. DTR came up. The data unit dialed. SLIP came up. The St. FX machines disappeared from the Rover screen."

"Disappeared from the Rover screen" was geek-speak, indicating that the connection was now working correctly.

St. Francis Xavier University was online. Another one done!

***

Daniel MacKay was about a third of the way through this morning's technical presentation for teachers at Parkview Educational Centre in Bridgewater, Nova Scotia—explaining the ins and outs of something called the Serial Line Internet Protocol (SLIP) and how you can use it to connect to the Internet over serial ports and modem connections—when he stopped suddenly and turned to his NSTN colleague Jim Saunders.

"Jim," he said, apropos of nothing anyone in the room could immediately wrap their heads around, "you know my wife went to the West Indies last week." MacKay then nodded in the direction of a piece of paper Saunders was holding in his hand.

Saunders looked aghast. It wasn't that he didn't know to expect something. Before his presentation, MacKay had handed him the piece of paper with two words written on it. "When I cue you, say the first word," Mackay instructed. "Later on, I'll cue you again and you say the second word." What did any of this have to do with SLIP, Saunders must have been asking himself? And MacKay's wife? Saunders knew, if the teachers here didn't, that Daniel MacKay didn't have a wife. He was gay. Still, he did what he'd been told to do.

"Jamaica?" he said lamely.

"No," MacKay answered turning back to the audience in triumph and delivering his drum-roll-please punch line. "She went of her own accord!"

It was, MacKay admits today, a "really stupid joke." He'd gotten it from an Internet newsgroup "for really stupid jokes" called eunet.jokes. "I wanted a couple of jokes to lighten up what was a mostly technical presentation."

Access to eunet.jokes was probably not what organizers of the Learning Connections Project had in mind when they'd initially pitched their idea to Parkview Education Centre's administrators. Learning Connections was to be a joint venture involving the school, NSTN and an Education professor at Mount Saint Vincent University in Halifax. Its more rarified educational goals were to promote "discovery" and "collaborative" learning, not to mention developing better writing skills, enhancing multicultural awareness, preparing students for a rapidly expanding global economy by enabling those in rural areas to communicate with those elsewhere who were already in careers or jobs they might be interested in and…

MacKay's joke not only helped break the Internet ice. It also showed his listeners the eclectic nature of what was available "out there."

MSVU Professor Lorri Neilsen had conceived the Learning Connections Project to see how students in a rural environment would use technology, whether students with special needs would take advantage of it and whether male and female students would use it differently—or at all.

She'd first had to convince skeptical school administrators. "They were concerned that it wouldn't be something that the general students or the special education students would benefit from because they just didn't have the skill or the ability," she would recall later. "Each of those points, of course, were the very reasons I wanted to get into the school system. So there was a real strong resistance."

Teachers were skeptical too. Jeff Doran,[8] an English teacher who became an enthusiastic convert, remembers first hearing about the project in the Fall of 1990. What he learned was that, if his school participated, "we would get new computers and be connected to something allowing students to write to people around the world. I had no idea what this meant. I only knew my school would get something for free."

Daniel MacKay's job this morning was not only to explain to the teachers at his alma mater—some of whom had taught him a decade before—how they could use the newly installed technology but also to show them why they should want to.

He continued with his technical presentation for a few more minutes before turning again to Saunders.

[8] Doran recounted his experiences with the project in *Learning Connections: One Teacher's Story*, his 1995 M.A. in Education thesis.

"Jim," he said, "you know, my wife went to Indonesia last week."

Today, Mackay laughs. "Again Jim's normally calm and cheery face flashed horror and confusion at the now inconsistent lie."

MacKay motioned to the paper.

"Jakarta?" Saunders read stone-faced.

"No, she went by air."

Jim, MacKay says today, "made a *great* straight man."

And Parkview's teachers began to understand that this thing called the Internet thing might actually also be fun.

"On May 1, 1991," Lorri Neilsen would write in a later report on Phase 1 of the project, "English Department Head Clem Mehlman, with Daniel MacKay of NSTN at his elbow, made the Learning Connections Project a reality by sending the first electronic mail message through NSTN out of Parkview Educational Centre in Bridgewater, Nova Scotia. By Friday, May 3, the general English students in Jeff Doran's class had received replies to the messages they sent to a Pittsburgh school.

"Within days, the [school's] computer room, which up to then had been used only 50 per cent of the school day and only for scheduled classes, filled to capacity. The room's 10 Commodore PCs were soon in use 100 per cent of the school day, with classes doubling up to make use of the network, and students and teachers staying after school and on weekends to make electronic connections."

John Sherwood had been right: "Build it and it will be used."

***

Tom Regan had just returned to Halifax after a year in Boston as a prestigious Nieman Journalism Fellow. Sitting in the front yard of his mother's south-end Halifax house one sunny summer afternoon, Regan happened to be talking with his sister Greta about Rigoberto Manchu, a Nobel prize-winning Central American Indian activist.

"I had always imagined that I knew a lot about her, being a journalist and all," Regan recalls today, "but my sister was staggering me with all his data she was throwing at

me about Manchu. I asked her where was she getting all this information from? She told me from the 'Internet.' This was the first time I had ever heard the word Internet. So I asked her how do you get an Internet connection, and she said you either had to work for the government or be a student. Well, since I neither worked for the government nor was I a student, I thought my chances of getting an Internet connection weren't very good."

But it turned out that the *Halifax Daily News*, the newspaper where Regan worked, had its offices directly across the street from NSTN's headquarters in Burnside. "So I went over to NSTN and talked to their founder, a guy named Michael, and spent $300 to buy the Mac software needed to connect my computer to the Internet."[9]

Regan not only quickly became hooked on the Internet himself, but he began to write columns and stories about NSTN, the Parkview experiment and the marvelous possibilities of this new "information highway."

***

Roswell James had signed up for a booth at the ninth annual Atlantic Canada Computer Show at the Metro Centre in Halifax because he knew he had to expand the market for his fledgling computer bookstore. The question was how.

Just over two months earlier—on July 1, 1992—he and his wife had opened Roswell's Computer Books on Brunswick Street in Halifax. It wasn't his first bookstore venture.

Born in Montreal, he'd studied TV production at what was then Loyola College and George Williams University. He got his degree but with a caveat; his teachers recommended he never actually work in the industry because the stresses or working in the editing room could trigger episodes of the epilepsy he'd developed as a teenager.

So James moved to Toronto in 1980 to study computer programming while working to support himself at The World's Biggest Bookstore near Ryerson Polytechnic. At the time, James recalls, "there was only one shelf of computer books. Since the [store's book] buyer didn't know how to turn on a computer, I was allowed to run the computer section. A year later, it was doing a million dollars in sales."

Initially, his customers were computer professionals but then along came personal computers and everyone wanted to know how to use them. "Computers became bigger

[9] Shortly after he bought his software, Regan remembers, the price dropped dramatically. "I went to Michael [Martineau] and I said 'Hey how about a rebate?' And he said something that has stuck with me my entire life online: 'Tom, it costs to be on the bleeding edge.'"

than anything else and created its own department." By the time he left three years later, the computer department was doing $3 million worth of business each year "and we even beat out fiction for sales."

In 1983, the University of Toronto hired James away to run its bookstore. Five years later, he returned to Montreal and opened his own computer bookstore near Concordia University's Computer Science department.

But he soon fell afoul of the province's strict language laws—"I had an 18-foot sign in French outside," he recalls, "but then I put up a small 8 ½ by 11-inch sign in English in the window inviting students to use the laser printer to print their term papers." Soon after, Quebec's "language police" descended on the store.

Disillusioned, James decided to leave Quebec. "I did market research. I knew I wanted to be in a government town, a university town with no competition from another computer bookstore. It came down to Calgary and Halifax. And then a computer bookstore opened in Calgary, so I decided it would be Halifax."

Although Roswell's Computer Books was the only computer bookstore east of Montreal, he quickly realized Halifax—with its metropolitan population of just over 300,000—wasn't a big enough market on its own to guarantee success. "I went to the computer show thinking I would get an 800-number and then advertise for customers throughout the Maritimes."

He mentioned his plans to the woman in the booth next to his. "I'm a naturally talkative person," he explains. The woman's named was Jay Parsons and she represented a company called NSTN. "She said her company was experimenting with using the Internet as a way for businesses to communicate. I said, 'What's the Internet?' I had no idea what it was because, even at that point, there were very few books available about the Internet."

The more they talked, however, the more James began to rethink his 1-800 number strategy. There really might be new—and better—ways to reach book buyers.

***

"What I really want," the IT Director at Halifax-based Maritime Life—the major Canadian subsidiary of the giant American John Hancock Mutual Life Insurance Company—was explaining to Mike Martineau, "is to be able to click and go."

The two men were talking during a break at an event sponsored by NovaKnowledge, a recently formed association to raise awareness about what was being called the knowledge economy and promote Nova Scotia's place in it.

"That's not the way it works," Martineau replied, beginning to explain patiently about gopher and ftp and the ways in which the Internet still actually worked.

The man cut him off. "You're not hearing me," he said. "*This is what I want.*" And he turned and walked away.

Today, Martineau shakes his head. "It was one of those events that taught me to listen to customers. 'This… is… what I want.'"

Luckily, what the IT guy wanted but couldn't yet identify—a web browser you could use to "click and go"—was already in development. And would soon change everything.

***

"What's this for?" Brent Conrad asked his wife, holding up a floppy disk he'd just found among their home computer supplies.

It turned out that the disk contained the software he needed to login to something called NSTN. His wife, who worked as the executive assistant to the president of Dymaxion, a local technology company, had won the disk—and a one-year subscription to NSTN—a few months earlier as a door prize at a technology event.

That Friday night, "with nothing else on," Conrad put the disk in his 386 computer with its "cutting edge" 14.4 mbps modem, and signed in.

Strangely—given that he was a computer science graduate who worked for Maritime Tel & Tel, Nova Scotia's monopoly telecommunications company—Conrad had never heard the word "Internet" before.

A native of New Brunswick, Conrad had graduated with a degree in organic chemistry, discovered there were no jobs in the region for organic chemists, returned to school for a more marketable computer science degree and then landed a job in MT&T's business information division working on financial systems.

When he was a student at the University of New Brunswick, he says, "there was no such thing as email." And no one at MT&T seemed very interested in the Internet.

Before long that first night, Conrad's Internet wanderings had led him to the University of Jerusalem's website where he began pulling up all sorts of documents. It was, he says today, an "epiphany" moment. "I said to my wife, 'Wow! Is this cool, or what?'"

Within weeks, he'd signed up for courses on email and how to use basic applications like newsgroups.

But it would be years before the company he worked for would have its own, "wow-is-this-cool-or-what" moment.

***

Steve Williams sat down in front of a computer in a chilly, outwardly unwelcoming room on the second floor of the Parkview Education Centre. He had an assignment for his Grade 12 French class—a project about Ontario—and his new first stop was the school's computer room. "I went through Gopher," he'd explained to visiting Halifax *Daily News* reporter Tom Regan. Regan then added, in parentheses, for his less computer-savvy readers that Gopher was "a communications program."

"I looked up keyword 'Ontario,' and it gave me a lot of files of information for it, which I could pick through and take information out," Williams continued, adding happily: "It was a lot easier than going to a library and looking for stuff."

In less than two years, the Learning Connections Project had transformed learning at Parkview. The computer room walls were now festooned with tacked-up souvenirs, celebrating student explorations: notes from correspondents in Russia and Hawaii, a map of the world.

One class had written directly to South Africans to find out more about squatter camps there for a presentation on urban housing.

A Grade 12 student, Karla Willingston—who told Regan she'd felt isolated among her classmates because of her fascination with something called "Japanimation"—explained delightedly that she had been able to "just 'phone' people up and find out information that other people around here don't care about. Better, "there do seem to be other people on the Internet who do care about them."

Another student told Regan she'd co-written a novel with a fellow high school student… in Virginia.

Girls turned out to be as interested as boys when it came to using the new technology—provided a female teacher was involved. And "general" students—those not headed to university—often appeared to gain more from their time on the Internet than their university-bound peers, according to the project's chief developer and driving force, MSVU professor Lorri Neilsen.

Teachers, she added, had mixed reactions. Some of them, she said, "loved" it, seeing the computer as a "real opportunity to expand and to extend and to get the curriculum out of the schools. Others were leery of their sudden loss of control."

Which was, in part, the purpose.

"There is something that happens when a student contacts somebody who wants to correspond with them in French," Neilsen explained. "They realize that the person from France can write to them to practise their English and she can write to him to practise her French. Something magical happens that doesn't happen in a text book."

No wonder then that, in April 1993, the Conference Board of Canada recognized that "something magical" by selecting the Parkview-NSTN partnership as the winner of the 1992-93 National Award for Excellence in Business-Education Partnerships.

***

It wasn't fast. When Roswell James arrived at his bricks-and-mortar computer book store in downtown Halifax each morning, the first thing he did was turn on his computer and connect to his new NSTN account. Or try to. "There was a launch script and half the time it didn't work. So I'd hang up and call again. And again."

Once he did finally get connected, he'd log in to his email account—setting up his address at rjames@nstn.ca/Roswell, he recalls, had been a "painful" experience—and begin downloading his overnight email.

"Then I'd go for coffee and I'd clean the store, then I'd come back to the computer after about 25 minutes to find out if my 20 new messages had been downloaded."

It may have been slow, but Roswell Computer Books was online—the first electronic bookstore in Canada, the second in North America.

James and Daniel MacKay had spent four months building the site. There was no World Wide Web then, so it was a text-based, hierarchical, menu-driven no-frills, "gopher"[10] site. But it worked.

Using Gopher, a potential book buyer could search for a specific book among Roswell's 7,000-title database, find out the price, check to see if there any available discounts and then find out how many copies were in stock. To order, however, the customer had to send an email—there were no electronic "shopping carts" then—to James who would respond directly.

To get around the prohibition on advertising, James had—at the suggestion of Jay Parsons—created a signature line at the bottom of his emails, explaining who he was and what he was doing. He also developed an email list—"it was subscriber-based so we never violated the rule of no advertising"—to keep customers and potential customers updated on the latest additions to his inventory.

Roswell's wasn't the only business doing online business through NSTN. He was, in fact, part of a new service called "The Electronic Shopping Mall," which included a company called MarketBase that provided buying and selling services and a Montreal-based music store called The Virtual Record Store offering alternative and import music.

James, whose online store had 500 inquiries on its first day of operation, says his very first order—"I still don't know how he found us"—[11]came from a professor at the University of Edinburgh in Scotland who was looking for a copy of a new computer book that hadn't yet been published in Scotland. "I had a copy on my shelf. He sent me his credit card information, and I sent him the book by courier. Three or four days later, he had the book in his hands. He was amazed."

James was "shocked" too. "I had the mentality that I was operating a bookstore selling to Atlantic Canada. And then this! 'Is this for real?' I asked my wife."

He began to get emails—and orders—from new customers in Israel, Switzerland, California, Australia, and the United Kingdom.

Most of his business was still local and offline, but there was some interesting crossover.

"I got this email from a professor at the community college in Yarmouth (Nova Scotia)," James recalls. "He was looking for 13 different books. We emailed back and forth for a

[10] Developed at the University of Minnesota in 1991, Gopher was a TCP/IP protocol for cataloguing, storing and retrieving information. Though briefly popular, it was soon supplanted by web browsers which offered a more free-form way to find information on the Internet.

[11] NSTN had also registered Roswell's book store site with "Veronica," a then-popular search engine.

while but there was no online order. Then one day I was sorting through some faxes and I realized that he'd ordered 15 copies of the 13 books—he just hadn't done it online. But he did it because of online."

Although his Internet sales were still just a fraction of his online sales, James told one local newspaper reporter. "I love it. We're getting a great kick out of this. And the comments I've been getting from people who are trying to use it, are really helping us improve the system. For me, I love trying to do something new every year. And our new thing this year is the Internet. To really create this online computer book store has been fun."

When another reporter asked him where Internet sales might be in a year, James didn't offer a prediction. "Hey, I don't know," he said. "Who knows? This hasn't been done before."

***

David Murdoch had seen the notice for a Community Networking Conference in Ottawa in August 1993 to discuss something called "freenets." At the next meeting of the UniForm Unix users group, he suggested someone from Nova Scotia should go. Why not you? someone else replied. And so he went.

At the time, there were dozens of private electronic bulletin boards run by computer enthusiasts and user groups like UNIFORM. And there were growing numbers of commercial ventures like Prodigy and Compuserve, electronically providing information and even email communications for those who could afford it.

But what about those who didn't have the resources to pay for such services, let alone buy the computers to run them?

The purpose of the conference was to discuss "the growing movement… to create an electronic service that offers useful information free of charge." Essentially, they were to talk about creating a free local public library for the electronic age.

There were, in fact, already two fledgling community freenets operating in Canada—one in Victoria, another in Ottawa—and conference participants watched a short video called *If It Plays Well in Peoria*[12] about that Illinois city's positive experience creating the Heartland Freenet. Mostly volunteer run, the Heartland Freenet had created an

[12] The video is still available on the Internet: http://www.ibiblio.org/rtpnet/archives/community-net/CommunityComputing.swf.

interactive, 24-hour-a-day community, offering everything from local events listings, to expert advice on automobile repair and legal issues, to pages created by the Chamber of Commerce, the Red Cross, the local hospital and even a student newspaper. Residents could access the freenet from their own computers, or log on from one of the public access terminals set up at local libraries. The video ended with a question from Thomas Grundman, the president of the U.S.-based National Public Telecommunications Network, that was also a challenge to those in Ottawa: "Who is going to join together to make community public access computing a reality?"

"It was all very energizing," Murdoch remembers.

There were five other Nova Scotians, including two librarians—Laura Jantek from the Halifax Regional Library and Marion Pape from the Provincial Library—Mike Dow from NSTN's marketing department and John Chesley from Industry Canada's Halifax office, along with an Industry Canada intern. "I remember at one point we were all sitting under a tree—it was warm and we spent lots of time outside—and we agreed we were going to take this back to Halifax and do something with it."

***

In January 1994, *Wired,* "one of the newest and hottest magazines devoted to the information age and the technology that fuels it," advised readers in its popular Net Surf column that "surfers looking for a good book to carry with them to the beach should paddle out to Nova Scotia, Canada, where lies one of the first online bookstores."

Touting Roswell's Computer Books international electronic presence[13] with more than 7,000 titles and its willingness to accept special orders, *Wired* instructed readers to gopher to nstn.ns.ca: "At the first menu, select 11; at the second, select 7; then you're on your way."

Intriguingly, the column's lead item that month touted yet another new development that would very quickly have profound consequences not only for Roswell's Computer Books, but also for the future of the Internet and Nova Scotia's place in that future.

"The past year or two has witnessed an explosion of new information sources on the Net," the item began. "Previously, a substantial array of tools was necessary to gather this information… Unfortunately, these tools have unique interfaces and require their

[13] That wasn't the only international mention Roswell received. In 1995, Britain's prestigious *The Economist* noted in a report on the online world that a book store "flourishes in Halifax, Nova Scotia—thanks to customers elsewhere, reached via the Internet."

own specialized software and knowledge to use. Now, however, one system ties these diverse sources together into a coherent whole, making it easier for novice surfers to steer clear of the breakers. This system, the World Wide Web (WWW or W3), has become quite popular among the information crowd and is causing quite a few waves of its own."

Better, the magazine added, there was now, finally, a consumer web client called "Mosaic," whose Mac and PC versions were "in beta test phase at this writing… Mosaic is definitely a high-end browser," reported *Wired.* "Its slick combination of pull-down menus and hot keys… form an integrated system that is easy enough for newbies to understand, yet powerful enough for first-class Net surfers to enjoy."

The introduction of Mosaic signaled the end of the beginning for one stage of the Internet. But it would also serve as the beginning of the end for Nova Scotia's central place in that ever-changing world.

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In the three years since he'd first used his wife's NSTN "door prize" to discover the Internet, Brent Conrad had become something of an evangelist for the argument that his employer, Maritime Tel & Tel, should embrace this new technology.

It was not an easy sell. At the time, MT&T had no Internet connection of its own, so Conrad and his small band of fellow evangelists—known around the office as the "techno-geeks"—had to convince engineers to jury-rig connections they could use to link to the web during lunch-and-learns they staged for various executives. "We even brought in Dan MacKay for one of those demos," Conrad recalls.

In another demonstration, Conrad showed how he could use NSTN's dial-up to connect from MT&T to a personal computer in the home of one of his colleagues, Fraser Smith, "something [executives] at MT&T had not seen before. 'Someday,' I told them, 'every company will have a web handle."

With computers becoming part of the MT&T office landscape and more and more of the company's employees hooking up their home computers to NSTN, it should have been an easy sell. Initially, Conrad remembers, "it seemed very encouraging."

Would MT&T really decide to embrace the Internet and, if it did, what would that meant for NSTN?

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The only thing Mike Martineau would remember clearly years later was "the smirk on Mr. Latham's face." Colin Latham was a Senior Vice President at MT&T—later its president—and Martineau had come to the phone company's corporate boardroom to pitch Latham and a group of his fellow executives on the idea of investing in, perhaps even purchasing, NSTN.

"Like many technology start-ups in a fast-growing market, we needed capital to grow the business," Martineau explains. "Launching service in a new city, for example, meant that we had to purchase equipment and make other investments in advance of generating any revenue from the new customer base. Our parent company, Software Kinetics, was limited in the amount of money that they could invest. Hence, the decision to raise money from external sources."

Hence, today's box of slides and collection of overhead transparencies filled with information about NSTN's phenomenal growth to date, along with rosy projections for a connected future… All that was required was a little infusion of new capital.

"I was incredibly nervous," Martineau remembers, "and I could tell by [Latham's] body language that he wasn't buying what we were selling." When Martineau had finished his pitch, Latham "politely explained that the Internet was for 'amateurs and hobbyists.' Organizations needing to conduct serious business, he lectured us, would use commercial data communication services from MT&T."

It was the first of many presentations NSTN would make to potential investors as it attempted to save itself from its own runaway success.

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The idea, as David Murdoch enthusiastically explained to anyone who would listen—and some who would not—was to create a community computer network that would offer ordinary citizens free, easy and interactive access to the Internet…

"My first response," recalls David Trueman, "was, 'how realistic is that?' The limit of my vision at the time was the idea of using the Internet for university research."

But Murdoch's Ottawa conference-goosed enthusiasm was catching, and Trueman soon found himself attending weekly late afternoon meetings in the basement of the Halifax Regional Library where he and an eclectic assortment of other enthusiasts, attempted to

figure out how to translate their vision for a true community freenet—"Every Nova Scotian will have free access to a Community Access Network, as part of a province-wide electronic network linked to the world-wide Internet"—into hardware and software reality.

"The best thing I could have done," Murdoch says today, "was to get David [Trueman] involved. "He had the technical expertise and he was always one step ahead of me."

The core group included Murdoch and Trueman as well as librarians Laura Jantek and Joan Brown-Hicks, Industry Canada's John Chesley, the Department of Education's Bernie Hart, local architect and professor Peter Henry and teacher Renee Davis. Others drifted in and out of the process. Hart remembers "this 90-year-old guy who began to show up at our meetings. We were all puzzled about why he would be there. He just smiled and told us this was going to make a big difference in the world. He kept coming. He never said anything but he was there to see a little of what the future might be like."

"The librarians had a sense of what this network could do and the technical people knew how to make it happen," explains Murdoch. "In the beginning, people were paired. We mentored them," he says, then laughs: "Or maybe it was a two-way street. We had to learn to 'de-teckie' the language we used. It was a huge learning process for everyone, and it worked very well. I don't recall voting, except at official board meetings. It was mostly all done by consensus."

The committee, in fact, operated on two parallel tracks. While one group worked on developing the administrative side—the network's governing infrastructure and marketing plans—the technical group moved forward with creating the software they would need to make the community network work.

One of the key early decisions was that the Halifax group would not employ the clunky bulletin board software most other freenets in North America were then using; Chebucto Community Net, as it became known,[14] would develop its own. "We could have gone with gopher and FTP," Trueman allows, "but we didn't want to provide people with just a connection. If we offered just a connection, we'd enable them to become consumers when what we really wanted was something more vibrant, a community where locals could become producers as well as consumers. We were very interested in the social side of things; we were involved early in what would be called social networking.

[14] There were long discussions over what to call the enterprise, remembers Bernie Hart. "The first suggestion was to call it 'Halifax Freenet.' That didn't go over well in Dartmouth. We also considered 'Harbour' but settled on 'Chebucto' [meaning Big Harbour, which is what the Mi'kmaq called it] as a neutral choice." There were also debates about the then-popular term freenet. "Using the word 'free' seemed to suggest the wrong connotation for what we were doing," Hart says today.

"Because we were [based] in the university," he adds, "we were also aware of the early work on the World Wide Web. At that point, Mosaic was very early in its development and highly unstable. But you could see the potential." The group eventually decided to go with Lynx, a text-based browser, "but it didn't do everything we wanted so we had to modify it."

What made that process work go smoothly and efficiently—it took just seven months to travel from gleam-in-the-eye idea at the Ottawa conference in August 1993 to the official launch of ChebuctoNet in April 1994—was partly the result of what Trueman called his "40% Effort" solution.

Essentially, explains Murdoch, the idea was that you would "make a start on solving a problem but you didn't have to take complete ownership. You made a start and you put it out there and then others could build on what you'd done. Everyone could throw in ideas and send it back and make it better. It felt like we were doing things in a new way."

But soon the question became: they could build it, but who would want to use it?

Since so few people understood what the Internet was let alone what a community net could do for them, the organizers had to undertake a major selling job in the community.

"We'd invite people to information sessions on the third floor of the Chase Building" on the Dalhousie campus, Trueman remembers. "And we'd go into people's offices and set up demos for them to show them how they could use it. We did demo after demo after demo. We talked *ad nauseum*. We proselytized.[15] I'm not a real extrovert," he adds, "so it didn't come naturally. But David [Murdoch] turned out to be a real pit bull terrier. He was ferocious, relentless. He made it happen."

That's not to say there weren't hurdles. One, ironically, was with NSTN. There was "a great deal of negotiation" between NSTN and Chebucto over the contract to provide Chebucto with its "pipe" to the Internet.

[15] Two key Halifax Cablevision officials, Dan MacKean and Jim Smith were among those who came out to a demonstration. "They watched the *Peoria* documentary," Murdoch remembers, "and they were just so focused." "They wanted to be pioneers in the Internet," Trueman adds, "which meant they would eventually be in competition with NSTN. At the time cable modems existed but they weren't being used commercially in most places. Halifax Cable gave us $15,000 for R&D to establish a network connection over cable. Which was huge for us at the time."

"Mike Martineau was extremely uncomfortable," Trueman recalls. "He saw us as competition and wanted to restrict what our users could do. No FTP, text only[16]… I think he'd probably agree now that we were doing him a service."

They were. Back in the early nineties, the idea of computer networking was still exotic and forbidding for many. But thanks to the arrival of Netscape and the publicity that had accompanied it, interest in the Internet had increased exponentially. NSTN, which had recently moved to larger offices in Burnside and hired more staff to process all its new subscribers and keep them billed, now found itself swamped by support requests from new users.

For many, ChebuctoNet served as a less intimidating on-ramp to the information highway, an opportunity for potential users to educate themselves about… well, everything.

David Trueman remembers that Chebucto's first employee, office manager Blaine Murphy, occupied the office next to his at Dalhousie[17]. "He'd sit in his office all day answering the phone, trying to help people who knew absolutely nothing," Trueman says. "I'd hear him being so patient:

'OK, now do you have a computer? No? Well. The best thing is to get one first…'

'Do you have a modem?'

'A what?'

'Well, you take two phones jacks, connect one to the serial port—'

'What's a serial port?'"

Trueman laughs. "Early on, that kind of basic technical advice was absolutely essential."

And it helped feed the appetite for easier, faster, spiffier connections. Indeed, many early freenet users, after test-driving the Internet with Chebucto, quickly decided they wanted the bells and whistles only NSTN could offer.

Could NSTN keep up?

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[16] In April 1994, the same month Chebucto launched its service, NSTN announced it was moving "from an information highway to a super information highway," upgrading its Internet connection to T-1, making it seven times faster, and dropping its prime time charge from $5 per hour to $1, the same price it was charging for nights and weekends.

[17] The university provided the office free of charge.

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On June 17, 1994, Maritime Tel & Tel issued a press release announcing it had signed a deal with Halifax-based Internet service provider NSTN to provide connections to the Internet for its customers.

Within five years, NSTN officials declared, they hoped to have the entire province Internet-ready for MT&T customers.

This "strategic partnership" seemed, at first blush, a milestone moment for both companies, marking MT&T's belated discovery of the Internet but good news for the future of NSTN too. The announcement, suggested the Halifax *Daily News,* "signals that MT&T will not try to start its own Internet connection company."

But there was something curious about the announcement. Instead of publicly touting the agreement, MT&T officials simply disappeared. "When we tried to get more information," the *Daily News* reported archly, "no one in the 3,600 employee company could be found to elucidate."

Curious.

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Tom Regan's fascination with the Internet had only grown since he first went online in 1992. In his columns for the *Daily News,* he wrote often about the latest developments in technology.

Which was how, in the summer of 1993, he had come to download an early beta version of the Mosaic browser with its graphical user interface (GUI). "I had no idea what GUI meant, but it sounded interesting," he remembers. "Once I opened it, I swear to you on my father's grave that the very first thought that came into my head was, 'This is the future of publishing.' It was that day that the idea of putting *The Daily News Online* was really born."

But that idea itself had grown out of an earlier frustration. During the year he spent at Harvard in 1992, Regan discovered just how difficult it was to keep up with the news from back home. "It was the year of the Charlottetown Accord, and I was desperate to find out about what was happening back in Canada. I would make frequent trips to Out

of Town News in Harvard Square. But there were never any newspapers from Canada and, when one did arrive, it was often two to three weeks old. I have a very clear memory of standing next to the Out of Town News and thinking to myself, 'Gee I wish I could use my computer to get news from home.'"

When he first heard of plans to launch the Chebucto Community Net, Regan approached his editors, Doug MacKay and Bill Turpin, with his crazy idea—why not put the *Daily News* online?

The paper—the city's try-harder, smaller, newer, cheekier second newspaper—was always looking for ways to best its Goliath rival, the Halifax *Chronicle-Herald.*

With the support of his bosses, Regan approached "four, very tall, very thin, very white, computer science students in the basement of the Dalhousie Computer Science Centre, who taught me how to write HTML…I like to joke that the original cost of putting the *Daily News* online was $40 and four coffee mugs. The $40 was for the Internet account with NSTN, and the four *[Daily News]* coffee mugs were for the students. They thought that getting four coffee mugs was the greatest thing ever."

At first, Regan would call up a story in the newspaper's computerized pagination system, cut and paste it into a Microsoft Word document, add in HTML coding and then upload it to the Chebucto Community Net's server. Initially, he only posted a story or two a day but readers began to take notice and soon the paper decided to publish the entire newspaper, including local and wire stories, even the daily editorial cartoon, online.

As a result, recalls then-editor MacKay proudly: "The wee *Daily News* thus became the first newspaper in Canada to publish on the web, appearing in June 1994 at www.hfxnews.com."

"And," adds Regan, "I believe the sixth [newspaper to go online] in the entire world."

It was an instant success—and in ways the newspaper's editors had not foreseen. Within a week of launching, the paper began to receive a flood of emails from across Canada, the United States and beyond. One Nova Scotia ex-pat based in Massachusetts wrote to say he "look[ed] forward to finally being able to read all about the juicy details of Nova Scotia politics again." "I have been reading it on Mosaic on the Gold Coast of Australia," wrote a down-under reader. By the way, added another Australian reader: "Loved today's cartoon."

Within a few months, the paper had switched its service provider from Chebucto to the larger, more commercial NSTN and rebranded its online version *The Daily News Worldwide*.[18]

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Brent Conrad slipped the video cassette tape into his office VHS player. The tapes had become one of the ways MT&T officials kept in touch with the company's thousands of employees. Executives would meet face to face with small groups of staff. Those meetings would then be recorded and videos circulated.

During this particular meeting, one of the employees had asked the executives about company plans for the Internet. The Internet? It wasn't important from the company's point of view, the executive explained. "It's just for a bunch of techno geeks."

Conrad turned off the machine.

"It was very demoralizing," he remembers.

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MT&T executives, of course, weren't the only ones still puzzling over what to make of this thing called the Internet. Kim Sullivan, one of NSTN's first call centre employees remembers spending hours on the phone "trying to convince people they should put their business online by creating, or having a web site created, and them asking, 'Do you really think this Internet thing is going to last?'"

But if most businesses didn't yet see the advantages of having an Internet connection, consumers themselves seemed to have swallowed the Kool-Aid, jug and all. Consider:

[18] *The Daily News Worldwide*, says MacKay today, "was neither a money-making nor money-losing operation. The costs were in a small amount of labour by someone who would have been there anyway, performing other tasks as well. And revenue—well, it was a decade or more before anyone figured out how, or even whether, to try selling web advertising. Indeed, its popularity may have been part of its ultimate undoing. Within a couple of years, it was being sufficiently used by students with access to the Dalhousie system that it popped up as a reason not to subscribe to the real paper ("I get it online") … The shape of things to come. Still, it was incredibly rewarding to have the paper being read all over the world. However briefly, the *Halifax Daily News* was a touchstone for Canadian expatriates from West Germany to New Zealand, because we were publishing all our wire copy along with staff-written material every day on the web. I have a sense that we were in the game a little too early, without the means to grow -- like being 'right,' but at the 'wrong' time. In any case, I think it's now a source of pride to all the participants."

in the entire month of August 1992, NSTN had recorded a total of 986 calls into its dial-up network. In August 1994, it averaged 2,000 calls *per day*.

"It's amazing how far the information highway has come in less than a year," Tom Regan marveled in a column in the *Daily News*. "In January 1993, 25 stories appeared in the U.S. national media that dealt with the highway, according to *USA Today*. In December 1993, that number shot up to 425, down from 475 in November. 'Doonesbury,' the comic strip, features it on a regular basis—always a sure sign of a mass build-up of critical interest)." And, he added, "local media have jumped on the bandwagon. [CBC Radio's] *Information Morning* recently did a series on 'Internet,' and the *Chronicle-Herald's* yearly business report will focus on technology, as will ours."

And NSTN was no longer alone in providing Nova Scotians with Internet services. There were a number of new upstart, start-up Internet service providers with names like Auracom, ISISnet (Internet Services and Information Systems) and Atlantic Connect,[19] all trying to horn in on NSTN's turf, offering ever cheaper, ever faster connections to the Internet.

There seemed—at least at this point in time—to be room for all of them. Nova Scotians were now spending more time online per capita than Canadians in any other province.

And NSTN was doing its best to encourage Canadians elsewhere to get online too—and, in the process, establish itself as a major national Internet company.

It had begun offering Internet services in Ottawa and Moncton (where it had connected the offices of Blue Cross), and announced plans to set up shop in Toronto and Kingston, Ontario, along with Saint John and Fredericton, New Brunswick, by the end of 1994 with hopes of opening its first western office early in 1995.[20]

There were, inevitably, service issues. One frustrated customer, for example, called the Ottawa support line—the Ottawa POP was almost always busy—and got voice mail. So he left a message that consisted of two minutes of the buzz of a busy signal. "See how you like it," he shouted at the end, and then hung up.

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[19] From its launch in 1994, Atlantic Connect grew exponentially "from zero to over 10,000 customers, with 31 franchisees in 18 months to become Atlantic Canada's largest ISP. By then, NSTN would have merged and moved to Ontario, becoming—briefly—Canada's largest ISP.

[20] As NSTN expanded its reach beyond Nova Scotia, its relationship with Dalhousie University inevitably changed. Given its own provincial and academic mandate, Dalhousie's role inevitably became less central. "As NSTN moved farther and farther afield," allows John Sherwood, "Dalhousie became less involved."

Thanks to a combination of smart people, good planning and better luck, Nova Scotia had positioned itself as a key player in the growth and expansion of the consumer Internet. It had more people spending more time online for a reason. There were things for them to do, places for them to go.

Roswell's bookstore, the Electronic Shopping Mall, T*he Daily News Worldwide*, the dozens of local sites being spawned by users of the Chebucto Net and NSTN—not to forget, of course, the exponentially expanding number of worldwide web sites. NSTN's "cybrarians" compiled those into regularly updated online catalogues for their customers until, soon overwhelmed by the daily and hourly deluge of new sites, they gave up.

But the rest of the world was catching on—and catching up. In March 1994, the Nova Scotia government released *The Nova Scotia Electronic Highway Study: An Action Plan to Seize Opportunities in the Electronic Marketplace*.[21] Prepared by NGL Nordicity Group Ltd., the report warned that "Nova Scotia will have to move quickly and decisively to advance its position both in terms of its provincial interest and in the interests of becoming a leading edge player in Canada." In that year's Throne speech, the government promised to appoint a Premier's Council on the Electronic Market Place, a blue-ribbon, 12-member advisory group to include three cabinet ministers and "opinion leaders from the community who would help shape and promote the vision and provide advice and counsel on implementing the Action Plan."[22]

Even at Maritime Tel & Tel, the sleeping giant had finally, slowly began to wake from its slumber—with a little outside prodding. Jones Education Network, a U.S.-based company that had already begun to digitize public domain works at the Library of Congress and had recently won a $450,000 contract to do the same with materials from the National Library of Canada. It was seeking public schools it could use to demonstrate its Global Electronic Library Project. For no better reason than the fact one of its employees had once attended East Pictou Rural High School, Jones decided to offer students there access via the Internet to its materials about the American Civil War and Canada's Confederation. To do so, of course, it needed a partner to handle the link. And who better—or so it must have seemed to the U.S.-based company—than the province's major telecommunications company.

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[21] Speaking of providing material for its customers to read and discuss, NSTN was quick to announce that the consultant's report "is now available for downloading from the NSTN Gopher in both Microsoft Word and Wordperfect formats. To get the document, open the NSTN gopher and select Nova Scotia Associations, NovaKnowledge, http://www.library.ns.ca/publications/disseminator/dissarchiv/DissApril1994.htm."

[22] The council was never appointed.

This time, MT&T was a willing partner. The company, which agreed to provide the necessary computer hardware and technical support, installed two telephone lines to connect the school via dialup to New Brunswick Telephone's NBNET. Although the inaugural press conference on April 5, 1995, did not go exactly as planned—a snowstorm in Nova Scotia disrupted the plan to hook up Toronto, New York and the two schools involved, East Pictou and Hammond Middle School in Virginia—the project itself was a success and, says Brent Conrad, "the company's first true taste of the Internet.

"Nineteen ninety five was a pivotal year," he adds. "I transferred from the business information side to the information centre. That was where the PC networking guys hung out, and we needed people who understood IP addresses."

A few months after the launch of the Global Electronic Library Project, MT&T established its first T1 connection to NBNET from the community college in Halifax.

The bigger battle lines were being drawn.

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Nineteen ninety five was indeed a pivotal year in Nova Scotia's moment in the Internet sun.

East Pictou wasn't the only Nova Scotia school[23] making use of an Internet connection that year. Atlantic View Elementary in Lawrencetown became the first elementary school with its own web page. And in April—the same month that the Global Electronic Library came to Pictou High—the Internet arrived at Cornwallis Junior High School in Halifax.

The Cornwallis connection came courtesy of Logan Duffield, an electrical engineer who operated a small Dartmouth-based defence contracting firm. His daughter was a student at the school, and he'd become frustrated that—despite the fact the principal and teachers were keen to make the Internet happen— bureaucratic walls inevitably

[23] And, of course, schools weren't the only ones discovering the power of the Internet. Dartmouth-based Morris Auld & O'Hara, Barristers & Solicitors, became the first law firm in Nova Scotia, and only the second in Canada, "to offer information through the Internet. Partner Jeff Morris says the free service offers legal information on such things as wills, house-buying, employment law, as well as access to actual cases through World Wide Web -- and information about the firm, of course." And Dartmouth Cole-Harbour MLA Alan Mitchell—who'd made history by being the first MLA to send an email from the floor of the legislature—staged an official public launch for the first MLA web page in July 1995. Although both of those pages were housed at NSTN, ChebuctoNet—by the end of its first full year of operation—boasted the number of organizations providing public information through it had grown to 150.

seemed to spring up. The project seemed too big, too complicated, too expensive. How much computing power was enough? How could the system provide each school with equal access? Who was going to pay for the damn thing anyway?

"Bureaucracy isn't well suited to getting things done," Duffield told a reporter at the time. So he offered to hook the school's existing local computer network to an old IBM 386, then add some specially written but simple software to link all of the school's computers through that 386, a modem and telephone line to his company's Internet server.

It worked so well and so quickly— the school was online within two months of his offer—other schools began contacting Duffield to see if he'd do the same for him. Eventually, he issued a blanket offer to connect every school in the city to his company's network.

Others took note as well, including the organizers of the Group of Seven, the organization of the leaders of the seven most powerful countries in the industrialized world, which happened to be holding its annual meeting in Halifax that June.

"However ineffectual [the G-7] may sometimes seem," the *New York Times* wrote, "don't say that the Group of Seven does not keep up with the times. This year, its summit meeting enters cyberspace—both with an official World Wide Web site on the Internet sponsored by the Canadian Government and with two unofficial Web pages, one set up by Dalhousie University in Halifax, the summit site, and the other created by teachers and students of Cornwallis Junior High School there."

Chebucto Community Net was front and centre too. It hosted, in cooperation with the federal, provincial and municipal governments, the meeting's official web site and took part in the Media Lounge, which gave it access to the world's media. Chebucto's participation, its annual report later noted proudly, not only "raised our local profile but also drew international attention. Just as one example: a Sao Paulo, Brazil, newspaper, in an article about the G-7, focused on Chebucto."

The G-7 leaders themselves were invited to watch a broadband Internet demonstration at the Super Nova Centre (which would soon become Halifax's Discovery Centre). Using MT&T, Bell and Newfoundland Tel's facilities along with CANARIE's 155Mbps ATM National Test Network, the leaders got to see a broadband videoconferencing demonstration from St. John's and a graphical visualization of a supercomputer simulation of burn patterns from Alberta. "The demonstration," as Alexa Thompson noted, "only attracted mild interest, but it was a step on the way to CA*Net 2."[24]

[24] CANARIE, or the Canadian Network for the Advancement of Research, Industry and Education, was set up in 1993 as a non-profit to operate and maintain what would become Canada's 19,000 km of long-haul, fibre-optic cables linking Canada's education and research institutions to each other and, through

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It was unfair. But, in the end, it didn't matter. It was a done deal. The only question was whether NSTN was done with it.

The Nova Scotia government had decided to invest in a major new TCP/IP-based network to connect the province's more than 500 schools, libraries and community colleges with each other and provide them with a gateway to the Internet.

NSTN had submitted a proposal for the lucrative government contract Martineau today says could have provided his company with "strong, predictable cash flow." But the newly awakened MT&T's Advanced Communications subsidiary underbid them. When Mike Martineau crunched the numbers, however, it became clear the price Advanced Communications quoted the province to lease communications lines from MT&T was significantly lower than the price NSTN would have had to pay to MT&T to lease those same lines.

Martineau protested. He lobbied Education Minister John MacEachern. He even took his complaint against gigantic monopolistic MT&T all the way up the political pecking order to Premier John Savage. With no success. "While they were, to a certain extent, sympathetic," Martineau recalls, "there was no overturning the decision. MT&T had more political sway""

For NSTN, another potential income door had slammed shut even as the need to dramatically increase its cash flow to fund its ever more demanding growth grew.

Which brought Martineau back to Rainer Paduch, an engineer-entrepreneur who was the Vice President of Technology at an Ottawa-based long-distance carrier with "the rights to string fibre optic cables along railway lines using a digger that entrenched the lines into the rail beds." For more than a year, Paduch had been kicking at the tires of a deal with NSTN, but the two sides "could not agree on the relative values of our respective companies," Martineau explains. "We argued about who was the bigger company and therefore worth more. Eventually, we both found ourselves in the same boat—in need of investment but each too small to attract serious investors."

It was time to get back to the negotiating table.

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them to local networks, and beyond them to the world of the Internet. The original CA*Net, which offered 56 kbps communications links in 1990 had already increased speed to 10 Mbps by the time of the G-7 demonstration of the National Test Network in 1995. By the time CA*Net 2 came along in 1997, speed had increased to 155 Mbps.

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Chebucto Community Net (CCN) marked its first full year of operation by staging a public party, "Chebucto Celebrates" at the south end Halifax VIA train station. The event drew close to 500 people and marked what David Murdoch called the group's "coming of age."

Its membership had grown to 3,073, the number of active users to 4,681 and monthly world wide web accesses were topping 2.5 million a month—reason enough to triple the number of telephone lines from 24 to 72.

With the help of the local library and volunteers like Gary Floyd, a retired computer consultant, CCN worked to expand the numbers of people who could take advantage of this new technology, including those who couldn't afford it and those—like retirees—who wouldn't ever get the chance to learn how to use the Internet through their jobs. In May 1995, Chebucto brought a donated Canadian Coast Guard computer to Spencer House, a local senior citizens' centre, and began teaching seniors how to send email and surf the web. Although initially intimidated, Floyd said at the time, "once I've shown them how they can use email to talk to their daughters and sons all over the country, they're keen."

At the 1995 Canadian Internet Awards, Chebucto, perhaps unsurprisingly, walked away with three awards: Best Community Site, Best Development Team and Internet Person of the Year, which was awarded to David Trueman.[25]

Trueman won for leading a development team of dozens of volunteers that had created Chebucto Suite, a collection of software, documentation and training materials that made it easier for a community network to install its own system without "being a UNIX guy." Other community networks—from Victoria to the Ukraine—began to adopt C-Suite, as it was known.

"Those were heady days," Trueman remembers. "We were pumped. I was going to national conferences, presenting about what we were doing. The response was enthusiastic."

As Chebucto had evolved, so too had the local commercial Internet scene. When it began operations in April 1994, NSTN was, almost literally, the only Internet service

[25] Other nominees in Chebucto Community Net's category included the Ecology Action Centre, which was nominated for Best Science Site, and the province's Law Reform Commission for Best Law Resource. Dalhousie University was also a winner; it nabbed Best Academic or Education Site honours.

provider game in town. By the time it was ready to negotiate a new contract in mid-1995, "ISPs started springing up left and right and quite a few… had become well established." So the Chebucto board put out a request for proposals. "We got three very solid proposals," negotiating committee member Jason Forrest reported to CCN members, "one from NSTN, one from Atlantic Connect and one from ISIS… It was unanimously decided by all members of the negotiating team that ISIS put in the best proposal in price and support."

CCN's relationship with NSTN ended.

For NSTN, the loss of a business they had, in effect, been subsidizing with lower-than-commercial rates was not significant financially, but it was yet another sign of a dramatically changing Internet marketplace.

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Roswell James smacked up against yet another of those signs in 1995.

Thanks to Daniel MacKay and Mike Dinn at NSTN, Roswell Books was now on the web with his own black interface, graphics and even a shopping cart.[26] You could actually order online without having to use email.

In the process, James himself had become modestly famous as the one of the first booksellers in cyberspace. In 1995, he was even invited to be a panelist at an Internet conference in Singapore. "My wife Janet and I were still the only main employees of the store so I couldn't take much time. I flew out [from Halifax to Singapore] on a Sunday night. With the time changes, by the time I arrived, it was already Tuesday in Singapore. The conference was on Wednesday. I chaired my panel and then I flew back. I had to get back to the store."

Things seemed to be going very well, he says ruefully, "and then Amazon happened…"

In 1994, an American entrepreneur named Jeff Bezos had quit his well-paying job as a Wall Street hedge fund manager and—with $140,000 in start-up capital—launched an online bookstore out of his garage in Washington State. In July 1995, his newly minted amazon.com sold its first book: *Fluid Concepts & Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought.* In May of 1996, he went public, raising $54 million from Amazon's IPO.

[26] The original site was as good as gopher could get. They'd used button icons to spell R-o-s-w-e-l-l. "R became 'read all about us,'" James recalls. "'O became 'Order;' the W was for 'willing to ship.'" The buttons were hyperlinked to pages with explanatory text in Courier font, "seven links to seven pages."

After "Amazon happened," Roswell James mom-and-pop online store—like plenty of other early Internet businesses—got lost in the new global shuffle. Although Roswell Computer books would manage to survive for another 10 years as an online retailer, it simply couldn't compete with an amazon like Amazon.

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NSTN had grown too big too quickly but, paradoxically, it had not grown large or fast enough to cope with the sudden explosion of consumer and commercial interest in the Internet.

"We couldn't keep up with our own success," remembers Michael Martineau. "We'd get more customers, which required more modems, more routers, more bandwidth, which we had to pay out up front. The demands kept outstripping our ability to keep up. And we were just a little private company owned by Software Kinetics. The shareholders were getting antsy about an investment many of them still considered speculative."

In August 1995, NSTN's year-long on-again, off-again, after-you-Alphonse courtship with Rainer Paduch's Ottawa-based fONOROLA was finally pushed to the altar with the help of a $5-million cash dowry, courtesy of Jefferson Partners, a technology-focused Toronto venture capitalist.

Paduch became iStar's first CEO, Martineau its Vice President of Engineering.

It was not a marriage made in heaven. "There were many amusing, exciting and sometimes scary incidents during my tenure at iStar," Martineau remembers. Including finding a name they could agree on for the new company. "Although all parties declared themselves equal with respect to valuation, not everyone acted as though we were equal. Between trying to avoid names that looked like one company was taking over the other and finding unique names that could be trademarked, we had quite the lively discussion," he jokes. "There were more than a few times when I thought we might actually come to blows."

Instead, in November, the merged companies announced they'd morphed into iStar, instantly becoming the largest of Canada's 300, mostly modest, one-city Internet providers. iStar had offices in Halifax, Montreal, Ottawa, Toronto, Calgary and Vancouver and hookups in the works for London and Victoria. The new company also boasted 20,000 dial-up customers and 650 dedicated phone lines.

On November 20, 1995, iStar went public, becoming the first major Internet stock on the Toronto stock exchange.

"Investors who were lucky enough to pick up iStar shares yesterday morning made a killing by lunchtime," the Daily News reported the next day. Within hours, iStar's initial sale price of $12 a share had goosed up to as high as $20 before settling back down to $18. The Internet company's initial public offering raised $43 million for the company, the news report noted, adding that it also put "a sure thing in the pocket of the mostly institutional investors who got in on the deal."

The cash influx gave iStar—"we're the market leader and we want to stay there," Martineau told reporters—the wherewithal to stay ahead of the existing competition—"we're buying modems like you wouldn't believe"—and prepare to take on the giant telcos and cable companies, both of whom were gearing up to jump into the Internet waters in a big way within the next year.

"Really, we welcome the competition," Martineau insisted. "There's so much market there we think there's room, and when other companies come in it keeps the hype up. Come in, the water's fine."[27]

It was less fine for Nova Scotia, and its place in the new scheme of things. The new iStar was to be based in Ottawa, and Martineau was among those who relocated there.

The company's centre of gravity shifted too. At one point, when iStar decided to dispatch trainers to travel the country to various offices explaining the Internet to new staff, employees in Halifax suggested someone in the Halifax office could probably handle their own training. The reply from head office was telling: "Oh, wow, is there someone there who could do that?"

How soon they'd forgotten the Halifax office had been responsible for bringing the Internet to Nova Scotia, and the country, in the first place.

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[27] The day after iStar's debut as a public company, MT&T's Advanced Communications unit, in concert with Bell Canada and the country's other regional telephone companies, launched Sympatico, a new "consumer dial-in service mainly intended for use by people at home and in small business." Two days after that, Dartmouth Access Cable announced a plan to allow cable subscribers to hook up to the Internet through their home cable outlet was "being tested as we speak." In fact, the local cable companies had been enhancing and adapting their cable systems to provide the necessary two-way communications for more than two years. When the system was up and running, the cable modem could offer speeds of up to 50 times faster than the still standard 9,600 bps modem with plans to increase that to hundreds of times faster within the year.

On November 11, 1996, bitter rivals Maritime Tel & Tel and Bragg Cable Group stunned their competitors—and perhaps even themselves—by announcing they'd reached an agreement in principle to form a new joint company, separate from both their existing businesses, to offer broadband Internet services to Nova Scotians. It was the first time in North America that a telephone company and a cable television company had agreed to work together.

The technical details of the $45-million share-swap arrangement—MT&T would acquire 29.9 per cent of Bragg's shares while Bragg, which operated a number of cable systems, including the province's largest in Halifax, would get six per cent of MT&T's shares, and both companies would continue to operate independently, even competitively in their traditional telephone and television backyards—were ultimately less important than what it portended.

"High speed, two-way telecommunications requires tremendous line capacity," MT&T noted in its press release. "Telephone companies and cable companies, acting alone, are years away from being able to provide this technology down every street and into every home and workplace."

Working in concert, on the other hand, with MT&T supplying its Sympatico service through Bragg's cable connections, could make dial-up services—and the companies that supplied them—history.

Perhaps not surprisingly, the *Daily News* reported that "pen protectors are rattling with worry in the pocket protectors of the province's Internet providers."

"I invite competition as long as it's fair," said Ross Beattie, the president of Auracom, a national ISP with 28 franchisees in Nova Scotia. But, "if all of a sudden an organization gets put together, which creates a monopoly, which is potentially unfair, you have to have concern with that."[28]

He wasn't the only one to be concerned. Charles Keating—whose family owned 46 per cent of Halifax Cable[29]—had been kept in the dark about the negotiations with MT&T, even though he and two other members of his family sat on the Halifax Cable's board. Keating, in fact, first heard of the deal when a reporter called to ask him about it.

[28] Consolidation of Nova Scotia ISP business had already begun. In late 1995, for example, Atlantic Connect merged with Hookup Communications, a larger ISP, and went public.

[29] John Bragg and Charles Keating, both well-known Nova Scotia Liberals, had been longtime friends and cable business allies, with interests in each other's companies. Bragg, in fact, also owned 25 per cent of Access Cable.

Keating quickly filed suit against his old friend Bragg, claiming not only conflict of interest but also—and perhaps more importantly—bad business sense. Keating, who'd already announced his Dartmouth Access Cable was going ahead with its own planned Internet service, was convinced cable's "only hope for survival" was to go after "some of the telephone company's core business," including telephone service, even as it developed its own new telecommunications products. Keating told the judge: "I interpret the agreement [with MT&T] as usurping the future potential of Halifax Cablevision for personal gain by one of the Directors—Mr. Bragg."

Keating's high-profile law suit—between them, the two sides were represented in court by 11 lawyers—was summarily dismissed, as was an appeal. But by the time that finally happened—on July 7, 1997—it didn't matter.

Two weeks before the appeal court's decision, MT&T and Bragg announced the deal was off. "The two sides," explained an MT&T spokesman, "simply couldn't agree on what the joint venture would do."

Ironically, on the same day the telco-cable deal fell apart—June 24, 1997—another significant event with even more far reaching consequences, occurred.

The Internet's growing commercial and consumer popularity had "created a demand for services that a group of busy academic volunteers simply couldn't meet," as *A Nation Goes Online,* a CA*Net Institute research paper, would later explain. So CA*Net Networking Inc., the academe-centred non-profit that had been operating the Internet in Canada for more than a decade, "ceased operations as an independent entity and passed the torch for that aspect of its mission to the private sector." The new operator would be Bell Advanced Communication and, of course, its MT&T regional affiliate.

Soon, MT&T would take over Dalhousie's role—and Dalhousie would become a customer of MT&T.

That set the stage for a high-noon Internet showdown between the cable and telephone companies.

Given that looming confrontation, it was almost inevitable that much of the rest of the fledgling Internet service providing industry would get caught in the crossfire.

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Before its star fell to earth with the sudden thud of a corporate takeover, iStar—née NSTN—had reached giddying heights. At one point, it boasted 70,000 dial-in and 1,300 direct-connection customers, and its stock price had even hovered briefly around $22 before falling. And falling. And falling.

By November 1997, it was barely scraping $2 a share.[30]

When iStar initially went public, wrote Ian Austen in *Canadian Business Magazine,* "being an ISP was a glamorous business, and the glamour made iStar's first share offering an immediate hit. Unfortunately, selling connections to the Internet is a fiercely competitive but not especially lucrative business."

iStar found itself squeezed like an accordion from one end by dozens of low-cost mom-and-pop competitors and pushed from the other by the now fully engaged and well-heeled behemoths of the telephone and cable industries.

"The big players came in and drove the margins out of the business," Michael Martineau remembers. Worse, he adds, iStar itself was now run by venture capitalists who tried to "squeeze nickels."

As for Martineau himself, "I was burned out. I had to get out." Not interested in providing a low-end commodity service or transforming the company into a niche business, Martineau returned to Software Kinetics and a job helping businesses make use of the Internet.

iStar, meanwhile, tried to position itself as a *network* service provider for corporate customers because the margins were better.

But that didn't change the company's downward trajectory.

Neither did cutting a deal with Bell Canada to defer $20 million in network access payments.

On November 10, 1997, U.S.-based PSINet Inc., bought iStar for $35 million, then merged it with its Canadian subsidiary, PSINet Limited.[31]

NSTN wasn't even mentioned in the official announcement.

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[30] Daniel MacKay, who bought employee-offered shares at $11 each when iStar went public, held on to his shares through the ups and downs until, as he puts, "they were worth the paper they were printed on."

[31] At around the same time, Hookup Communications Corp., another publicly traded Canadian ISP, was also bought by an American company, Netcom. Hookup had been formed in 1995 by the merger of a number of regional ISP providers, including Nova Scotia's Atlantic Connect.

Nova Scotia's brief shining moment in the Internet sun had come to its inglorious—but perhaps inevitable—end.

Epilogue

Levees—annual New Year's morning meet-and-greet open houses sponsored by everyone from lieutenant governors, to city fathers, to the Archbishop and local legions—have been a popular welcome-the-new-year tradition in Halifax for more than two centuries.

On January 1, 2003, Daniel MacKay organized his own very untraditional but very appropriate (featuring propeller beanies, Cheesies and cans of Jolt cola) New Year's Day levee to mark the "birth" of the Internet. Or at least to acknowledge that New Year's day 20 years before when networking engineers turned off "the very limited NCP protocol and turned on TCP, the one we use today, creating a network that could grow to where we are today and beyond."

And, of course, to celebrate Nova Scotia's fleeting but important role in the now exponential growth of the Internet.

MacKay's party was "*not* a videoconference, an e-meeting, a blog, WoW, Second Life, ting, bliki, moo, mud, or gobby [but] a real-life press-the-flesh, real wine and real cheese, face-to-face reception," his invitation explained. "If you find the string DEAD.BEEF.CAFE funny, you argue about what 'conservative' means in RFC 822, you know that a vampire tap is not just for Halloween, you can quote Postel and Mockapetris chapter and verse, you might want to be at this party."

Dozens did. Including such veterans of Nova Scotia's pioneering Internet days as computer bookseller Roswell James and John Sherwood, by then Dalhousie's Executive Director of University Computing and Information Services.

MacKay's levee offered an opportunity to renew acquaintances and reminisce. There was a time, Daniel MacKay told a reporter from the Halifax *Daily News,* when he knew every single Canadian online. "There was a lot of camaraderie," he explained. "You could call someone in Vancouver and say, 'Look, I need this favour.'"

It was a time too to reflect on the dramatic changes the Internet had wrought in how we live our lives. "It changes your expectations of how the world works," John Sherwood said. "You expect things to happen immediately now. It's a change in the way we do things, but we've embraced it."

"As people were leaving," MacKay recalled, "they said they were looking forward to use organizing the 25th year anniversary."

MacKay did just that. And he is, at the time of this writing, planning the 30th.

Nova Scotia's brief shining moment in the Internet sun is still worth celebrating.

Whatever happened to…

Brent Conrad is still with MT&T… except it's no longer MT&T. "I've worked for the same company all along but, really, I've worked for multiple companies," he explains. MT&T became MTT, then Aliant and now Bell Aliant. Conrad himself has also held a number of positions; he's currently Bell Aliant's Senior Network Architect. Around the office, he says, he's still known as the "grandfather of the Internet."

Roswell James closed his physical computer book store in 2007 and modified his web site to showcase the Halifax-based business consultancy he and his wife now run. He provides consulting and services—from bookkeeping to website design—for companies and non-profits, especially those involving people with disabilities, an ongoing interest of his. In 2012, with help of a former NSTN employee, he created a new web page — enablers.ca—as a resource for people with disabilities.

Peter Jones took early retirement from Dalhousie in 1994 when he was 60 years old. He and his wife returned to Britain and settled in Devon next door to a croquet club. "I play, I manage, referee," he explains. He only uses a computer, he adds, for developing and managing croquet club schedules. He's never used Skype, which he pronounces "Sky-pee."

Daniel MacKay left Dalhousie in 2003. Today, he is the Senior Technology Consultant for Barrington Technology Group in Halifax but still keeps in touch with many of those from the heady early days of the Internet in Nova Scotia.

Michael Martineau: These days, Mike Martineau lives in Ottawa where he serves as the Vice-President, Sales & Marketing at B Sharp Technologies, a health care information management company. But even now, he says "my crowning achievement of my career will be the work I did at NSTN. It was a phenomenal part of my life and I am

immensely proud of what we did. I'll never do anything like that again in my life. And, even knowing what I know now, I'd do it all again." Perhaps not surprisingly, he chose "mikenstn" as his Skype name.

David Murdoch took an early retirement package from the Halifax dockyard in 1996 and then began a series of contract positions, including as regional Project Manager and Coordinator for the federal Community Access Program (CAP), a program designed to provide Canadians with "affordable public access to the Internet." In 2007, he began David Murdoch Consulting. He is also currently the provincial advocacy officer for the National Association of Federal Retirees.

Lorri Neilsen Glenn continues to teach in the Master of Education Program at Mount Saint Vincent University. The author or editor of 10 books, including poetry, collections of essays and books on ethnography and literacy, she served as poet laureate for the Halifax Regional Municipality from 2005-09.

Jay Parsons stayed with NSTN until 1996 after it had become iStar. But when iStar laid everyone off at the company's call centre in Halifax and moved it to Ontario "because they wanted to be seen as big in their Ontario headquarters," Parsons was ready to take a severance package. She happily quit, got married and moved back "home" to Newfoundland where she is currently vice president at an association management firm called Pathfinder Management Group.

Tom Regan became one of online journalism's pioneers. Between 1994 and 2007, he worked for the *Christian Science Monitor,* spearheading development of its online edition. In 2008, he served as executive director of the Online News Association. Ironically, Regan says today, his impetus for putting the *Daily News* online was more personal than pioneering. "During my Nieman year, I had met this really cool girl from Georgia, Barbara Petzen," Regan explains. "I really wanted to see her more often, but that was difficult with me being in Halifax and her being in Boston." By putting the newspaper online and teaching others how to post it, Regan could keep up with the local news he needed for his newspaper column—wherever he happened to be. "When I would go to Boston to visit Barb, I would just use her Harvard University Internet account, see what was happening in Halifax, make a few phone calls, and voilà! A column." He and Petzen married in 1995. They have four children. They live in Washington, D.C..

John Sherwood retired as Executive Director, Computing Services, at Dalhousie in 2009. Today, he runs his own consulting firm, Alindale Consultants and serves as technical director for ACORN-NS (Atlantic Canada Organization of Research Networks in Nova Scotia), "a community of like minded organizations and individuals that lead and promote the development and operation of advanced research and innovation networks and services to accelerate research, education, health and industry

collaboration, learning, discovery and innovation for the growth of a knowledge-based digital economy and society in Nova Scotia. ACORN-NS is one of 12 regional advanced networks providing access to the CANARIE Network."

David Trueman: After his wife, Lise, died suddenly in 1997, leaving him the single father of three children, Trueman decided "I had to change everything." He quit his job at the university and took a job as a software developer at a small local startup known as InfoInterActive, where he helped develop a program called Internet Call Manager, a phone management system for online users. In 2001, AOL acquired Call Manager and Trueman moved on to Research in Motion, first in Halifax and later Waterloo, Ontario, where he ultimately became Vice President of Platform Product Services, supervising a team of 80. In 2012, his division was disbanded and Trueman was out of a job. Today, he is looking for work.

Nova Scotia's Internet Honour Roll

It's impossible in a narrative such as this to capture the important contributions of all of those many people who contributed to the development and popularization of the Internet in Nova Scotia. What follows is not an exhaustive list by any means, but a small attempt to recognize the many who made it all possible:

Baha Baydar, ISIS Internet Services;
Ross Beattie, Atlantic Connect;
Jonathan Blanchard, ISIS Internet Services;
Joan Brown-Hicks, Halifax Regional Library;
John Chesley, Industry Canada;
Brent Conrad, MT&T;
Michael Dinn, NSTN;
Marc Dooley, NSTN;
Michael Dow, NSTN;
Logan Duffield, Iotek Inc.;
Lorri Neilsen Glenn, Mount Saint Vincent University;
Ivor Harrington, Nova Scotia Department of Industry, Trade and Technology;
Bernie Hart, Department of Education;
Roswell James, Roswell's Computer Books;
Laura Jantek, Halifax Regional Library;
Peter Jones, Dalhousie University Computing;
Daniel MacKay, NSTN;
Doug MacKay, Halifax *Daily News;*
Dan MacKean, Halifax Cablevision;
Michael Martineau, NSTN;
David Murdoch, Chebucto Community Net;
Lynn Pammett, Atlantic Canada Opportunities Agency;
Marion Pape, Nova Scotia Library;
Jay Parsons, NSTN;
Tom Regan, Halifax *Day News;*
John Sherwood, Dalhousie University Computing;
Jim Smith, Halifax Cablevision;
David Trueman, Chebucto Community Net;
Paul Westhorpe, Atlantic Connect.