



# PORTRAITS OF DIGITAL CANADA

Exhibit Catalog

# INTRODUCTION

In 1952, there was just one digital computer in all Canada—the Ferranti Mark I—installed at the University of Toronto that year and nicknamed FERRUT. In 1955, there were three. At that time, only a small group of Canadians knew what computers were about and even a smaller circle of professionals had access to them. A decade later, computers were already widely used across Canada. However, the general public still viewed them as mysterious machines operated by a dedicated priesthood of computer engineers and technicians who were feeding these “big brains” with data to be converted into recipes for economic growth and social progress. Computer professionals did little to dispel fears of this unknown technology and the unpredictability of its social impact, leaving the task of demystifying computing to a small group of early computer educators and enthusiasts, to ill-informed media, and to the unchecked imagination of science fiction writers.

It would not be until the end of the 1970s, when computers began to enter Canadian homes en masse, that a realistic appreciation of their capabilities and potentialities would begin to take shape. From the late 1970s, home computer sales in Canada were growing rapidly and crossed the 100,000-units-per-year mark in 1981. By the mid-1980s, a myriad of computer user groups, clubs, and stores, together with budding digital social media and popular computer shows and fests, were painting a backdrop for the remaking of Canada into a society of information consumers. Portraits of these remarkable four decades in which Canadian society gained computing competence are numerous. Captured in photographs and films, these accounts attest to Canadian society's technological competence, creativity, and openness to change.

The “Portraits of Digital Canada” exhibit presents a selection of images from a large archive of photographs taken for International Business Machines of Canada (IBM Canada) in the last century. Since its incorporation in 1917, IBM Canada has been documenting its corporate history as well as Canada's evolving technological and social landscape in hundreds of thousands of photographs and films. Many of the early photographs have survived thanks to the collecting and curatorial efforts of several remarkable people, most notably Dave Robitaille, Director of Corporate Citizenship at IBM Canada, and George Dunbar – IBM's staff photographer from 1957 to 1989. The size, scope, and richness of the photographed themes make the IBM Canada Images Archive one of the most significant records of Canada's technological development in the last century.

The selection and arrangement of exhibited photographs do not comply with or establish any particular time-line of events or milestones in the history of computing in Canada. Nor do they present the development of computing in Canada through the lens of IBM's corporate objectives. Instead, the photographs are unique vignettes focused on technological change brought about by one of the most complex devices ever conceived and constructed. These are portraits of the budding information age in Canada.

The majority of the exhibited images are authored by award-winning photographer George Dunbar. His portraits of digital Canada are not exactly what one might have expected from a staff photographer who was tasked with documenting his company's corporate life. In his assignments, Dunbar frequently found time to put his artist hat on and to spot subjects and themes for photographic vignettes. As a result, he created remarkable portraits of computer makers, installers, and operators. He documented a complex social response to the new computing technology, capturing people's curiosity, excitement, and fascination as well as their uncertainty and blissful indifference.

The IBM Images Archive was donated by IBM Canada to York University Libraries and will become part of the Clara Thomas Archives and Special Collections located in the Scott Library. It is the objective of this exhibit to dust off these remarkable photographs—if only for a moment—for all to see.

**Zbigniew Stachniak**

*Curator, Portraits of Digital Canada*

# BEFORE COMPUTERS

## 3

THINK

Even before three Canadian companies were amalgamated in 1917 under the name of International Business Machines Company Limited (or IBM), several Canadian companies were already manufacturing business and office equipment, including mechanical calculators, typewriters, cash registers, telephones, and telegraphs. IBM Canada's first products were neither calculating nor data processing equipment. Its Toronto factory at 300 Campbell Avenue assembled, among other products, a variety of time equipment including clocks and time recorders. The 1923 photograph depicting assembly of attendance recorders at the Toronto plant is among the earliest images of a Canadian facility manufacturing office and business equipment. It sets the starting reference point for this exhibit's narrative. In 1923, Canada wasn't a computing nation yet but work on transforming the country into an information-consuming society would soon begin.

The North American industrial revolution of the 19th century created a blueprint for the modern office. Typewriters, telephones, and even staplers were introduced at that time and so were commercially manufactured mechanical calculators. Data processing equipment capable of performing more complex tasks than rudimentary arithmetic operations done on calculators was soon to follow.

All kinds of data could be handled and all kinds of operations could be performed by early data processing equipment called by various names such as "unit record equipment" and "tabulating and accounting machines." These devices required data to be recorded as holes punched in special cards made of stiff paper. Stacks of such punched cards could then be semi-automatically copied, compared, sorted, searched, merged, tabulated, or stored for future use.

Calculating and tabulating equipment started to enter Canadian businesses and agencies in the early 1900s. Some companies created dedicated data-processing departments to deal with their ever increasing volume of number-crunching tasks, while other businesses relied on services offered by independent data-processing firms. There are numerous photographs of such data centers in the IBM Images Archive. They typically depict rows of data-processing stations, women operators punching corporate data onto cards, a male supervisor, and a wall clock drumming out the beat of a new era of large data. They depict the set and cast for a new reality expressed in numbers and encoded as holes on punched cards – numbers the meaning of which was understood by neither the operators nor their supervisors, a preamble to our own digital reality which affects everyone but is comprehended by a fraction of our society.





▲ Assembly of attendance recorders at the IBM's Toronto factory located at 300 Campbell Avenue.  
Photographer unknown, 1923.



▲ Punching and sorting cards at an IBM Canada office.  
Photograph by Pringle & Booth Ltd., Toronto, 1940s.



◀ Data center at Federated Customs Brokers Ltd.  
Photographer unknown, September 1959.

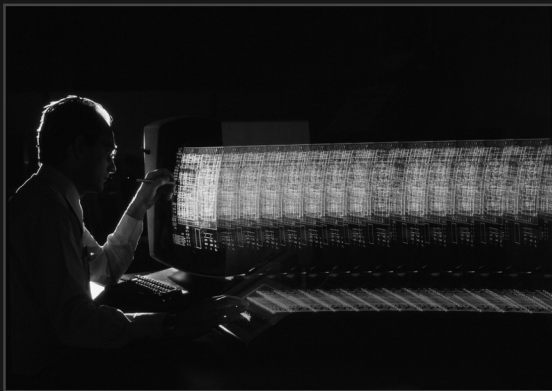
# MAKING COMPUTERS

5

In the 1960s, the fast-growing adoption of computers initiated an important debate on the kind of technological systems humans and computers were to form. Were computers destined to simply remain “humanly extended machines” (a term coined by American computing pioneer J.C.R. Licklider) which interacted with an operator in a limited way and only when certain tasks (such as inputting data) could be better accomplished by a human? Or were more symbiotic connections with computers inevitable – in which one would see humans and computers solving computational tasks in a complete, interactive, and collaborative way? Would data centers, such as the IBM Data Center which, in the 1960s, was located at 36 King Street East in Toronto, remain processors of data under the complete control of an operator, or would they evolve into “computer thinking centers” replete with artificial intelligence-based problem solving stations? And how would such human-machine systems be realized? Would they consist of a single operator interacting directly with a single computer in complete solitude surrounded only by the noise of air conditioners and peripheral equipment, or would future computing become the foundation of a new kind of social community, linked in global networks, powered by supercomputers augmenting human intelligence?

Several of the exhibited portraits depicting computer operators explore the human-machine relationship on a deeper, broader, and more intimate level. For his “Glass Head” portrait, Dunbar placed a glass head in front of a computer terminal in a dark room and pressed the shutter on his camera. The result of this photographic tinkering is a beautifully ambiguous reflection on the dramatic but inevitable changes that computer and information technologies would bring. Are we witnessing the “soul of the machine” projecting itself on the operator and remaking him into a digital man, or a new form of communication, a digital link between us and the world of the machines? Will our identities be reduced to numbers and symbols?

Another of Dunbar’s works is more than just an aesthetically pleasing portrait of a man operating a CAD terminal in IBM Toronto’s Computer-Aided Manufacturing Laboratory. An augmented reality—of light stretched and dispersed, overlaid with data and computer code—unravels in multiple dimensions, ready to further expand or contract at the touch of an operator’s light pen, invoking the suggestion of society probing a digital world of its own creation, a world which it is about to embrace.



▲ An operator of a CAD terminal at IBM Toronto's Computer Assisted Manufacturing Laboratory.  
Photograph by George Dunbar, 1970s.



▲ *Glass Head*  
Photograph by George Dunbar,  
Toronto, 1970s.

An operator of a mainframe computer at  
IBM Data Center located at  
36 King Street East in Toronto.

◀ Photograph by George Dunbar, 1965.

The enthusiasm that greeted the introduction of telephones to homes at the end of the 19th century was tinged with skepticism, outrage, and fear. Concerns about an invasion of privacy were common, as were anxieties that the “atrocious nature” of the telephone would slacken, if not collapse, social rules and etiquette. Such concerns about the ills that attend the prospect of dependency on a new technology have also been present in discussions about computing and society.

However, fear is not the dominant response to new technological breakthroughs. The woman in the photograph reproduced below is captured in a moment of reflection: is this how the future will look? Is this what will matter most? Will there be space for us all? The couple photographed in front of IBM Toronto's Data Center gaze with curiosity at a computer room filled with mysterious equipment. And so does the crowd of spectators gathered outside the center for a glimpse of the spectacle that unveils itself in front of CBC cameras during the Canadian federal election of 1963.



IBM Data Center, Toronto.

◀ Photograph by George Dunbar, 1965.

Open house events organized by IBM Canada were bringing hundreds of curious visitors to the company's headquarters, laboratories, and manufacturing facilities. Computer shows were attracting even larger audiences. Judging by the high attendance numbers recorded at the Canadian Computer Show and Conference in the late 1970s, Canadians were ready to take a closer look at computers without fear, especially those offered for personal use.



▲ The Canadian federal election of 1963 coverage at IBM Data Center, Toronto.  
Photograph by George Dunbar, April 8, 1963.



▲ Playing with an IBM PCjr (read "PC junior") home computer during a computer show. Photographer unknown, 1984.



A couple looking through the window of IBM Toronto's Data Center.  
◀ Photograph by George Dunbar, 1963.



# | CANADIANS at WORK | 9

The 1960s, '70s, and '80s were golden decades of Canadian computing. Firms large and small, domestic companies as well as subsidiaries of foreign corporations, were designing and building computers, computer components, peripherals, and networking equipment. They were publishing software and offering computing services.

Portraits of Canadians building, testing, and operating computer equipment are many. They typically contrast with other images of Canadians at work, such as those of coal miners taken by Owen Fitzgerald in the mines of Cape Breton and published in his 2007 collection *Seven Miles Deep, Mining Faces from the Fitzgerald Collection*. The camaraderie and ruggedness of underground communities of miners smeared with coal dust, as captured by Fitzgerald's camera, stands in sharp counterpoint to the orderly, meticulously designed hi-tech environments depicted in the exhibited photographs, where white-shirted technicians and engineers, calm and focused, work on tasks of seemingly intractable complexity. However, as with Fitzgerald's images, the IBM photographs capture the context, conditions, and human aspect of work, and they supplement in a significant way other important photography collections of working Canadians such as Vincenzo Pietropaolo's *Canadians at Work* published in 2000.

Photographs by George Dunbar (bottom: IBM plant, Toronto, 1961), and unknown photographers (middle: Expo 67, Montreal, 1967, and top: IBM head office, Toronto, 1960).



Building computers is a long and complex process which begins with the manufacturing of all the components, followed by their careful assembly inside a computer's chassis, and ends with the product's testing. In the 1960s and '70s, IBM Canada had its manufacturing facilities spread across the country. Large assembly areas in IBM Toronto's Don Mills plant were filled with computer assembly stations, where technicians in pristine white shirts and dark ties put together computers for Canadian Institutions and corporations. In October 1966, one of such computers—an IBM 360 model 30 with just 22 KBytes of memory—was installed at York University.



▲ The assembly area for IBM's best-selling System/360 family of computers. Photograph by George Dunbar, 1965.



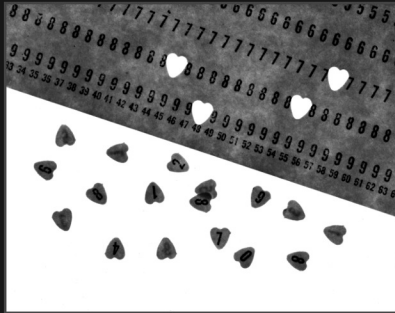
▲ Assembling a computer component. Photographer unknown, 1964.



▲ *Steel Worker* by George Dunbar, 1966.

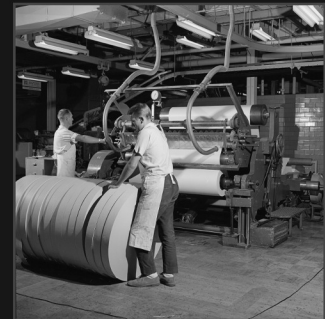
Dunbar's award winning 1966 photograph *Steel Worker* shows a construction workman “walking the sky” at the construction site of a new IBM Canada office in Toronto located at 1150 Eglinton Avenue East. By abstracting color and texture from an ordinary construction scene forged by circumstance and light, Dunbar created an exceptional piece of minimalist art.

Several photographs included in the exhibit deal with punch card manufacturing. Such cards were not an IBM invention. As early as the 18th century, wooden blocks with holes in them were used in mechanical looms to encode complex design patterns for textiles.



A fragment of a punch card punched with hearts.  
Photograph by George Dunbar, 1960s.  
◀ (Not shown at the exhibit.)

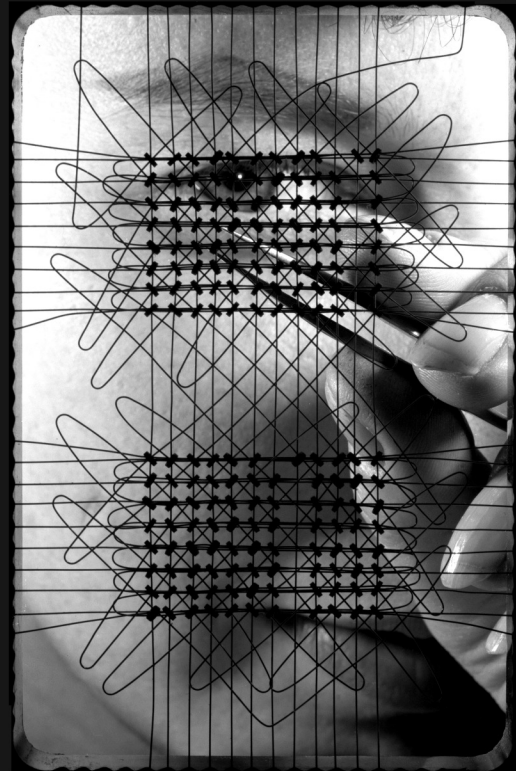
IBM punched cards were thin three-by-seven-inch sheets of stiff paper designed to store information. Each card was divided into 80 columns and a single hole punched in a column could represent a digit. Hence, a card could store up to 80 digits. The cards could also store non-numeric data such as text. Until the 1980s, punch cards were as prevalent a storage medium as flash memory is for our present every day needs.



Punch card manufacturing at IBM card plants in Montreal and Toronto. Photographers unknown, 1960s.

Dunbar's photograph of a woman inspecting a computer memory component is one of the most interesting portraits in the exhibit. Such memory consisted of tiny cores of magnetic material linked by a web of wires going through them. Each core was able to store one bit of information: zero or one. Core memory components were put together by hand in a careful but tedious process of threading cores with wires. Errors were frequent and careful inspection and testing was crucial. Dunbar made several portraits of core assembly workers and inspectors, but the one in question is, perhaps, his best on the subject.

A technician inspecting core memory.  
Photograph by George Dunbar, 1960. ►



◀ A fly "playing" with a tiny magnetic core.  
Photographer unknown, 1964.  
(Not shown at the exhibit.)

Since the formation of the computer industry in the 1950s, media coverage of the industry had been based on mutual support, co-operation, and respect, although such coverage was not without an occasional dose of mystification and self-interest.

Canadian media covered not only large computing events, such as the Canadian Computer Show and Conference organized annually since 1968 by the Canadian Information Processing Society, but also products unveiled by Canadian startups. In 1973, *The Globe and Mail*, *The Toronto Star*, and other media outlets reported on the unveiling of a small desk-top computer—the MCM/70—developed by Micro Computer Machines, a small Canadian startup. The MCM/70 was the world's first computer designed specifically for personal use. Thirty years later, both newspapers celebrated the anniversary of that significant event in the history of computing with feature articles.

TV production of PROJECT 80s.  
Photographer unknown, 1983. ►



The IBM Images Archive contains numerous photographs depicting these interactions between IBM and the media. They capture TV camera lenses and human eyes focused on the newest technological marvels bearing the IBM logo and bystanders gathered in front of IBM Data Center in Toronto, curious to see what all the media attention is about.





CBC broadcast of the Canadian 1963 federal election from IBM Data Center in Toronto. Photograph by George Dunbar.  
◀ April 8, 1963.  
▼



CBC broadcast of the Canadian 1965 federal election from CBC Toronto's Studio 7. For the first time, computers were used for "instantaneous" coverage of election results. Photographer unknown, November 8, 1965.  
◀

With some regularity, Canadian computer manufacturers invited the general public to its manufacturing and research facilities. IBM's open house events were aimed at showcasing the company's computer technology and corporate might. All were invited to these events, including children.



▲ IBM Canada open house. Don Mills location. Photograph by George Dunbar, September 1972.

▼ IBM Canada open house. Photographer unknown, 1965.



In the 1960s, IBM punch card equipment proved to be as exciting to watch in action as rows of lights blinking on the operating panels of the large IBM computers. So did printers because, in an age still defined by the typewriter, these new devices could print pages of text at high speed using several fonts. The fact that these printers were noisy was not necessarily a demonstrational disadvantage. When printed, each character produced a distinct sound pitch and printing the same character several times allowed the machines to sustain that pitch for a desired duration. Thus, an IBM computer could generate musical notes and open house visitors could be treated to a computer playing Shostakovich's Waltz nr. 3 on an IBM 1403 line printer.

On some occasions, IBM 2741 printing terminals connected to computers were made available to give IBM open house visitors a chance to interact with these “big brains.” Older children found these interactive environments fascinating and irresistible. Younger children pressed keys and switches and turned knobs left and right as if testing the play value of the mysterious machines while still immersed in a world filled with familiar objects such as balloons.



IBM Canada open house visitors  
mesmerized by an IBM 1403 printer.

◀ Photographer unknown, 1965.



Children at IBM Canada open house,  
Don Mills location.

Photograph by George Dunbar,

◀ 1972 (left) and 1965 (right).



Children interacting with a computer via an IBM 2741 printing terminal.

◀ Photographer unknown, 1965.

Technological progress has never been uniformly greeted with an unquestioned enthusiasm. While many guests found computer open house events inspiring and empowering, for others the digitally mediated world of the future unveiled during such events was not equally benign, seductive, and alluring.



▲ An open house intermission. Photographer unknown, 1965.

At the end of some open house events, IBM employees handed out brochures, printouts, and other souvenirs. One of such “exit through the gift shop” events was captured by Dunbar in 1965. A row of IBM employees hand out computer printouts to children lined up opposite them. As with Dunbar's other photographs, this one projects several interpretations. Is this the passing of the digital flame to a new generation? Do the children understand that what's expected from them in the unknown digital age might not be fun at all?



“Exit through the gift shop.” IBM Canada open house.

◀ Photograph by George Dunbar, 1965.

IBM Canada Data Center in Toronto was a magnet for curious passersby. Through large windows facing King Street East, the center was revealing the still uncharted for many world of computing.



Boys watching an operation of an IBM 026 Printing Card Punch terminal at IBM's 704 computer center in Toronto.

◀ Photograph by George Dunbar, 1963.



Computing and information are examples of high technologies in constant motion, advancing at a speed that makes projecting their progress and impact difficult. Progress in computing can be expressed and measured in several ways. Novel applications unattainable only a few years earlier are tangible manifestations of such progress, and so are the advancements in data storage technologies and the degree to which stored information can be considered private or personal.



▲ The Toronto Board of Education–sponsored demonstration of Computer Assisted Instruction – a “new technique for the development of educational courses.”  
Photographer unknown, 1965.

▼ Computers in business presentation during a business show at the Royal Connaught in Hamilton.  
Photographer unknown, 1959.



In the early 1960s, IBM introduced a new kind of storage device – a portable magnetic disk pack – the predecessor of floppy diskettes used in early personal computers.

It was the portability of the new device that dared IBM's marketing to make a thought-provoking suggestion that

*This saucer-shaped package could be the newest version of a businessman's briefcase.*

a personal storage device, the “files of the future,” as it was described in the promotional note attached to the original photograph.

The amount of information that could be stored on such a disk pack would require at least 25,000 cards to be punched. In the 1960s, that was certainly a lot of cards. However, to put this number in proper perspective, one can now carry a tiny flash memory card in one's pocket that can store information that would require millions of IBM disk packs or billions of punched cards – enough cards to circle the Earth several times when lined up along the equator.

A businessman carrying an IBM disk pack designed to work with the IBM 1440 small business computer.

Photographer unknown, 1962.





KCS Data Control, one of the first computer consulting companies in Canada, was founded in 1955 in Toronto. Two years later, KCS was contracted by the Metro Toronto Chief Traffic Engineer to do a feasibility study for the planned computerized traffic control system that was to operate 1800 intersections in Toronto to ease traffic flow. The success of the pilot project conducted by KCS led to the system's full implementation in 1963, making Toronto the only city in the world at that time with a computerized traffic control system.

A photo series taken by Dunbar in 1961 captures the delivery of an IBM 7070 computer to KCS. In the early 1960s, computers were large, heavy, and required vast amounts of energy to work. Unfortunately, the locations at which they were to be installed were not built with such equipment in mind. The installation of large computers at such locations was challenging and frequently required heavy construction equipment and considerable electrical upgrades.

Computer delivery to KCS.

◀ Photographs by George Dunbar, 1961.

The first experiments with the use of computers for purposes other than number crunching began soon after the birth of computer industry in the early 1950s. Game playing programs such as chess, checkers, and tic-tac-toe were among the first applications of that type.



Leslie Mezei showing his computer art created on the University of Toronto's IBM 7094 Data Processing System.  
◀ Photograph by George Dunbar, 1968.

Computer art was born in the late 1950s and by the mid-1960s such art was recognized and publicly exhibited. In 1968, Dunbar took several pictures of a Canadian artist Leslie Mezei who is one of the most important early partakers in the North American computer art scene. In 1964, Mezei was teaching at York University.

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*Portraits of Digital Canada* is sponsored by IBM Canada, York University Libraries, the Department of Electrical Engineering and Computer Science at York University, and York University Computer Museum.

Exhibit's curator: Zbigniew Stachniak

Exhibit's music: *XhiBiTmUziX* composed and recorded by Gabriel Reynolds

Catalog written and designed by: Zbigniew Stachniak

# YORK UNIVERSITY COMPUTER MUSEUM

