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From books to byte: Pioneers of the scientific information highway NRC-CISTI

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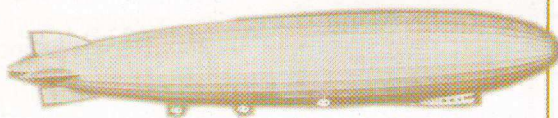
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THE HEADY DAYS OF 1924...

The NRC library took its very first steps in the Roaring Twenties: a time of explorers and, of course, exhilarating discoveries, but also an era of dreams overshadowed by the fragile peace between two world wars. A surrealistic renaissance straight-jacketed by Prohibition, when people danced the Charleston under the looming threat of war. A time of pioneers, the early days of our institution.

ZR-3 COMPLETES FLIGHT CREATING NEW WORLD RECORD



Aviation was making great strides, spurred on in part by daredevil pilots. On 15 October 1924, Hugo Zeckener personally delivered his 658-foot-long baby, the ZR-3 zeppelin, to the United States. He left his native Germany on an 81-hour odyssey that challenged the forces of nature to complete the fourth transatlantic crossing in history, and the first ever in winter.

A few weeks earlier, three American aviators also pulled off another astounding feat. Their three planes accomplished the very first airborne circumnavigation through six and a half months of countless stopovers and frustrating setbacks. Yet with patience, these pioneers ultimately finished first in the history books!

PROVEN BEYOND ANY DOUBT THAT MARS HABITABLE

While Albert Einstein's theories dominated the world of science in 1923, little green men placed the legendary genius' exploits into a different context in 1924, when Mars captivated people's attention.

On August 23, eminent astronomers around the world attempted to establish communications with the purported Martians by placing intense projectors at the summit of Jungfrau, in Switzerland. They attempted in vain (no kidding), using a snow-covered valley, to focus a 2 million candlepower projector on the Red Planet so they could send intermittent signals.

US government astronomer Captain T.J.J. See announced that "astronomical observations have proved beyond any doubt that plant and animal life exist on this planet." Orson Welles revelled in this credulity later, when the radio broadcast of his *War of the Worlds* set off mass panic in the United States.

ONTARIO DRY MAJORITY NOW 37,000: PROHIBITION WILL PREVAIL

The world was moving through a sombre period. Prohibition dominated life in Canada. The clergy lent their authority to stifling the self-realization of women. An Ottawa newspaper ran the headline "Feminism turns women into brutal, heartless creatures." Gandhi had to resort to a hunger strike to get his message across. Hitler wrote *Mein Kampf* in prison, while the first Nazi candidates were elected to the Reichstag and their beliefs took root in Germany as it quietly rebuilt its war machine in violation of the Treaty of Versailles.

1924 Stats and Facts

- The United States' gold reserves amounted to \$4,250 billion, almost half the world total, yet only 10 percent of Bill Gates' assets today!
- In Nova Scotia, the average miner earned \$100 a month, and a female teacher in Quebec made about \$450 a year.
- Canada had a population of less than 10 million. The national debt rose to \$2.4 billion, while the Canadian dollar was at par with its American counterpart.

TRANSATLANTIC TRANSMISSION OF PHOTOGRAPHS BECOMES A REALITY

But science had a more serious side as well, one that included Canadians. An original invention by Canadian Sir William Stephenson allowed the first wireless transmission of a photograph for publication in the *London Daily Mail*, on 26 October 1924. This system revolutionized news reporting and provided the technical launching pad for television.

It was also in 1924 that some of the best medical researchers in the country co-operated with the NRC to discover a cure for tuberculosis. Their work continued until 1938 and contributed to development of the BCG vaccine, which proved to be an effective weapon against this disease, which claimed some 12,000 lives a year in Canada.

Sir William Stephenson in front of his wirephoto transmitter



OFF THE BEATEN PATH

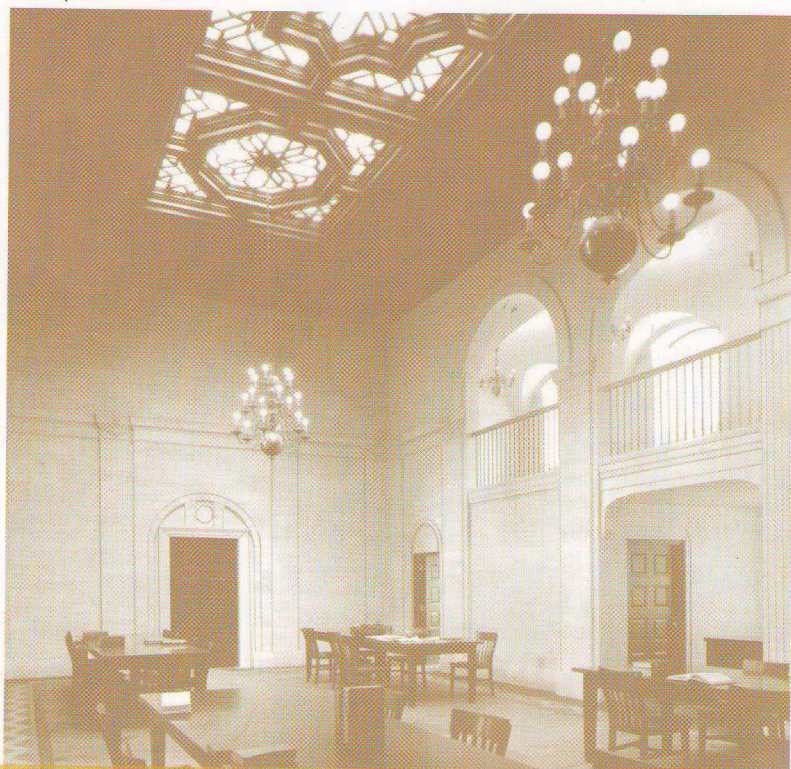
The First World War was the driving force for the creation of the National Research Council of Canada in 1916 and, indirectly, its library. How could there be a serious research facility without a storehouse of information to feed it? As pointed out by Jack E. Brown, one of the greatest visionaries in the history of CISTI and its Director from 1957 to 1979, "...it was not until World War I that public attitudes towards science and technology changed sufficiently for the government to take any direct action to encourage research. With the bombing of London by zeppelins, however, even the most ignorant citizen could understand at last the relationship between inventions and warfare."

Homeless

It is difficult, however, to pinpoint the exact founding date of the NRC library. Before the NRC Laboratories were opened on Sussex Drive in Ottawa in 1932, the organization had no official home. In fact, the NRC's tiny collection was first housed in the Council's modest offices in the West Block on Parliament Hill, when Beatrice Walling was appointed librarian in 1917.

There tends to be agreement that the NRC library saw the light of day in 1924, because the Council's brand new president, Henry Marshall Tory, announced his intention to "building up a library that would serve scientific workers everywhere in Canada." That same year, Parliament passed the *Research Council Act* to fund the first NRC research project. Bolstered by this success, Tory then garnered support for realizing his grand dream: a Temple of Science.

Lost in space! After just moving into the vast facilities in the Temple of Science in 1932, the minuscule collection of 12,000 books takes up only about three percent of the available shelf space.



In the Shadows

Officially named the NRC Laboratories, this temple of science was raised at a cost of \$3 million. More than 2,000 guests handpicked from the field opened the Temple in grand style on 10 August 1932. Despite a massive media campaign, there was little mention of the library. The spotlight shone on the laboratories, for two reasons. First, the small collection of some 12,000 volumes was dwarfed by rows of shelves that could accommodate half a million books! But above all, the Great Depression was decimating the country. Henry Marshall Tory's inaugural address clearly set the tone, through his dedication to justifying every cent invested in his Temple by the financial progress already achieved by industry thanks to the work of his researchers.

But ensconced in the hallways of the ornate Italian Renaissance building, overlooked on the endless list of dignitaries and doctors, a great pioneer was nurturing much greater ambitions for her library. That person was Margaret Gill.

Come Wind and High Tide

Hired as NRC librarian in 1928, Miss Gill had to cope with the ravages of the Depression and the fact that she was a woman, in expanding the collection and fulfilling her aspirations of making the NRC library an institution with a national mission. In those days, the administrator of the Montreal Diocese preached about "the criminal negligence of mothers seeking a career for their daughters." Most librarians of the day were women and the profession enjoyed little authority. Yet as founder of the Canadian Council of Libraries, Margaret Gill is credited with an historic role in creating the National Library of Canada.

Under her 30-year reign at the NRC library, the Council's sparse collection grew to 350 times its original size, to 20 kilometres of shelf space, a truly phenomenal expansion! In the annals of CISTI, 1957 is considered the year in which the NRC library began to take on its role as a national science library, at the end of Margaret Gill's tenure. What else could be said, except "mission accomplished!"

75 YEARS OF HISTORY FOR

With the passage of time, events and people with a bold vision of the future have inspired thoughts, ideas and advances that have shaped our destiny.

1916

Founding of the National Research Council of Canada (NRC), consisting of just nine council volunteer members attending quarterly meetings, chaired by A.B. Macallum, in modest offices on Parliament Hill



1917

NRC hires a librarian, Beatrice Walling

1918

End of the First World War, catalyst for creation of the Council

1919

NRC's budget includes a "miscellaneous, library" portfolio with \$3,000



1924

Parliament passes the Research Council Act to fund temporary laboratories to test a material to be amalgamated in industrial refractory furnaces, the NRC's very first research project - a success

Founding of the NRC library

The computer age is born with the founding of IBM

1928

Appointment of the NRC's first official chief librarian, Margaret Gill; she inherits a minuscule collection of 1,000 titles



1929

Publication of the first periodical by the NRC Research Press

1930

Despite the ravages of the Great Depression, construction starts on the NRC Laboratories, the Temple of Science, at a cost of \$3 million

1932

Highly publicized opening of the NRC Laboratories on the tenth of August. The collection of 12,000 titles is lost in the new facility with 20 kilometres of metal shelving

1937

The Temple is no longer adequate for the type of experiments conducted by the NRC, such as testing of powerful aircraft engines

1938

The Council's president,



General McNaughton, announces his policy of access to NRC technical information services for Canadian universities and industrial research units

American physician Chester Carlson invents the photocopier

1939-45

The Second World War leads to



phenomenal growth at the NRC, beginning with construction of new laboratories on the vast Montreal Road campus east of Ottawa

1946

The first functional electronic computer, a 30-ton monster named ENIAC



1947

Previously part of the Department of Reconstruction, the Technical Information Service is transferred to the NRC

1952

Library collection reaches 60,000 volumes

1953

Founding of the National Library of Canada

1957

The NRC library unofficially takes on the role of national science library (NSL) as its collection reaches 350,000 volumes

Pioneer Margaret Gill retires after 30 years of hard work and is replaced by visionary Jack E. Brown



1959

Engineer Robert Noyce produces the first integrated circuit, a precursor of the age of miniaturization

Agreement with the National Library of Canada on concentrating its activities in the fields of social science and humanities, thereby securing the national role of our science library

1960

NSL collection: 450,000 volumes

1962

Planning starts for a new building on the Montreal Road campus

Start of mechanization of library operations in NSL (use of IBM punch card system)

1963

First data base produced by NSL (list and index of NRC publications)

1964

Use of telex improves ordering service

1965

NSL compiles its first collective catalogue of scientific publications in Canadian libraries

1966

Recognition of the NSL as a national library of health sciences for Canada

FOCUSSED ON THE FUTURE

1967 The status of National Science Library is made official; collection reaches 725,000 volumes



1968 Publication of the first NSL external newsletter, the forerunner of CISTI News

First computerized national selective information dissemination service, CAN/SDI, developed by NSL ~ predecessor of InfoAlert, now part of CISTI Source. An avant-garde system used as a model by several foreign countries

1969 Cabinet gave the NRC a mandate to develop a national scientific and technical information system

Delivery of documents accelerated exponentially with installation of the first fax machines

1970 NSL became Canada's national co-ordinator for MEDLARS, a real-time information system in the field of medicine developed by the National Library of Medicine in the United States



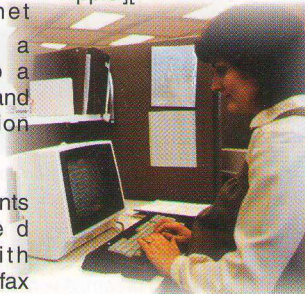
1971 The CAN/SDI service software was given to UNESCO, by NSL, for distribution to interested countries

1972 CAN/OLE is created, the first real-time information tracking system in Canada, introduced by NSL

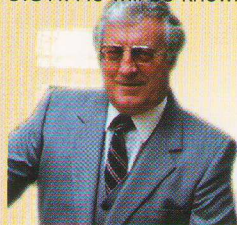
1974 Unification of NSL and the Technical Information Service under the CISTI banner

Grand opening of CISTI's new home, an impressive masterpiece of modern architecture located in the heart of the Montreal Road campus

1978 First commercial personal computer, the Apple II



1979 Jack E. Brown retires; Elmer V. Smith becomes the new Director General of CISTI. He will be known



above all as a progressive defender of the gains made by the institution

1983 CISTI generated more than 200,000 copies and loans of documents, more than any other specialized information centre in North America. Publication of the first issue of CISTI News

1984 Previously financially independent, CISTI's budget is no longer the subject of a separate vote by Parliament, and now falls within the NRC's general envelope

1985 CISTI's collection covers more than 50 kilometres of shelves

1987 Douglas Dewar, a reference librarian at CISTI with a doctorate in chemistry, plays a key role in identifying a troublesome toxin contained in mussels from Prince Edward Island. This toxin, domoic acid, previously poisoned about a hundred people and claimed three lives. Through this discovery, Dr. Dewar helped to save lives.



1991 Elmer V. Smith retires. Margot Montgomery replaces him as Director General of CISTI; she introduces a business approach. Under her reign, a

strategy will be developed for international distribution of its services

1993 Telex service is dropped and the first orders are accepted by Internet

1994 Through IntelliDoc, CISTI's document supply service is computerized from end to end. At the same time, the photocopier era comes to an end

On September 15, CISTI launches its first Web site, an interface that now handles almost 50 percent of orders

NRC Research Press and CISTI merge

Creation of the marketing department, reinforcing the change in culture achieved within CISTI

Romulus, the first CD-ROM ever produced by NRC (developed in partnership with the National Library of Canada), receives an award from the Canadian Library Association

1995 IntelliDoc is given an award of excellence by the publishers of Canadian Business, to mark the "design of a remarkable solution in information technology"

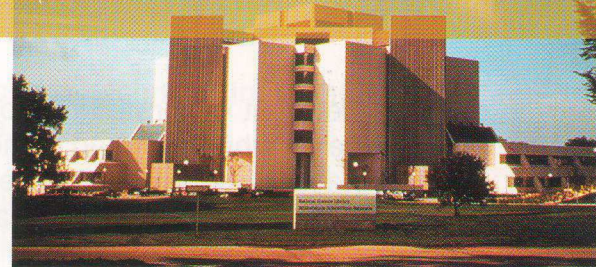
1997 CISTI launches its Virtual Library to provide direct access to its library services for NRC research institutes from coast to coast

1997-99 CISTI's national network of branch libraries becomes NRC Information Centres and expands service within research communities across the country. By 1999 CISTI operates 10 centres in St. John's, Halifax, Boucherville, Montreal, Ottawa, London, Winnipeg, Saskatoon, Victoria and Vancouver

1998 Bernard Dumouchel replaces Margot Montgomery at the head of the Institute

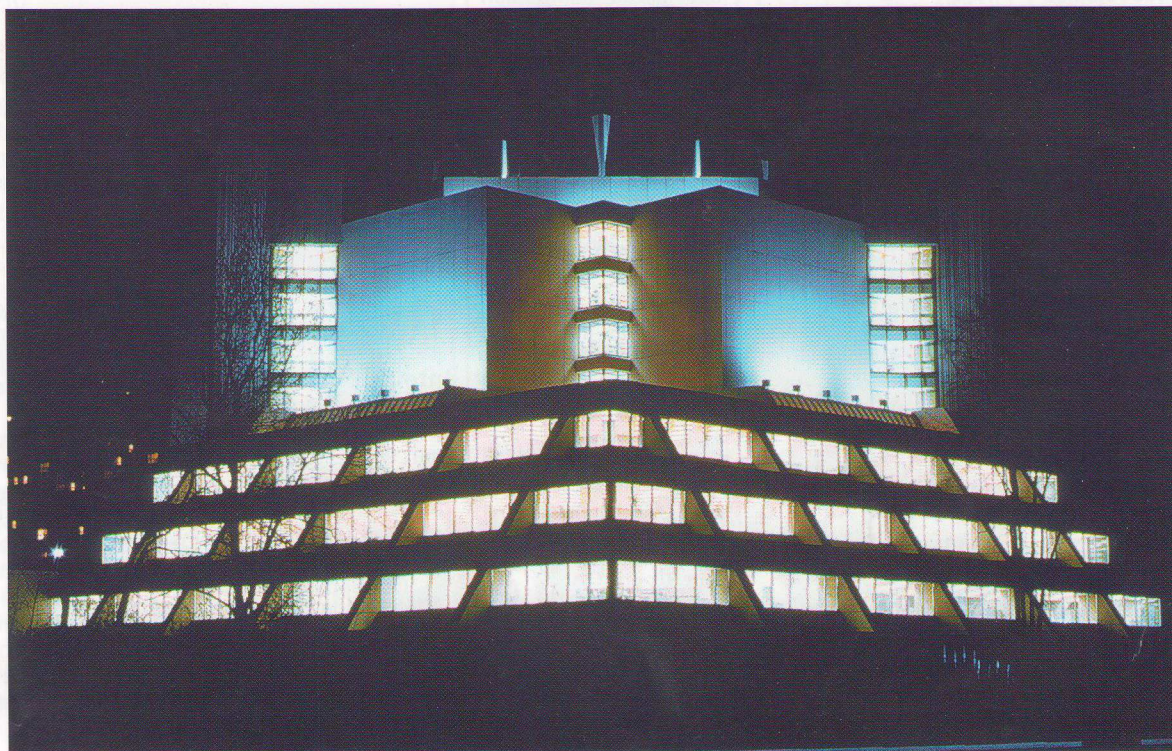


1999 CISTI maintains an inventory exceeding 8 million and receives more than 3,500 requests a day. Rush orders are processed by CISTI in less than two hours



THE HOUSE THAT JACK BUILT

In 1957, the most venerated person in the history of CISTI came onto the scene: Jack E. Brown. The day the new head of the NRC library stepped into his office on Sussex Drive, he found a national collection squeezed into very tight quarters. Plans for a new building commensurate with this visionary's ideals were started very quickly.

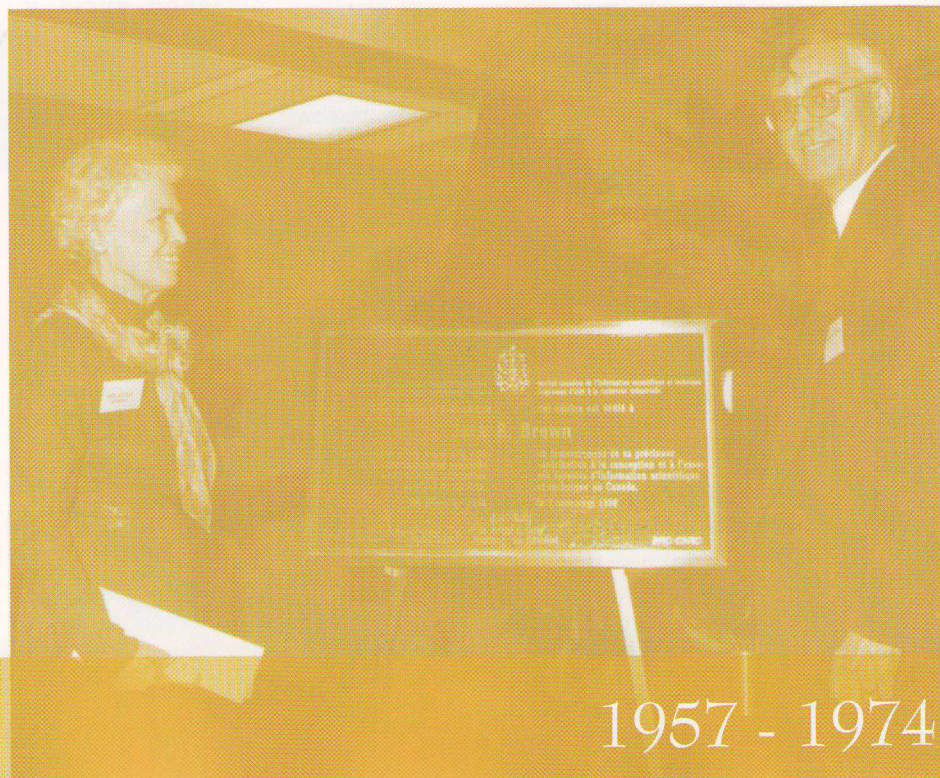


Night view of the J. E. Brown building. Believe it or not, National Science Library services were available without interruption during the move, which was completed over a weekend in February 1974. We're talking about a million books and 132 employees!

On 10 May 1996, the major contribution by the late Jack E. Brown was immortalized by having his name given to the building that was his dream. A very emotional day of reunion for CISTI staff past and present. Shown below are Ms. Brown and Dr. Arthur J. Carty.

During the twelve years or so that it took for this megaproject to be cast in concrete, the computer revolution swept over the world. This inspired Jack Brown to ensure that his library would not miss out on this technological shift. Toward the end of the 1960s, his institution created nation-wide services driven toward success by computer technology. It earned a cutting-edge reputation and the official status of Canada's National Science Library.

In February 1974, when the new, ultramodern building was ready for its occupants, the so-called library was no longer true to its name. The new facility called for a new image. Jack E. Brown had brought his dream into reality: extending the tentacles of a national network for disseminating scientific information. The Canada Institute for Scientific and Technical Information (CISTI) was born. The house that Jack built has proved to be quite a masterpiece!



CISTI TAKES ON THE WORLD

After conquering the national market for scientific and technical information, CISTI is continuing to build on the reputation of its new name.

The innovative information dissemination systems designed and developed by the Institute have been honed over the years and earned CISTI an international reputation. Several countries in fact have used CISTI as a model and now use its process technology.

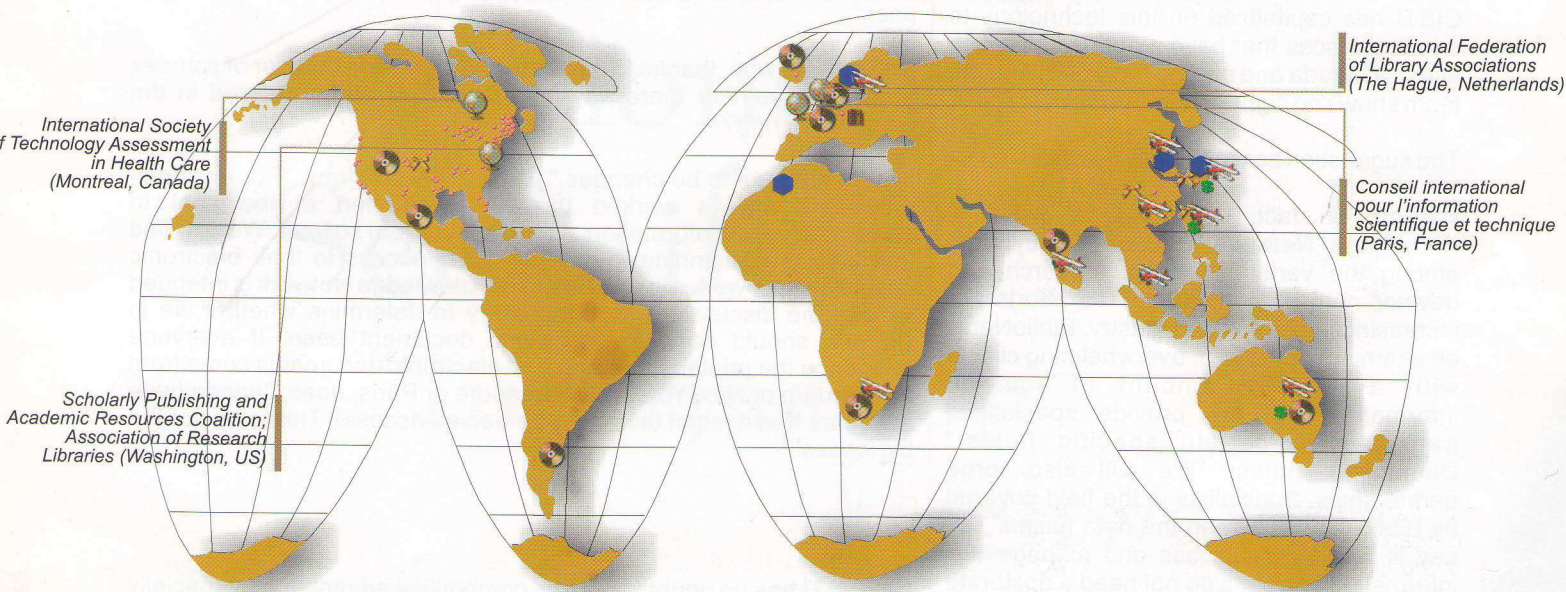
After Jack E. Brown retired, Elmer V. Smith and later Margot Montgomery, strengthened this determination to break down barriers.

During the 1980s, under the guidance of Mr. Smith, "we have extended CISTI's mission by introducing computer systems to supply documents, fostering much broader access to our services," notes Bernard Dumouchel, current Director General of CISTI and one of Mr. Smith's directors at the time.

Then Ms. Montgomery arrived in 1991 and gave the Institute the commercial weapons it needed to enter the international market in the emerging era of globalization.

The formation of a marketing group and development of a strategy for international distribution of services helped support CISTI's presence in every corner of the world. Then the NRC Research Press merged with CISTI in 1994, adding the weight of their international credibility in the publishing field.

We have now lost count of the number of foreign delegations that have come to study the Institute's workings, the overseas partnerships as well as the conferences and exhibitions CISTI has attended abroad. Today, slightly more than one third of document transactions move beyond Canada. CISTI is now a truly international player!



Legend

Morocco, Sweden, Korea and China are just a few of the countries that have worked with CISTI to create or upgrade their own institutions for disseminating scientific and technical information

Argentina, Australia, Belgium, England, India, Mexico, the Netherlands, South Africa and the United States are among the countries that have adopted some of the processes designed by CISTI

CISTI has negotiated international agreements on sharing resources with the Centre for Scientific and Technical Information in Chinese Taipei, the document supply service of the British Library and the National Library of Medicine in the United States. Negotiations are now underway with China and Japan on similar arrangements

CISTI has showcased its prestigious image in countless American cities and some Asian countries, such as Singapore and Japan, since the launch of its international exhibits program in 1994
NRC Research Press makes its presence felt each year during the Frankfurt

Book Fair in Germany. Also, many of NRC Research Press' peer reviewers come from around the world. These are just a few aspects of a service that showcases Canadian and international research

International committees on which CISTI's Director General sits

Many foreign delegations and students come to Ottawa to learn from CISTI. These include delegations from Indonesia, Korea, Thailand, China, Australia, Japan, Sweden, South Africa and Chinese Taipei

More than one quarter of CISTI revenue from outside North America comes from Japan and almost one third is split almost equally between Australia and Chinese Taipei

TOWARD THE THIRD MILLENNIUM

Appointed as Director General just one year ago, but rooted in CISTI's forward-looking philosophy for many years, Bernard Dumouchel is the captain charged with piloting the Institute safely into the third millennium. Who better, then, to talk about the future of CISTI?

"The long-term vision is to grow in our current mission of providing leadership in the dissemination of scientific, technical and medical information in Canada," Dumouchel begins.

And anyone talking about *long term* must first think technology, which some find a daunting monster to be subdued. Not CISTI.

Technology Provides Opportunities

As we have seen earlier, the phenomenal growth of computer technology is the wave that has carried our institution to its greatest achievements in the past three decades. CISTI has capitalized on this technology to create services that have extended its reach across Canada and around the world. And the team shows no signs of slowing down...

The suggestion box is actually overflowing!

We are, in fact, developing a Scientific Knowledge Network to create a synergy among the various national research and development resources. CISTI's efforts are increasingly focused on industry. BiblioNet is an example. "Instead of overwhelming clients with a massive amount of sci/tech information, we will provide specialized gateways in certain specific fields," Dumouchel notes. "We will also forge partnerships. Specialists in the field covered by BiblioNet will screen the data bases. The key is to simplify access and manage this information so user's do not need a doctorate in library science to be able to use it."

Acknowledgements

Peter Wolters, former key CISTI employee, for shedding light on the growth of automation in library operations and services from 1962 to 1974.

Ann Bilodeau and Lynn Delgaty, NRC archivists, for their kind and dedicated assistance.

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Marion E. Boyd, information specialist, for her zeal.

Marie Charrette, for her fast work and cheery disposition.

Christine Campbell, Manager, Library and Information Services, National Museum of Science and Technology.

Staff of the National Library of Canada, for their patience!

Technology has its Own Challenges

Problems on the horizon? Challenges posed by runaway growth in technology?

"We are still managing the printed page, but we're also managing in electronic format as well, so the challenges have virtually doubled," CISTI's Director General explains. "When we talk about a digital scientific library, we're talking about access to the same information but in electronic format ~ information that also is often available only in electronic form. So over the longer term, will we still be delivering documents in hard copy? Not likely. We must seize the opportunities that arise to rethink our interfaces with customers. Instead of dealing with a customer through a library or another person, we want certain services to link up directly with the end user."

An end user who, thanks to the Web, has a growing number of sources of information. Are there any future perils to be considered in the competitive ring?

"There are sure to be changes," Dumouchel confirms. "For example, publishers always worked through middlemen in the past to disseminate their information, subscriptions, and so forth. We now find that they are beginning to provide direct access to their electronic collection. Our work with the Scientific Knowledge Network is intended to take the discussions to the country to determine whether we in Canada should have an electronic document base. If everyone abandons the printed page and if all electronic documents come from Amsterdam or New York City, Singapore or Paris, does Canada have any fears that it might ultimately be denied access? This is one of the big issues."

Technology has its Limits

But CISTI has no doubts about its competitive advantages, especially that it does not exist to generate profits but to reinvest the funds collected into the quality of its collection, its infrastructure and its services. A customer-based approach has been developed, a systematic approach to delivering documents the machine is broken in, reliable and stable. It is now being continuously upgraded.

And the chief navigator has his eye firmly on the horizon: "Despite all the talk of technological advances, the Web, and so on, Canada's innovation system will always need someone capable of weighing and selecting the proper information. A need for expertise."

A need that will definitely outlast another 75 years...

CISTI News

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