HIS 2129

Technology, Society and Environment since 1800

(Winter 2014)

Mass Consumption and Technology in Daily Life

- If the electrical system is a system for delivering power and the automobile a system for delivering mobility to individuals, they do not determine what will be done with power or automobility
- Since the beginning of the 20th century, various technologies have become a part of the fabric of our daily lives, at work or at home or even on the move
- Parkways, freeways, and highways have cut through cities, offering new opportunities for leisure but also for commuting
- Meanwhile, the phonograph, cinema, radio, and later television afforded individuals greater control over their entertainment and consequently greater identification

Telecommunications

- The development of radio: An early case of technoscience?
- Radios as mass commodities: consequences
- The invention of television
- The spread of television to Canada
- Television and culture

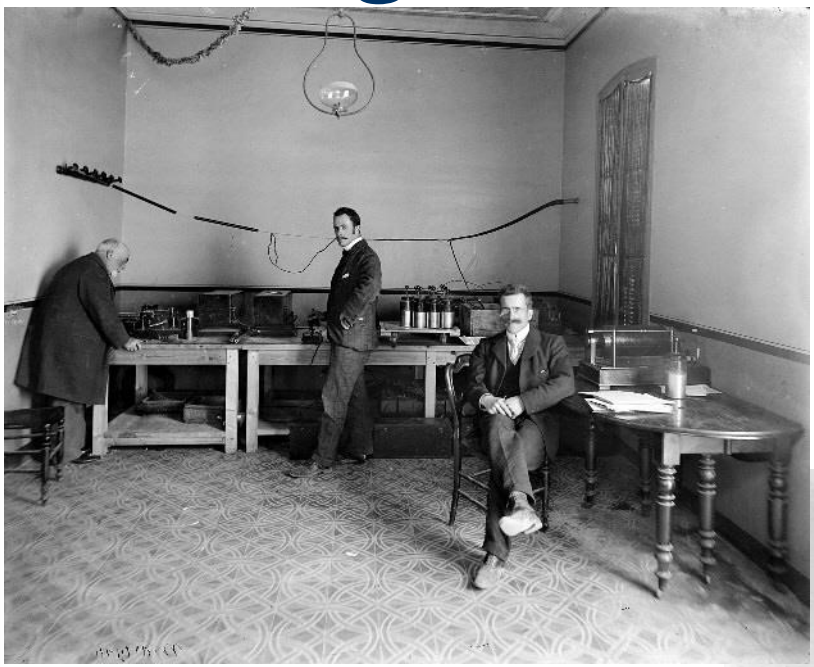
Telecommunications, for one… and all

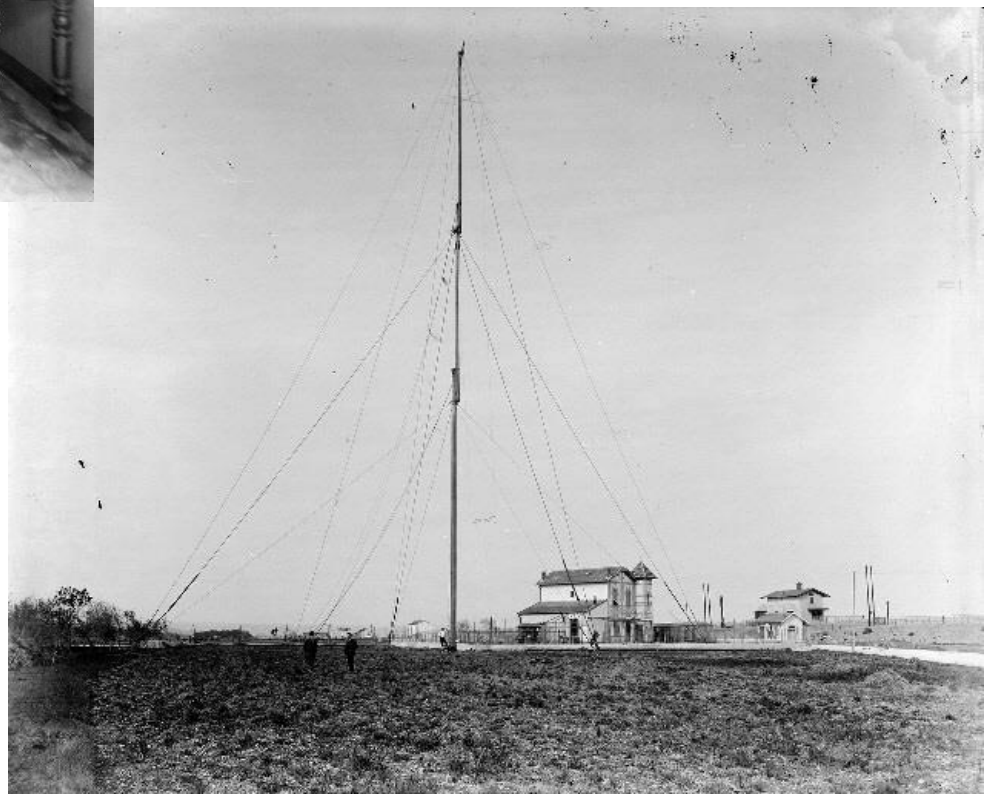
- Radio developed out of scientific theory and research, as well as international contributions to its technical evolution, making it an early case of a technoscience
- The first radios were beloved of amateurs because they enabled them to communicate one-on-one, but spectrum limitations led rather to the development of broadcasting by a few stations
- Television was an experimental technology in the 1930s with electro-mechanical designs still competitive with pure electronic ones
- Commercial television broadcasts started in the 1940s and so many stations fought over the electromagnetic spectrum that it became necessary to regulate broadcasting

From Marconi to Fessenden

- Italian **Guglielmo Marconi** (1874-1937) is the entrepreneur who did the most to establish by the end of the 19th century the feasibility of wireless telegraphy using Hertzian waves
- He profited from earlier inventions, but he also discovered that using antennae while grounding both the transmitter and the receiver multiplied message ranges
- He sought a first patent in 1896, launched the Marconi Wireless Telegraph Company in 1900, and sent a message from Poldhu, UK, to Newfoundland in 1901

The age of wireless experiments





Here we see some radio experiments conducted in the south of France in 1900. Such high antennae were typical.

Reginald Aubrey Fessenden (1866-1932)

- Born in East Bolton (Québec), he left for the U.S. where he worked for Edison, among others
- He patented an electrolytic receiver much more sensitive than the Branly-Lodge *coherer*
- He helped build a high-current, high-frequency alternator capable of generating a continuous radio wave
- He also tried modulating the amplitude of Hertzian waves (AM radio) in order to reproduce music and the human voice, while U.S.-born **Edwin H. Armstrong** later came up with frequency modulation (FM) to combat interference

The first radio broadcasts

- In **1900**, Fessenden was the first to use radio to transmit the human voice (instead of Morse code signals)
- Though it's often been said that around Christmas 1906 he broadcast from Brant Rock (Massachusetts) words and music for wireless operators capable of demodulating his transmissions, it seems likely now that U.S.-born **Lee De Forest**'s wireless telephony experiments of Spring 1907 in New York were the first true radio **broadcasts**
- Fessenden may be credited with the first **long-range** broadcasts later in 1907
  (Lee De Forest's broadcasts were detected within 100 km of New York, but Fessenden's were detected over 350 km away)

Crystal radios

- Patented as early as 1901, crystal radios truly took off after 1906
- They were cheap and easily made with a galena, silicon or pyrite crystal used (along with a “cat’s whisker detector”) to convert the oscillating radio signal into a direct current
- They provided the first generation of radio “fans” with the means to receive radio signals from friends and strangers
- A mass market developed after WWI

Emil Berliner Museum

To recapitulate (1)

- What did the first private users of radios love about them?
- Explain what factors drove the adoption of broadcasting as the dominant form of radio use.
- Identify four countries associated with early developments in the evolution of radio.
- What technology was key to the first mass adoption of radio?
- Did Fessenden invent AM or FM radio?
- Was Edwin Armstrong the first to transmit the human voice by radio?

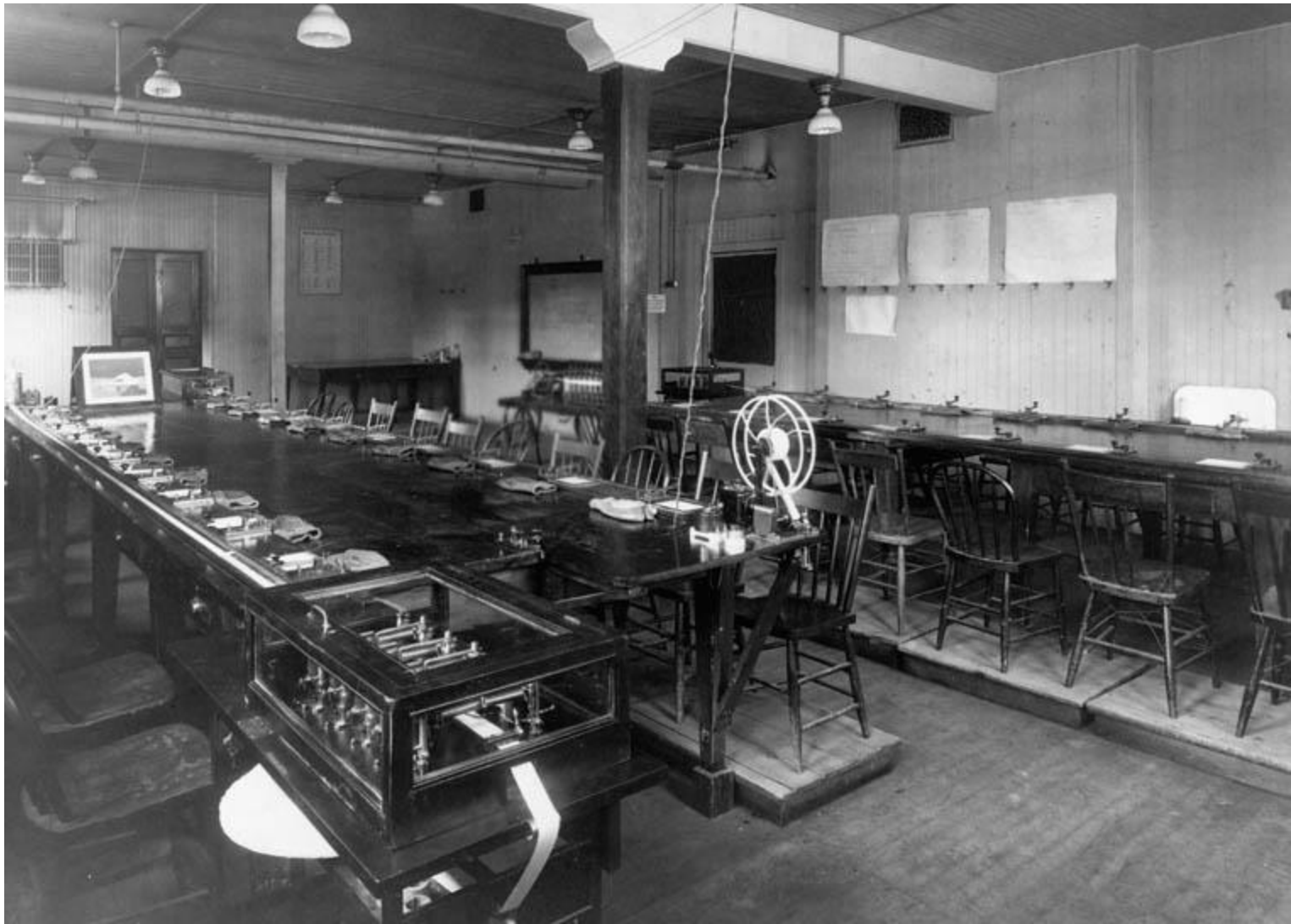
The adoption of wireless (1)

Port Nelson (MB) Wireless Station and Camp No. 1 in 1915

G. H. Herriot, Department of Mines and Technical Surveys,
Library and Archives Canada, PA-023110

The adoption of wireless (2)

A wireless telegraphy installation at the University of Toronto School of Aeronautics in 1917



Department of National Defence,
Library and Archives Canada, PA-022941

The adoption of wireless (3)

Wireless telegraphy instruction room at Camp Borden (Canada's first air force base) in 1917 (near Angus, ON)

Department of National Defence,
Library and Archives Canada, PA-022854

Welch & Johnston Ltd. Radio equipment display in Ottawa (1920)

Starting around 1920, radios using vacuum tube technology (diodes, triodes, etc.) began to prevail, especially in the commercial field.

Clifford M. Johnston (1896-1951), Archives Canada

Early Radio Fans (1)

Farmers were among radio's early adopters because it could (i) relieve boredom, and (ii) provide useful news.

c. 1921

Early Radio Fans (2)

Mary Texanna Loomis, *c.* 1921

Early Radio Fans (3)

John Ingle in Chicago, *c*. 1922

Radio Fans (4)

In 1923, this well-to-do radio listener still required a fairly elaborate set-up.

Douglas Fairbanks and Mary Pickford at CKAC (Montreal, October 1922)

Notice the radio antenna disguised as a lamp shade on the desk.

Library and Archives Canada

Celebrating wireless (September 1925)

The Eastern Arctic Expedition brings back pictures like these, showing Ataguttiaq, wife of Nuqallaq, holding *Wireless Age* in Pond Inlet, now Mittimatalik/Tununiq, Nunavut

Richard S. Finnie,
Library and Archives Canada,
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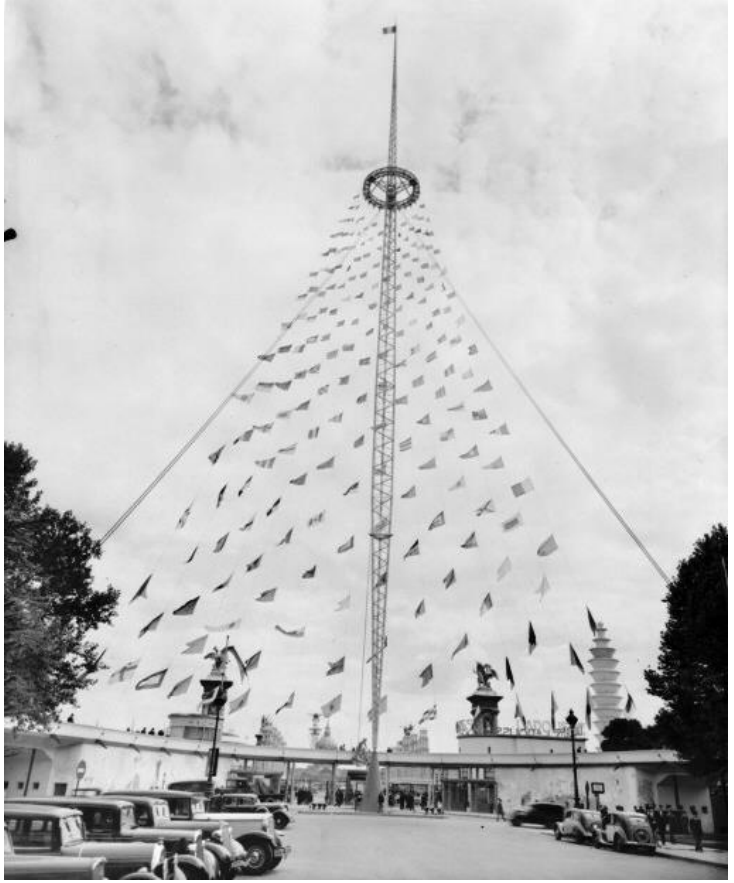
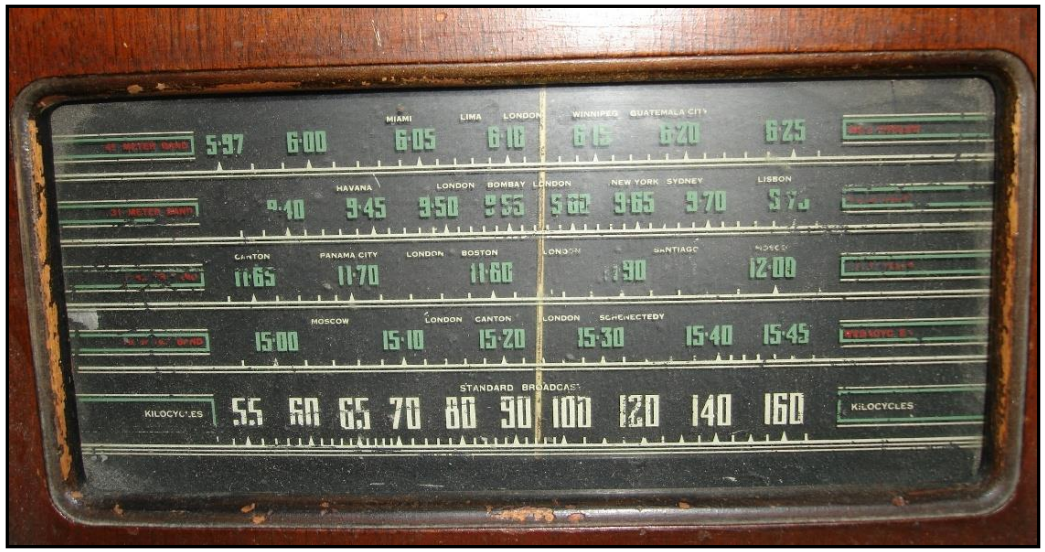
Celebrating a Radio World (1937)

One centerpiece of the 1937 Paris World Fair was a radio antenna, festooned with the world's flags



By the end of 1936, one million homes in Canada had bought licences for their radios. In November 1936, the Canadian Broadcasting Corporation (CBC) replaced the old Radio Commission.



Tuning the radio at work (Montreal, Quebec, July 1944)

Male and female workers assembling and testing wireless sets on the assembly line at the RCA Victor plant in Montreal (QC) during WWII

Jack Long,
National Film Board of Canada. Photothèque,
Library and Archives Canada

Tuning the radio at home (Quebec City, August 1942)

Hélène Perry (left) and Roberte Perry (right) worked at the Dominion Arsenals plant

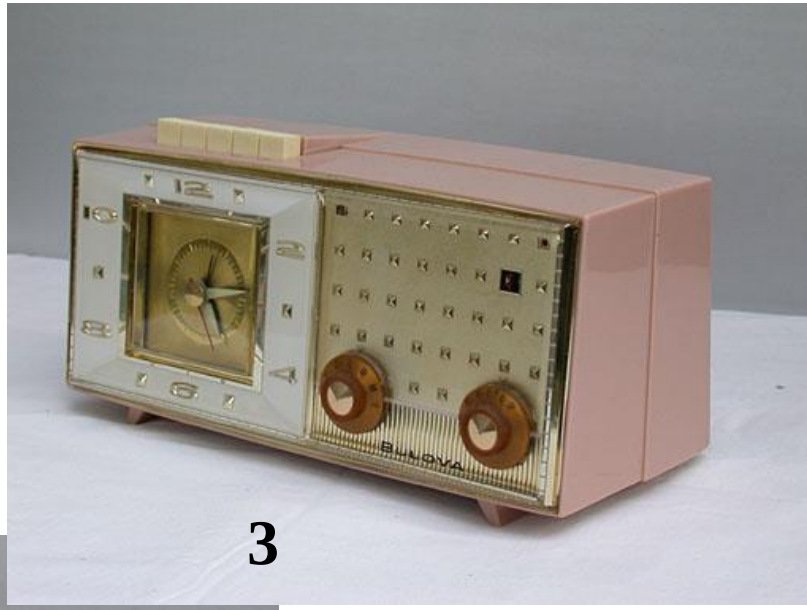
Harry Rowed, National Film Board, Library and Archives Canada

Radio for the masses (1)

The Westinghouse 578 model from 1946 still looks like a cabinet...
🡐

… as does the Philco E-15 model from 1948 🡒

Radio for the masses (2)



The models from the Fifties turned their back on the older looks

1 : Northern Electric 5508 (Canada, 1952)
2 : Crosley D-25 (Toronto, 1953)
3 : Bulova (Canada, 1957)

Radio for the masses (3)

← Admiral 4H2X (United States, 1957)

The solid-state (semiconductor) transistor

Admiral 537 (United States, 1959, with 8 transistors)

The first portable transistor radio set (the Regency TR-1) was released in 1954 by the I.D.E.A. company (in time for Christmas). Sales were mediocre (the set was expensive and the sound poor), but other companies took over. By 1957, over five million transistor radios had been made and sold.

Radio for the masses (4)

← Ekco PT378 / Ferranti PT1056 (Great Britain, 1961, with 6 transistors)

Sony TR-610 (Japan, 1958, with 6 transistors, the classic design)

Transistors made it possible to move from the portable radio to the hand-held radio that could even be carried in a (large) pocket.

“Music by Muzak” for a munitions factory (Montreal, November 1943)

Original Caption:
“Many Canadian industrial plants are now using scientifically selected musical recordings to improve plant efficiency and morale. All kinds of music are presented. Here, Madeleine Brown, operator of the central control room in a Montreal factory, selects a record for the loudspeaker system.”

National Film Board, Library and Archives Canada

Canadian Prime Minister Mackenzie King as a disc jockey putting on new "records"

By the 1940s, the combination of sound recording and radio broadcasting threatened traditional musical culture

(J. C. Petrillo was the leader of the American Musicians' Union who led a 1942 strike to outlaw recorded music and save live performances)

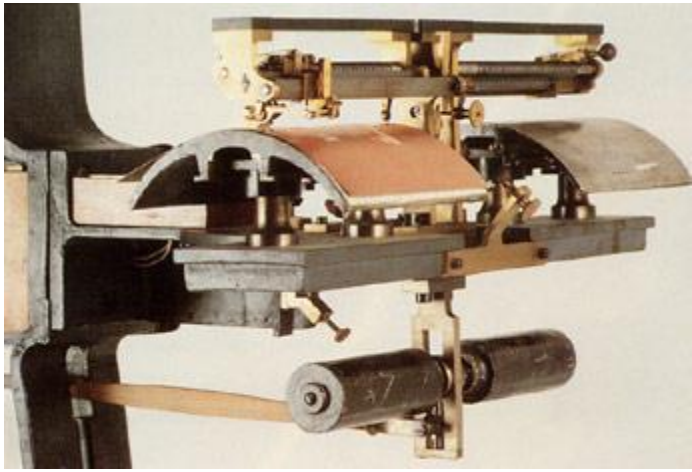
John Collins, Library and Archives Canada

To recapitulate (2)

- In what year did the Canadian Broadcasting Corporation take on radio broadcasting?
- In what year was the first transistor-based radio put on sale?
- What class of users greeted the introduction of radio broadcasting with particular relief? Why?
- Name one wartime use of radio that, by the end of WWI, led to the training of many additional radio operators.
- Identify three (3) technologies used in radios between 1920 and 1960.
- Explain how and why radio threatened the livelihood of many live musicians by 1940.

The Origins of Television

- Sending pictures was not a new thought even in the early 1900s. Experimental telegraphs had already transmitted low resolution images by the middle of the 19th century and Caselli's Pantelegraph, the ancestor of the modern fax machine, could already reproduce messages in Chinese in 1856.
- In 1873, the discovery of selenium's photoelectric sensitivity to light stimulated more experiments to record and send images.
- At the International Congress of Electricity in 1900, Russian scientist Constantin Perskyi already spoke of "television" (in French).



Caselli's Pantelegraph (detail) ↗ Musée des Arts et Métiers © CNAM

The road to television… (1)

- By 1900, the cinema was already well-known to millions in Western countries.
- Since 1839, photography had demonstrated that it was possible to fix images on a suitably treated surface.
- By 1874, Étienne-Jules Marey (1830-1904) was capturing motion on film, but cinema was turned into an everyday reality by Edison (around 1893) in the United States and the Lumière brothers in France (in 1895)
- Edison's initial version could only be enjoyed by individuals; the Lumière brothers invented the projector

Before Television: Movie News

Prime Minister R. B. Bennett and Governor-General Lord Bessborough (*c.* 1931-35)

The road to television… (2)

- By World War I, cinema was an international industry open to all comers since silent movies could transcend linguistic barriers. However, moving pictures remained a communal experience for most, so that the goal of individual television ownership remained attractive.
- Advanced television designs were all-electric (or all-electronic) by the 1920s, though John Logie Baird stuck to an electro-mechanical concept in England.
- In the United States, Vladimir Zworykin, hired by RCA, and Philo T. Farnsworth, an independent inventor, focused on the applications of the cathode ray tube (already foreseen twenty years earlier by several investigators, including one of Zworykin's professors).

The road to television… (3)

In Canada, the Montréal newspaper *La Presse* collaborated with radio station CKAC to launch the first television station, VE9EC, in 1931, using an electro-mechanical system. The station operated until 1933. In Montréal, Toronto, and Winnipeg, the local Eaton's stores launched (mechanical) television broadcasts in 1933 on a trial basis.

- While Farnsworth may have produced the first modern television set and explored some key innovations, he was too attached to his independence to collaborate effectively with others. A great inventor, he made a poor entrepreneur.
- His television would be present at the 1939 World Fair, but the models produced by RCA (under licence from… Farnsworth) were not only on display but sold to the paying public.

RCA (Radio Corporation of America) shows off

- In 1939, the New York World Fair opens as war breaks out in Europe
- Despite the Depression, the great U.S. companies are all set to let visitors look into the future
- Among the novelties on show: the first televisions for sale, especially in the RCA pavilion

By using transparent Lucite, RCA's "*Phantom Teleceiver*" revealed the insides of a TRK 12 television set

RCA televisions in 1939

The deluxe TRK 12 model: the picture was bounced off an adjustable mirror (because of the tube's length)

The lightweight TT 5 model: for sound, plug into a radio

The TRK 9 model: a radio was included, as television broadcasts were still infrequent

Television studio at the Capitol Radio Engineering Institute (1945)

Theodor Horydczak (*c.* 1890-1971), Library of Congress

In the United States, television was well established by 1949, with sets in 2% of households; this grew to 64% within six years. By 1959, it was 90% of homes that owned TV sets.

Michael Bugeja, *Interpersonal Divide* (2005), p. 92.

In Canada, the CBC aspired to take on television broadcasting, though the cost would be high. By 1949...

John Collins, *The Gazette*, McCord Museum, M965.199.8359

The Massey Commission (1949)

- In 1947, the CBC had a plan for developing television in Canada, but it would not be cheap
- The Royal Commission on National Development in the Arts, Letters and Sciences was appointed in 1949, chaired by Vincent Massey, and reported in 1951 on a variety of topics, including broadcasting
- Massey supported extending to television the authority over radio enjoyed by the CBC
- The CBC launched television service in English and French in September 1952
- That same year, the first urban cable television system was offered in London (ON)

The Massey Commission and its new mission for the CBC were not greeted with unanimous praise...

John Collins, *The Gazette*, McCord Museum, M965.199.6138

To Sum Up: Television in Canada

- When television sets started selling in the United States, Canada was at war and this new, expensive technology was not a priority
- As a consequence, television developed both sooner and faster in the United States
- After 1945, as Canadians with sets watched U.S. shows, Canada's government struggled with questions of control and culture
- After the CBC launch and the 1953 coronation of the Queen, about one quarter of the population had television at home; by decade's end, it was estimated 95% of Canadian homes had access to television

To recapitulate (3)

- What 19th-c. scientific phenomenon most concretely inspired inventors looking to create television?
- How could images be transmitted over long distances in the 19th century?
- In 1955, what percentage of U.S. homes owned a television? (a) 2% (b) 64% (c) 90%
- What major radio company launched the first all-electronic televisions in 1939-1940?
- In what year did the CBC launch its television services in French and English?

By 1953, Thomas W. Eadie of Bell Canada oversees a growing 6,200-km network with 139 stations; in 1958, it extends from coast to coast

Bell Canada

Weather report from an early CBC studio in February 1954 (Montreal?)

Gar Lunney, National Film Board, Library and Archives Canada

The Laing family watching television (Ottawa, 1955)

In 1955, about 66% of Canadians were able to access CBC television. The opening of the Parliament in Ottawa was televised for the first time. A new commission, chaired by Robert Fowler, was created to report specifically on the future of broadcasting in the context of television's explosive growth.

Library and Archives Canada, Chris Lund (1923-1983)

International television statistics (1955)

Country	Population (in thousands)	Transmitters	Transmitters (per million)	Receivers (in thousands)	Receivers (per capita)
United States	159,629	413	2.59	35,000	0.219
United Kingdom	50,857	13	0.26	4,156	0.082
Canada	14,781	24	1.62	1,100	0.074
U.S.S.R.	209,000	10	0.05	700	0.003
France	42,860	7	0.16	125	0.003

Report of Canada Royal Commission on Broadcasting, 1957

The Kennedy-Nixon debates

- In the 1960 U.S. presidential race, John F. Kennedy and Richard M. Nixon squared off on live television in four debates
- Those who heard the debates on radio gave the nod to Nixon, those who saw the debates on TV thought Kennedy (younger, handsomer) had outscored Nixon (who sported a less telegenic five o'clock shadow)
- In the third debate, each candidate was in a different studio, Kennedy in New York and Nixon in Los Angeles: television created a virtual reality

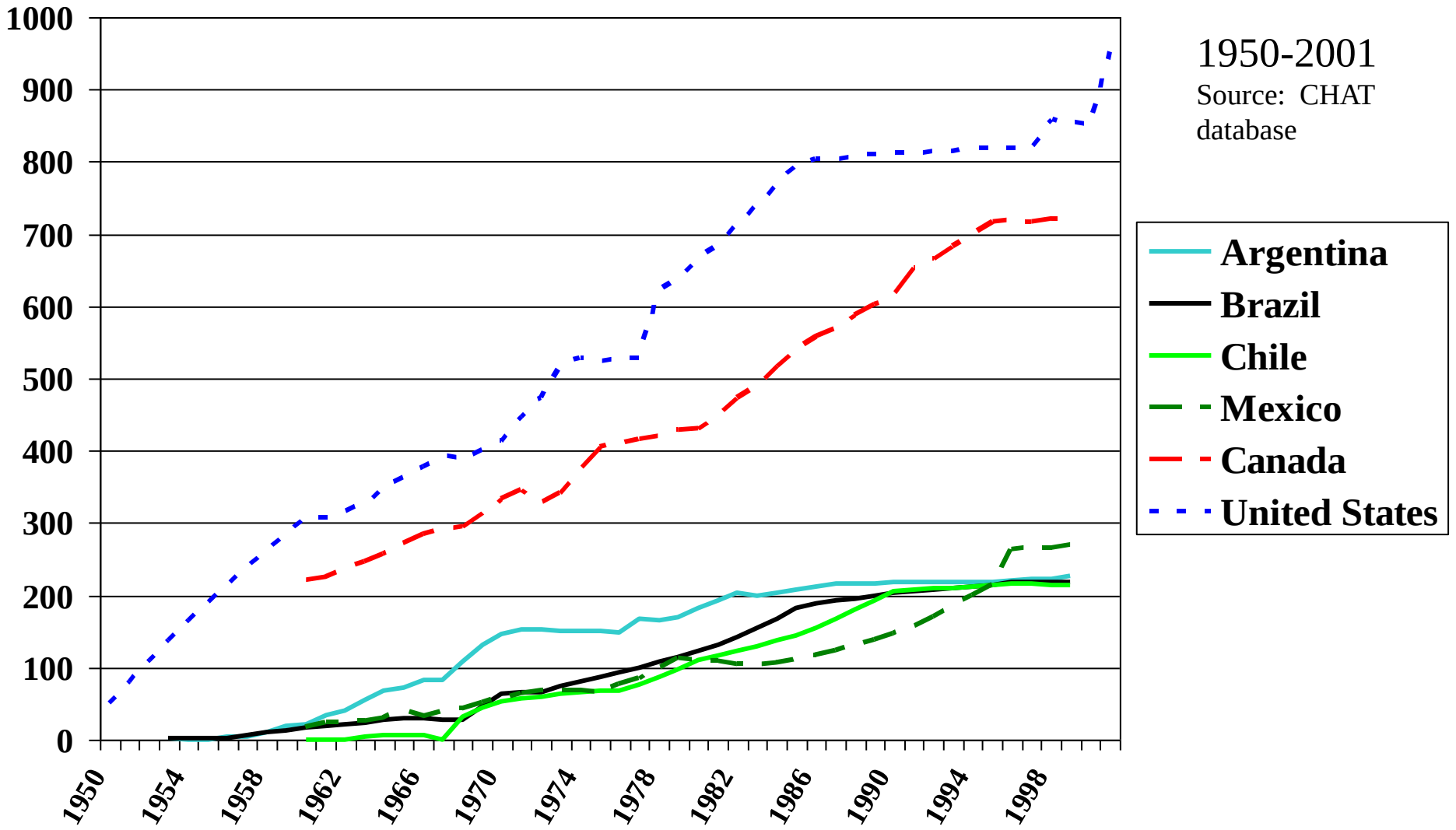
By 1962, political debates begin the move to television in Canada

The first televised debate between political leaders is a provincial one, between Jean Lesage (Liberal) and Daniel Johnson, Sr. (Union nationale) on November 11, 1962. Lesage's adviser researched the Kennedy-Nixon debates and Lesage (his face suntanned in a local salon) scored a win.

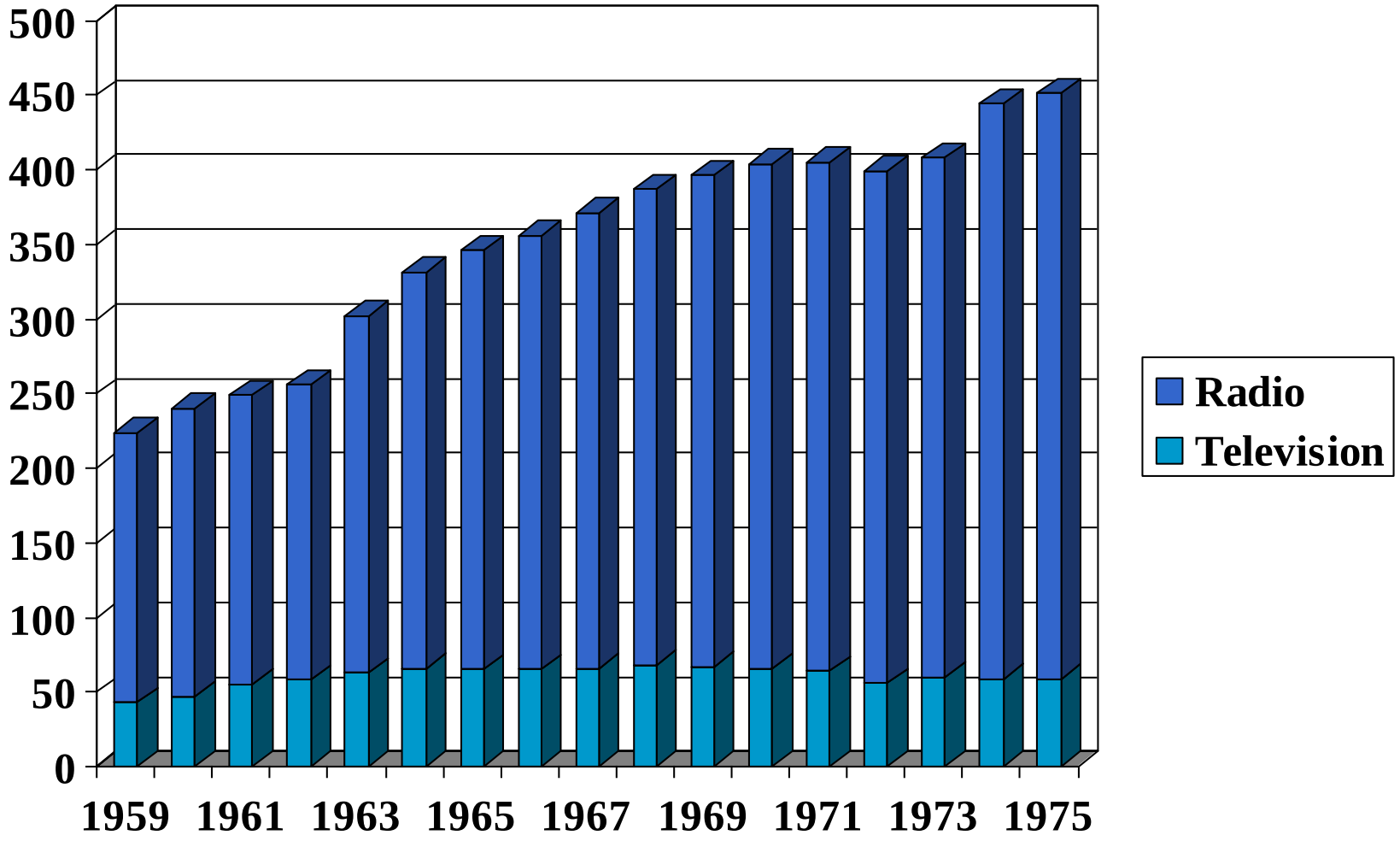
The first debate between federal politicians took place on June 9, 1968, involving the four main party leaders.

John Collins, *The Gazette*, McCord Museum, M965.199.7219

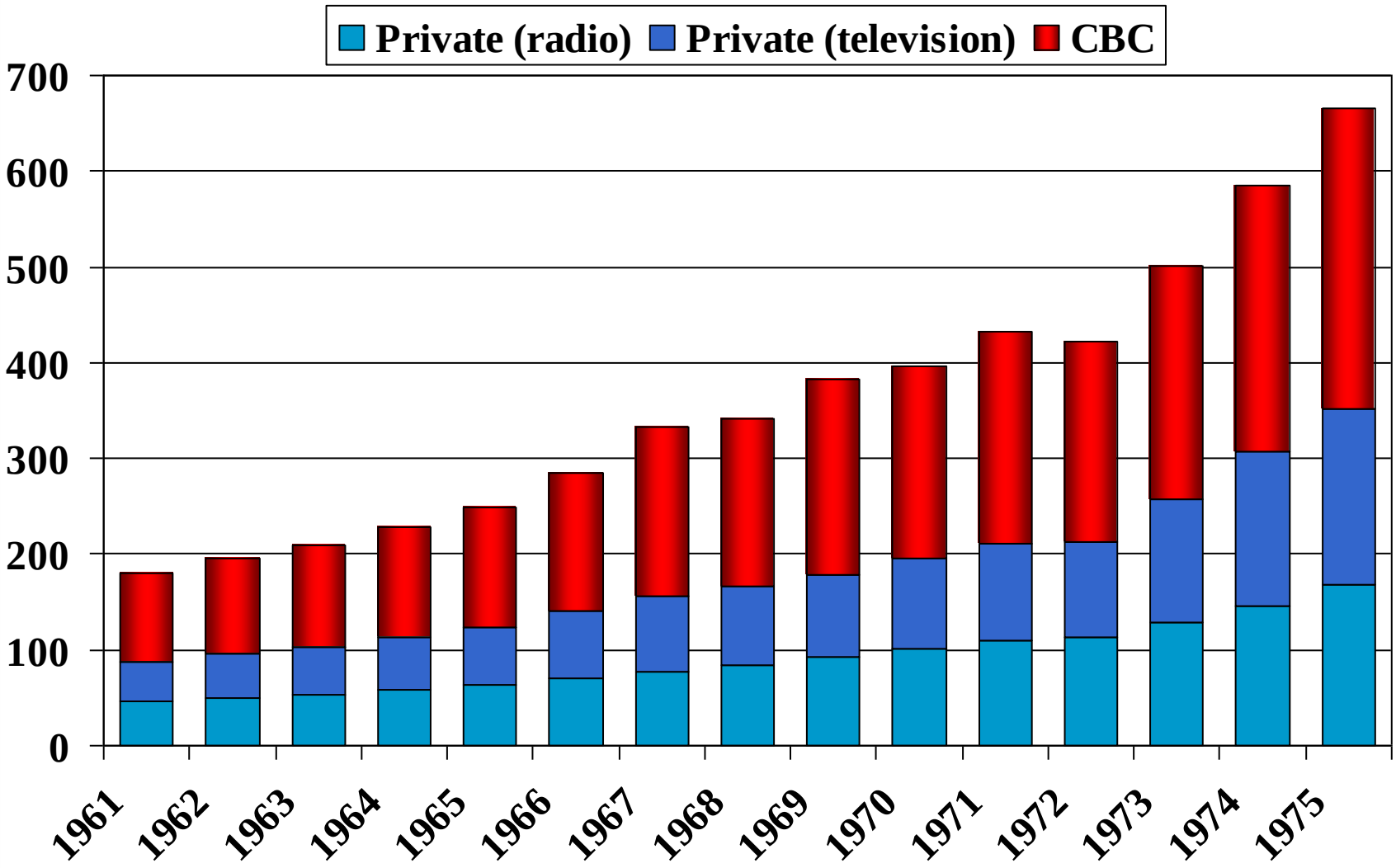
International television statistics:
TV receivers per thousand in the Americas



Private radio and television stations in Canada (excluding CBC)



Canadian Radio and Television: Operating Expenses (millions of $)



To recapitulate (4)

- What country had the most televisions per capita in the Americas between 1950 and 2000?
- Was the first televised political debate in Canada federal or provincial?
- Name the top three (3) countries in the world w.r.t. television ownership in 1955.
- Before there were satellites, what technology allowed the CBC to broadcast live from coast to coast?
- Were radio stations more expensive to operate than television stations?