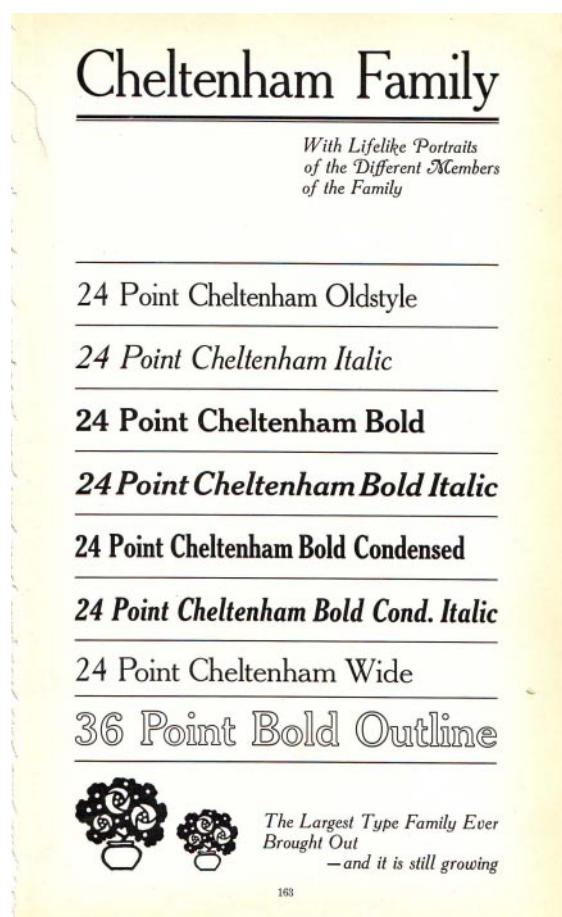


The Linotype Machine

A key board was part of another crucial nineteenth century invention, the linotype machine (exhibited at right), which mechanized typesetting; dramatically reducing the time it took to create newspapers.

Today it is hard to appreciate the amount of labour involved in setting type by hand.

We can change fonts and their size with the click of a mouse.



Font sample sheet

Every change in font size or style meant using type from a different drawer (example at left). And each letter of each word had to be placed in the right order into a chase or frame to be printed. Each column was built line by line until a chase the size of each page was filled with type.

The linotype actually cast each line of type from a reservoir of hot lead located on the machine. As the operator typed out an individual line of copy from a news story, tiny molds of each letter were released from a case mounted on the top of the machine and allowed to slide into a holder which was then filled with hot lead. A single piece of metal, a slug, was produced made up of the words from the line of copy that the operator had typed out. When cool, the slugs were arranged into stories, proofed and then assembled into pages. The molds, known as matrices,

were then returned to their correct place in the case mechanically. After each edition was put out, the slugs were melted down for reuse. The linotype machine was approximately five times as fast as hand setting, allowing for an increase in newspaper size and in the amount of advertising.

Before the linotype, printers used type cast at foundries. As the linotype became popular, the type foundries realized the demand for type would drop and in 1892, twenty-three US foundries amalgamated into the American Type Founders Company. The company continued to design new type faces and in 1908 produced Cheltenham, the bold, condensed version of which was used for headlines by *The New York Times*.

Left:

Cabinet and type, c. 1910, Hamilton Manufacturing Company, Two Rivers, Wisconsin

Foundry type (Cheltenham), American Type Founders Company, Jersey City, New Jersey
Museum London, Belial Press Collection, Gift of the Faculty of Arts, The University of Western Ontario, 2002

Right:

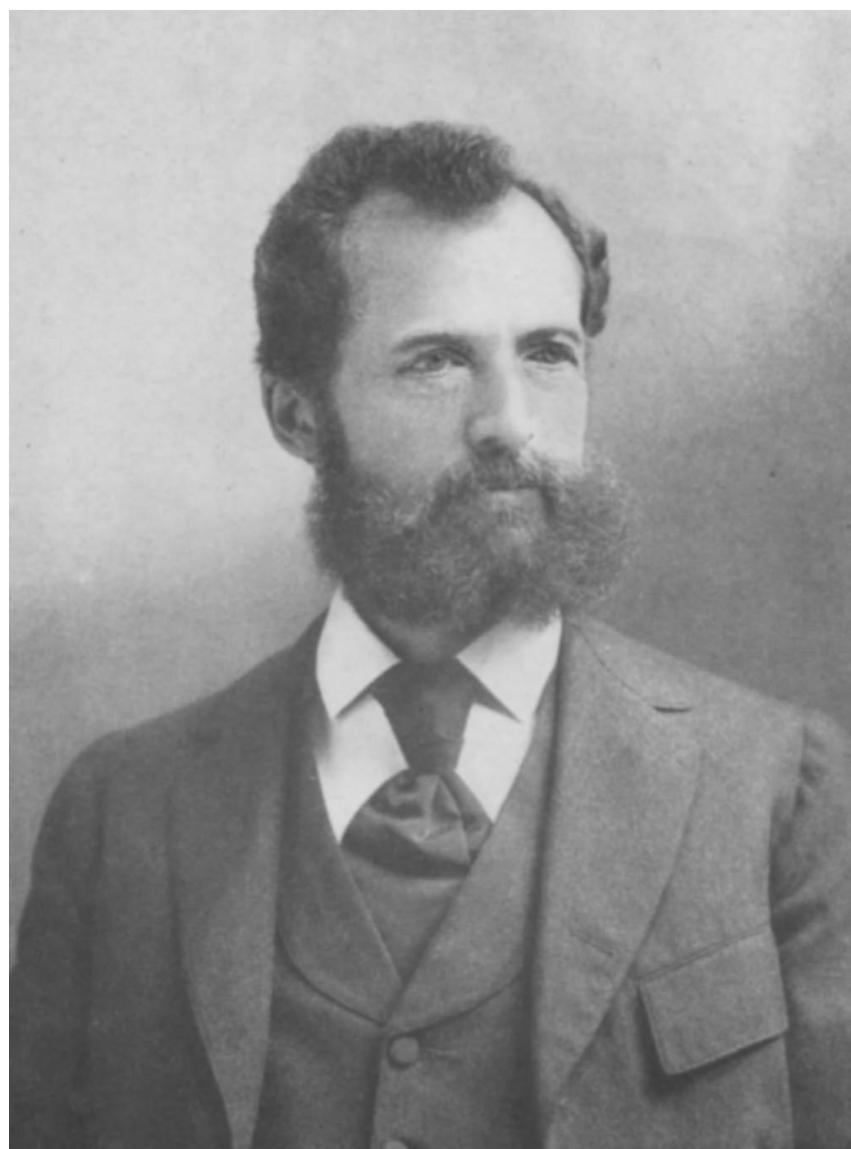
Linotype Model L, c. 1924

Museum London, Purchase, funds provided by the Volunteer Committee

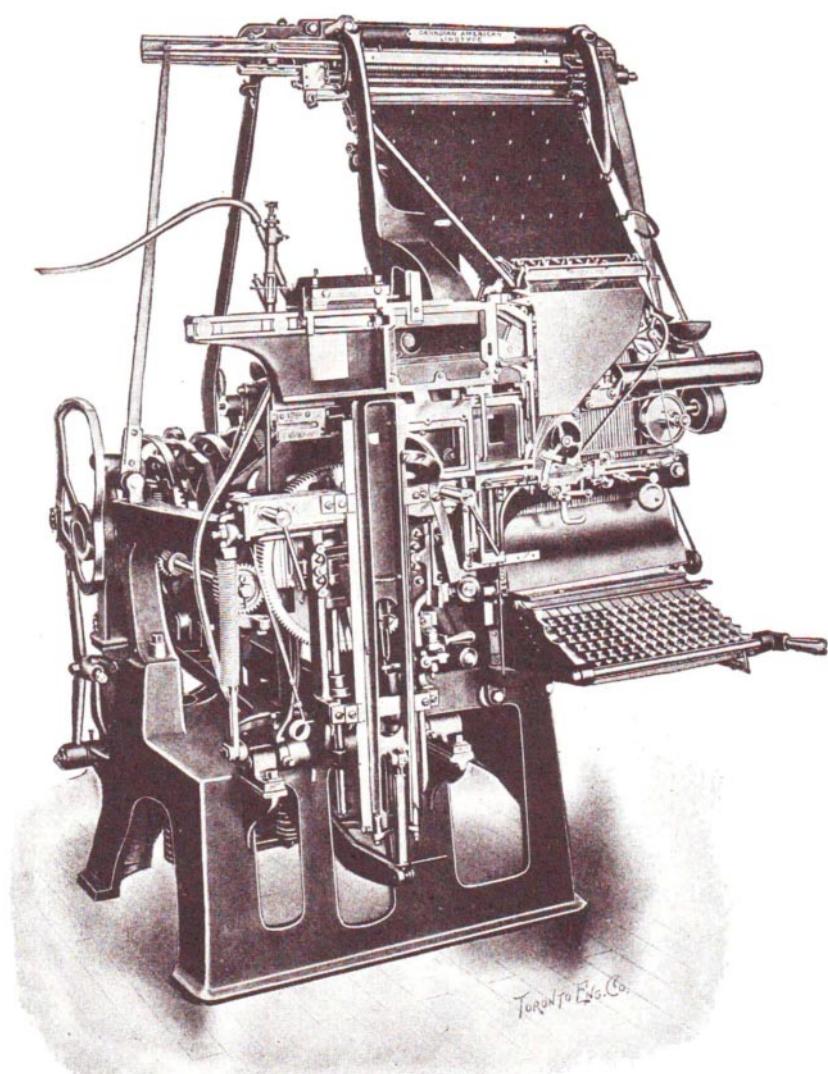
Words

The modern business office began to take shape in the late nineteenth century on the strength of several key inventions. Commercial organizations such as financial service companies, the railways, and large mail order department stores grew in size and complexity. They were the primary market for the new business machines including the stencil duplicator, the typewriter and the graphophone, inventions that would remain part of the average office, in one form or another, as late as the 1980s.

Other inventions that appeared in the later half of the nineteenth century resulted in a series of improvements to the world of printing. The time-consuming task of setting type by hand was eliminated by Mergenthaler's linotype machine in 1885 and at the same time, the half-tone printing plate gave book, catalogue and newspaper publishers a means of reproducing photographs and other illustrations cheaply and quickly.



Ottmar Mergenthaler, who invented the linotype in 1884, immigrated to the US from Germany. He worked in a shop building patent models for inventors.



Linotype machine, c. 1902

The Typewriter

The typewriter was invented in Milwaukee by a newspaper editor and former type setter named Christopher Sholes. He and two partners received a patent in 1868 which they sold to a James Densmore, the man who had suggested that they use the QWERTY keyboard arrangement which spread out the heavily-used letters, slowing the typist down and preventing the machine from jamming. Densmore convinced the Remington Arms Company to manufacture the Sholes typewriter which first appeared in 1874.

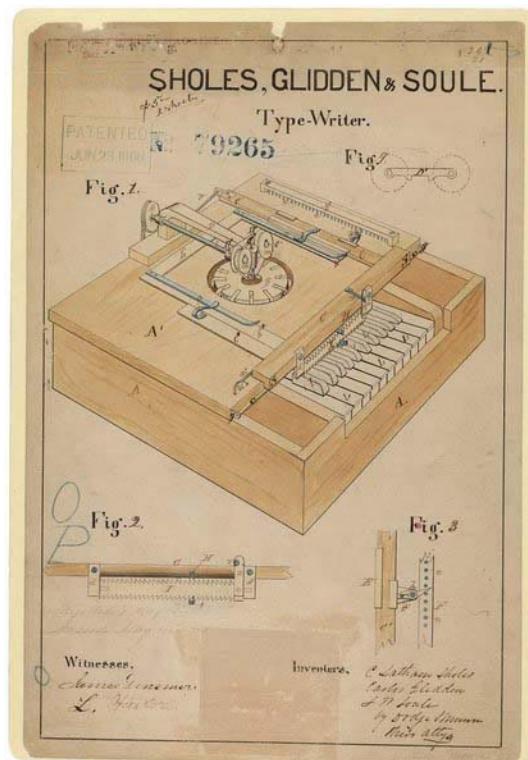
The Remington and other, competing, models were all *up strike* machines in which the keys hit the paper below the platen (roller). This meant that the typist could not see what was being typed. One of the first to experiment with a *front strike* machine, where the operator could see the ink appear on the page, was John N. Williams. His “grasshopper” keys hopped from their place up onto the paper and back. The Williams No. 1 appeared in 1891 and the No. 2 in 1895.

It was the Underwood, however, that would soon set the pattern for typewriter design in the 20th century. John T. Underwood a carbon paper and ribbon manufacturer started production of Franz Wagner’s typewriter design in the 1890s. It was a front strike machine which employed a four-bank keyboard with a single shift for capitals. This was the best arrangement for touch typing.

The Underwood Company dominated the typewriter market in the early twentieth century. The Model 5, similar to the c. 1920s example exhibited here, changed little from its first appearance in 1899. Simplicity and reliability were its main selling points, and millions were sold.



Christopher Sholes



Sholes' Patent, 1868

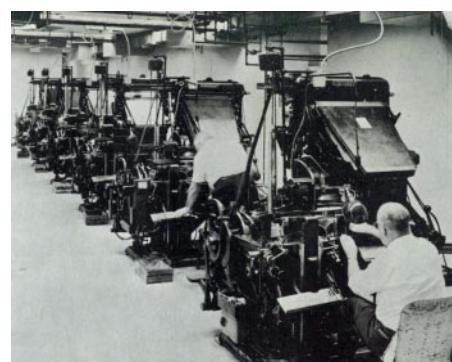
The London Free Press

The *London Free Press* purchased four Linotypes in 1902 and used line casting technology until the 1970s. The linotype machine exhibited here was used at the *Free Press* and afterwards was purchased by the *Lambeth Signal Star*.

Evelyn McInnes, a Linotype operator for 30 years, who worked at the *London Free Press* during WWII, was interviewed for this exhibition and recalls this about the linotype:

"I could work with some machines, some machines would fight me. You just feel it, you know? They're so intricate that they're almost human.... In fact some of the operators I've known consider it almost human. It's so knowledgeable. One man at the *Windsor Star* where I worked for a while would get up and kick his Linotype regularly and he'd say, "Now you behave." And then he'd sit down and go at it again."

Evelyn McInnes, 2006



1.



2.



3.



4.



5.

Line casting and composing at the *London Free Press*, c. 1966

Reproduced from *Communications in the Community*

Left to right:

1. Line casting machines in operation.
2. Trays of type from the linotype machine being proofed and assembled. Once proofed the stories were matched with headings in larger-sized type from different machines and moved to page forms.
3. A compositor at a makeup table assembles material in flat page forms: ads are placed first then news and pictures.
4. As page forms are filled they move to the stereotyping department. Here a soft cardboard mat is placed over the page and inserted in a direct-pressure press. Using a 400 ton squeeze an impression of the type is pressed into the mat.
5. The flexible mat carrying an impression of the page is placed in a casting box where hot metal fills the hollows in the mat creating a type high curved printing plate (exhibited nearby). In the 1960s a 47 pound plate could be cast in 27 seconds. Once cast, the plate and dozens like it were placed on the press and the edition was run.

Right:

Stereo mat, 1941

London Free Press Printing Company

Museum London, Gift of Mr. Tim Baer, 2003



**Stenographers transcribing dictation using
the graphophone, 1906**

Sears, Roebuck Stenographic Department, Chicago



How a **RED** belt can keep you in the **BLACK**

One Dictaphone TIME-MASTER with
Dictabelt record can add \$1,250 a year
to your profits.

Only the plastic Dictabelt can offer
you such *confidence* as you dictate. *Fidelity*—your secretary can't mistake it.
Permanence—can't be erased accidentally.
Visibility—you see your recording
take place, easily find your place.

The new TIME-MASTER dictating ma-



THE NEW, ALL-TRANSISTOR Dictaphone TIME-MASTER

Dictaphone, Time-Master and Dictabelt are registered trademarks of Dictaphone Corp., 730 Third Ave., N.Y. 17, N.Y.
204 Egerton Ave. E., Toronto, Canada; 17-19 Stratford Pl., London W.I., England.

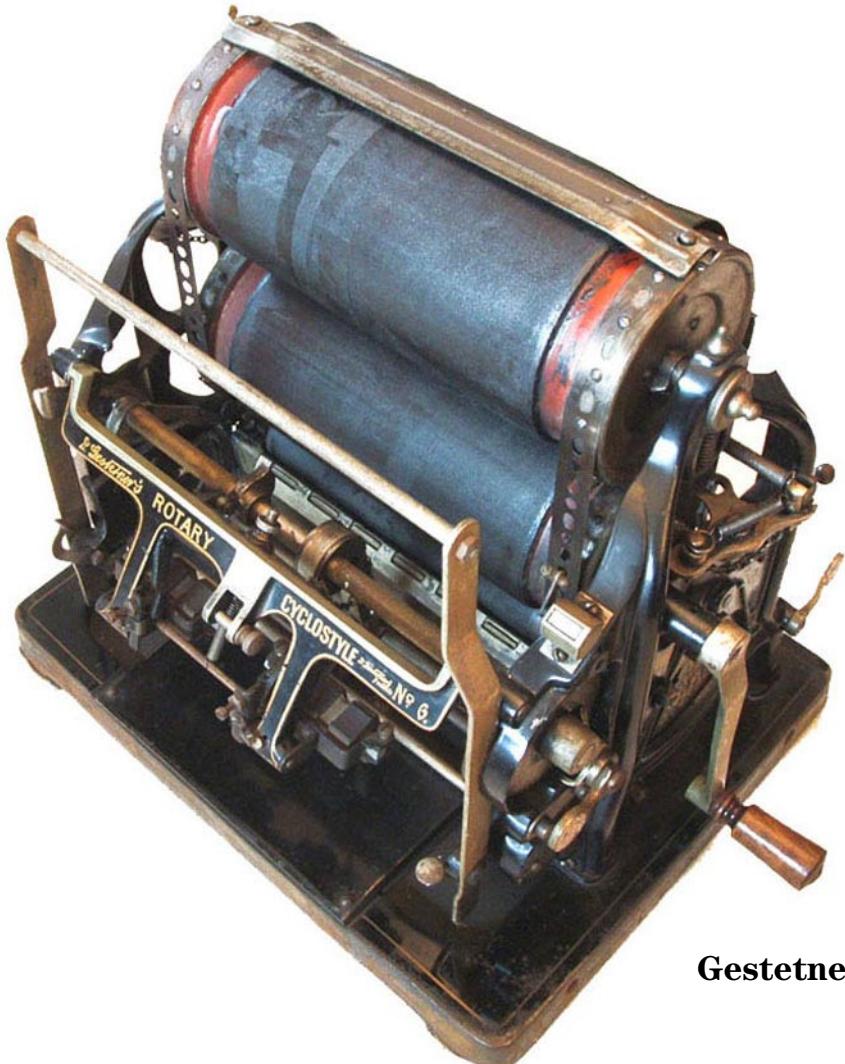
Dictaphone Time-Master advertisement, c. 1959

The Business Phonograph

On November 20, 1877 Thomas Edison recited *Mary Had a Little Lamb* into a horn with a diaphragm attached to one end. The sound waves vibrated the diaphragm and an attached stylus embossed an impression on a rotating roll of tin foil duplicating the pattern of his voice. Running the stylus back through the groove in the tin foil again vibrated the diaphragm and recreated the sound.

Edison initially thought that voice recording would be used mainly for office dictation. However he left the development of the phonograph to others while he worked on the electric light bulb and it was actually Alexander Graham Bell, his cousin Chichester Bell and Charles Tainter that patented the first practical recording machine, which they called the graphophone. Its key features included a wax cylinder on which the recording was made.

The success of the graphophone brought Edison back into the field and by 1904 two competing office recorders were on the market. Around 1907 the Bell-Tainter machine was renamed the Dictaphone and by 1910, Edison had launched a new office system later known as the Ediphone. Now three machines took the place of one: a dictating machine, a transcribing machine and a cylinder shaver which allowed the cylinders to be reused. A company buying the Ediphone system would create a centralized transcribing department, replacing the stenographers who had personally taken dictation with typists.



Gestetner Rotary Cyclostyle advertisement, c. 1920

Gestetner Rotary Cyclostyle duplicator

The Stencil Duplicator

In 1876, a year before the phonograph, Edison patented an “electric pen” which made minute perforations onto a stencil which in turn could be used to print copies using an inked roller. In England, David Gestetner, patented a similar pen he called the Cyclostyle, in 1881. As a young man Gestetner, born in Hungary, had worked in an office copying out market reports and dreaming of a way to mechanically reproduce them. The Cyclostyle contained a minute steel wheel with a toothed edge which perforated the stencil. When ink was rolled across the finished stencil it passed through the openings where the words had been written leaving a copy on the paper under the stencil. With later models the stencil was placed on a drum allowing for automatic inking and faster copying.

Until the 1980s, the Gestetner could be found in countless offices, schools, churches, clubs, and anywhere else that quick and inexpensive copies of reports, contracts, agreements, bulletins, newsletters, tests, and assignments were required. It also made low-budget amateur publishing possible. The Gestetner was widely used until the 1970s when it was superseded by the photocopier, scanners, and laser printers.

Left:

Gestetner stencil duplicator, c. 1970

Museum London

Gift of Reverend Ken Anderson, St. James Westminster Anglican Church, 2006

Right:

Blank Gestetner stencil and writing equipment, c. 1975

Museum London

Gift of Reverend Ken Anderson, St. James Westminster Anglican Church, 2006

Sounds

By the time the business world could make use of the phonograph it had already become a familiar source of entertainment. In the early 1890s coin-operated phonographs with a variety of musical selections could be found in saloons, soda fountains and drug stores. By 1900, the three key inventors, Edison, Chichester Bell and Emile Berliner, a German inventor living in Washington, were all manufacturing machines for use in the home.



Top to bottom:
Recording a record, 1916;
Reginald Fessenden;
A 1941 Sparton Savoy

In most cases the machines were quite affordable. Edison's Gem model for example, sold for \$7.50 and the recordings, most of which were still on cylinders holding about 2 minutes of recorded music, sold for fifty cents. After 1913 every manufacture had moved to flat records; however Edison also continued to make cylinders. By 1914, nearly 500,000 phonographs a year were being produced in the United States.

The Depression nearly killed the phonograph. Production fell to 40,000 machines in 1932 from a high of nearly a million in 1927. Over 100 million records were produced that year compared to 6 million in 1932. In the midst of the Depression people turned to the radio for less expensive entertainment.

Several breakthroughs in the invention of devices that could detect, receive and transmit radio waves occurred in the late 1890s. In 1900, Reginald Fessenden, a Canadian working in Maryland, made the first audio transmission, however it was Guglielmo Marconi who grabbed the headlines in 1901 (and the US patent for the radio) with his transatlantic transmission of Morse code. Little would have come of any of these experiments however without Fessenden's continuous-wave voice transmitter which allowed him to make the first human voice broadcast in 1906, even though it was only shipboard wireless operators who could hear him.

Once radio became commercially viable after WWI, stations proliferated and networks such as NBC were formed. In London, the leading daily newspaper, the *Free Press*, started a radio station in 1922 and entrepreneurs like Hobbs Langford fabricated battery powered receivers.

In 1930, a branch plant of Sparton, an American radio manufacturer, opened in an abandoned London piano factory. Some of their early models combined the radio and the phonograph. Where earlier generations had gathered around the piano, now families gathered around the radio.

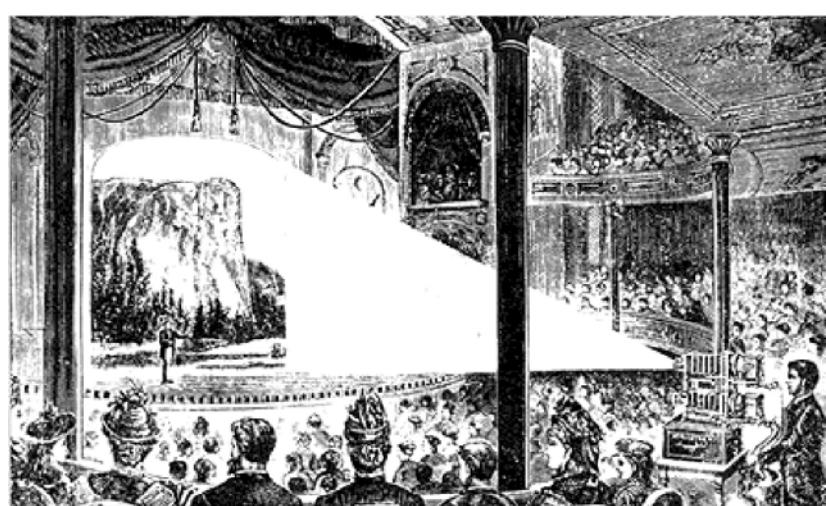
Images

With the appearance of commercial radio and the widespread popularity of the phonograph, words and music were everywhere by the 1920s. A world of imagery also found its way into the home at the beginning of the twentieth century, spurred by the development of several key inventions including the camera, the stereoscope, the magic lantern and the half-tone plate, each of which was able to either create, reproduce or project images.

Louis Daguerre's photographic process discovered in 1839 was widely used on both sides of the Atlantic, sparking the appearance of itinerant daguerreotypists. Two of them, William and Frederick Langenheim of Philadelphia, found a way of fixing a transparent positive image onto a glass plate which could be coloured and then projected onto a wall.

The projector, which came to be known as a magic lantern, was manufactured widely and most makers offered a huge range of slides that included travels through every part of the known world, historical events, plays, poetry, and church themes including temperance lectures along with hymns, psalms, and selections from the Gospels.

At least one slide company, Underwood and Underwood, also used its image bank to produce stereo views. These views –two nearly identical photographs mounted together on a card - when looked at through a viewer, appeared to take on a three-dimensional quality. By 1910, the Underwood Company was producing 25,000 cards a day.



Magic lantern show, c. 1900

Many magic lanterns were easily fitted to project film once the process for capturing a moving image had been discovered. Edison was among the first to achieve this. His 1890s coin-operated kinetoscopes allowed a single viewer to see a fifty foot strip of film flash past with subjects such as a man sneezing or a woman dancing. His home version, available in 1911, was not as popular however.



Princess Theatre, 154 Dundas Street, c. 1912

The first motion picture projections occurred in 1895 and by 1910 there were 10,000 movie theaters in the US. In London two early theaters, the Star and the Princess, appeared near the corner of Dundas and Richmond Streets in 1911. Museum London's large collection of church lanterns and slides attests to the popularity of the magic lantern.

Lac-Mac Ltd: A Quiet London Success Story

All of a sudden you went from having products with a life-span of 20, 25 launders to products that were still being used well over one hundred times or more...that [switch from cotton fabric to a cotton-polyester blend] was huge

former Lac-Mac Limited president Ted Zurbrigg, 2006



Lac-Mac Ltd. exhibit, Royal York Hotel, Toronto, 1947

Since 1920, London's Lac-Mac Limited has been producing quality reusable textile products, like the garments before you, for Canada's health care markets.

Facing difficult times during the depression, the survival of Lac-Mac was ensured in 1930 when St. Joseph's Hospital in London requested uniforms for its student nurses, including capes like the one on display. Lac-Mac developed its clientele to include other London region teaching hospitals and within several years had clients all over

Ontario. Today Lac-Mac has customers coast-to-coast and exports London made health care products into the United States and Brazil.

The company was a pioneer in the use of polyester-cotton blends that revolutionized the Canadian hospital garment industry in the late 1960s. Blended fabric brought greater comfort to patients and staff, and translated into more efficient and environmentally friendly laundering compared to traditional all-cotton hospital products and garments, like this Lac-Mac nurse's uniform from the 1950's. In 1980, Lac-Mac Ltd. marketed a new product called Comfa-Trell® that was a cotton-polyester blended fabric created specifically to be used in operating rooms.

In 1950 Lac-Mac Ltd. changed the look of the modern operating room forever when they introduced a blue-green fabric called EYEREST™ green to the operating room for the first time. The colour quickly became an industry standard as a solution to the eyestrain experienced by surgeons as a result of the glare from bright lights on white operating room linens.

In the 1980's, Lac-Mac Ltd. brought modern technology to fabric with a revolutionary new product produced in partnership with W.L. Gore and Associates Inc.: water-proof and bacteria-proof Gore-Tex™ Surgical Gowns and Drapes. Continuing research and development at Gore developed a product that was eventually viral-proof as well. Today, these Lac-Mac products, like the surgical gown on display, are known as InnerBloc® Surgical Gowns and Drapes incorporating GORE™ Surgical Barrier fabric.

Lac-Mac Ltd. continues to provide high quality and cost effective reusable apparel products for health care central laundries, hospitals, clinics, veterinarians and health care professionals. These products include Lac-Mac Ltd.'s health care uniforms, shoes and accessories, institutional health care apparel, and splash protective clothing incorporating GORE® Fabric for Chemical Splash Protection.