

TECHNOLOGY



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INTRODUCTION

Between the mid-eighteenth and mid-nineteenth centuries, Great Britain, Europe, America, and other Western countries like Australia, New Zealand and Canada underwent an industrial revolution. Prior to this, manufacturing was mostly done in people's homes and farms using hand tools or basic machines. Industrialisation not only marked a shift to powered, special-purpose machinery, factories and mass production, but also saw predominantly agrarian, rural societies transformed into urban ones. The invention of the assembly line also led to the speeding up the factory production of consumer goods. A second industrial revolution (1865–1900) came about following the invention and use of electricity, steel, and petroleum products. Following the growth of railways, steam ships, scientific advances, and technological inventions, many western countries saw unprecedented access to communications and faster transportation. Among the countless inventions coming out of the late-1900s were the light bulb, telephone, typewriter, sewing machine, gramophone and moving pictures. [See below for a selective list of late-nineteenth and early-twentieth century inventions]

TOWN HALL.
Commencing 7th March, 1901,
FOR A SHORT SEASON ONLY.

CLAY'S
WAXWORKS
AND
Vaudeville Company.

With all the **LATEST NOVELTIES** from
London and Paris.

SPLENDID Wax Tableaux, including the
Breeching Blacks.

10 STAR VARIETY ARTISTS 10.
Selections on the Theatrephone, from 7.15 to
8 o'clock.

1s ADMISSION 1s
Children under 10, half-price.

Doors open 7.15. Entertainment 8 p.m.

JAMES W. BOYLE,
Advances Rep.

Warwick Examiner and Times 6 Mar. (1901), 2.

Vaudeville was indirectly an outgrowth of the industrial revolution. Whereas minstrelsy developed as a response to African-American slavery and rural culture, and was largely carried out by independent troupes, the rise of vaudeville can be seen to have incorporated the various itinerant amusements of the early to mid-1800s into a stable, institutionalised and urbanised form of entertainment. Vaudeville's strength as an entertainment medium during the late-1800s and early-1900s was its capacity to celebrate modern life - the emergence of physical culture, science, artistic endeavour, and the latest trends and fashions. At the same time, the new working class sought entertainment and relaxation suitable for the entire family, and thus vaudeville shows were often marketed as "polite" or "clean." Vaudeville entrepreneurs also introduced technological advancements, either as part of the show or as display items, thereby helping to further lift their entertainments into the realm of respectability. This was particularly the case with regional touring companies which were often the primary means by which country folk were able to see such wonders close at hand. Although film offered the ability to see new inventions and industrial processes, for most regional Australians their first actual encounter with the latest technology was via the variety show, travelling exhibitions or fairs.

The most visible and significant technological advance to impact on the vaudeville stage was film - not only in the moving pictures themselves but through their means of exhibition. Indeed, for at least two decades following the introduction of film exhibition in Australia (in 1896), the projector and/or the company producing them were often the focus of advertisements, with the films relegated to minor notices (if at all). Among the systems to come to Australia were the Bio-pictro-scope, Sperantoscope, Theatregraph, Chronomegaphone, Chronos, Biotint, Cinématographe, Vitascope and the Vitagraph. [See the AVTA's "[Film and Vaudeville](#)" section for further details] In addition to moving films there were other forms of mechanically-operated visual entertainments, including the Mutoscope.

Moving pictures were not the only technologies to feature on the vaudeville stage, or be associated with vaudeville entertainments. Vaudeville entrepreneurs like [Harry Clay](#) sent new machines and games with their touring companies, during the 1900s and 1910s. In addition to waxworks, cosmoramas, photographic exhibitions and moving pictures etc, Clay's early New South Wales and Queensland tours regularly included the latest audio and penny-in-the-slot machines for his patrons to use or observe. The sound and visual devices included the Theatrephone (aka Theatrophone), the Polyphone, and illustrated song lanterns. Clay was not alone in presenting such inventions to the Australian public. [Harry Rickards](#) and [J.C. Williamson](#) also invested in technological "amusements" at various times, as did lower level entrepreneurs like [J.C. Bain](#), [Beaumont Read](#), [Leonard Davis](#) and [Wybert Reeve](#). In some instances the technology became the focus of touring variety shows - the Theatrephone Co (1901), for example.

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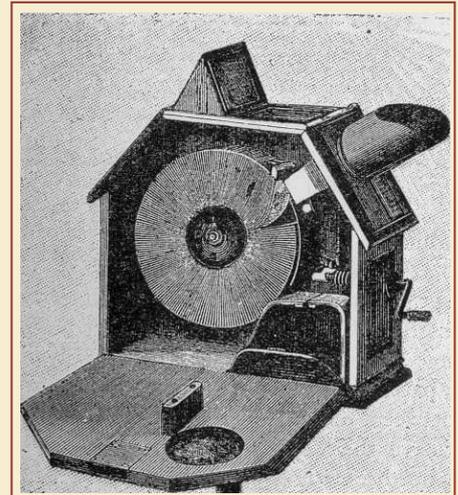
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Significant Moments in the History of Inventions: 1850-1930

- 1851:** Isaac Singer invents a sewing machine.
- 1856:** Louis Pasteur invents pasteurisation.
- 1857:** George Pullman invents the Pullman Sleeping Car for train travel.
- 1858:** Jean Lenoir invents an internal combustion engine.
- 1861:** Pierre Michaux invents a bicycle.
- 1862:** Alexander Parkes invents the first man-made plastic.
- 1866:** Alfred Nobel invents dynamite.
- 1867:** Christopher Scholes invents the first practical and modern typewriter.
- 1876:** Alexander Graham Bell patents the telephone. Nicolaus August Otto invents the first practical 4-stroke internal combustion engine.
- 1877:** Thomas Edison invents the cylinder phonograph or tin foil phonograph. Eadweard Muybridge invents the first moving pictures.
- 1878:** Sir Joseph Wilson Swan is the first person to invent a practical and longer-lasting electric light bulb.
- 1880:** The British Perforated Paper Company invents a form of toilet paper.
- 1884:** George Eastman patents paper-strip photographic film. James Ritty invents the first working, mechanical cash register. Charles Parson patents the steam turbine.
- 1885:** Karl Benz invents the first practical automobile to be powered by an internal-combustion engine. Gottlieb Daimler invents the first gas-engined motorcycle.
- 1886:** Josephine Cochrane invents the dishwasher.
- 1887:** Emile Berliner invents the gramophone.
- 1888:** John Boyd Dunlop patents a commercially successful pneumatic tire. Nikola Tesla invents the AC motor and transformer.
- 1892:** Rudolf Diesel invents the diesel-fueled internal combustion engine.
- 1895:** Lumiere Brothers invent the Cinematographe, a portable motion-picture camera, film processing unit and projector.
- 1900:** Count Ferdinand von Zeppelin invents a rigid airship which becomes known as the zeppelin
- 1901:** The first radio receiver, successfully receives a radio transmission. Hubert Booth invents a compact and modern vacuum cleaner.
- 1903:** Bottle-making machinery is invented by Michael J. Owens. The Wright brothers invent the first gas motored and manned airplane.
- 1905:** Albert Einstein publishes his "Theory of Relativity" ($E = mc^2$).
- 1906:** Lee Deforest invents electronic amplifying tube (triode).
- 1907:** Leo Baekeland invents the first synthetic plastic called Bakelite. Color photography is invented by Auguste and Louis Lumiere. The very first piloted helicopter was invented by Paul Cornu.
- 1908:** Cellophane invented by Jacques E. Brandenberger. The first Model T Ford is sold.
- 1910:** Thomas Edison demonstrated the first talking motion picture.
- 1912:** The motorized movie camera is invented. It Replaces the hand-cranked cameras. The first tank is patented by Australian inventor De La Mole.
- 1913:** Mary Phelps Jacob invents the bra. Gideon Sundback invents the modern zipper.
- 1916:** The radio tuner is invented, allowing different Stations to be recieved. Stainless steel is invented by Henry Brearly.
- 1918:** The superheterodyne radio circuit is invented by Edwin Howard Armstrong. Today, every radio or television set uses this invention.
- 1919:** The pop-up toaster is invented by Charles Strite. Short-wave radio invented.
- 1921:** The first robot built. John Larson invents the lie detector.
- 1922:** Insulin is invented by Sir Frederick Grant Banting. The first 3-D movie (spectacles with one red and one green lens) is released.
- 1923:** Garrett A. Morgan invents the traffic signal. The television or iconoscope (cathode-ray tube) invented by Vladimir Kosma Zworykin. Clarence Birdseye invents frozen food.
- 1924:** The dynamic loudspeaker invented by Rice and Kellogg.
- 1925:** The mechanical television, a precursor to the modern television, is invented by John Logie Baird.
- 1926:** Robert H. Goddard invents liquid-fueled rockets.
- 1927:** Philo Taylor Farnsworth invents a complete electronic TV system. Technicolor is invented. Erik Rotheim patents an aerosol can.
- 1928:** Scottish biologist Alexander Fleming discovers penicillin. Bubble gum is invented by Walter E. Diemer. Jacob Schick patents the electric shaver.
- 1929:** Paul Galvin invents the car radio.

THE MUTOSCOPE

Essentially an elaboration of the flick-book principle the Mutoscope was an early motion picture device that like Thomas Edison's Kinetoscope did not project on a screen, but rather provided viewing to one person at a time. Operating via a sequence of black-and-white, silver-based photographic prints on flexible opaque cards which are arranged around the perimeter of a drum, individual viewers can see a moving scene by simply turning a handle on the side of the machine. The rapid movement of successive cards gives the impression of movement. Each drum (or reel) can hold up to 800 or 900 cards. The machines were conceived as coin-operated viewing booths with the cards typically lit by electricity. As each machine can hold only a single reel comprising a single scene, the subject matter would be publicised on the outside of the machine, typically in the format of a poster. A popular subject during the early years of the Mutoscope was woman in various states of undress.



Source: Mutoscopes at Tumblr

The Mutoscope was invented by Henry Norton Marvin and his partner Herman Casler and patented in 1894. The following year Marvin and Casler, along with former Edison inventor W.K.L Dickson,¹ and Elias Koopman founded the American Mutoscope Company and began marketing the machine. Casler's invention of the Biograph camera in 1895, and soon afterwards the Biograph projector, saw the company change its name to the American Mutoscope and Biograph Company. In the 1920s the Mutoscope was licensed to William Rabkin who started his own company, the International Mutoscope Reel Company, which manufactured new reels and also machines from 1926 until 1949.



From a 1956 Munves catalogue. Left: 1926-1949 Rabkins Mutoscope. Centre: Latest "deluxe console light up" model. Right: 1890s-1909 Clamshell Mutoscope.



A popular subject for Mutoscopes

Source: "Mutoscope Arcade Movie Viewer / Peep Show" (pinrepar.com)

The Mutoscope was brought to Australia in 1892 by the Australasian Mutoscope Syndicate Ltd. Under the direction of managing director Mr A. Knox, the first two Mutoscope galleries were established in Sydney in early December - one at 74 Oxford Street and the other at 290 George Street. The company gained much publicity and public goodwill in the lead up to the opening by presenting a "grand display" of 100 machines for the city's Hospital Saturday Fund, with the proceeds donated to the organisation.² Prior to this, members of the press and invited guests had been given a preview.³

¹ While employed by Edison, William Dickson was largely responsible for developing the Kinetoscope between 1889 and 1892. The concept had been described by Edison in 1888, however. Dickson and his team at the Edison lab also invented the Kinetograph, a motion picture camera with rapid intermittent, or stop-and-go, film movement, to photograph movies for in-house experiments. This eventually led to commercial Kinetoscope presentations.

² [untitled] *Evening News* (Sydney) 10 Dec. 1902, 4. [Column 6]

³ "The Mutoscope." *Sydney Morning Herald* 11 Dec. 1902, 11.

In July 1903 Adelaide's *Register* newspaper reported on the formation of the Adelaide Mutoscope Company, the intention being "to acquire the business patents and sole control of the Australasian Company of Sydney, the parent company in these states, together with its future inventions in chronophotography." The report went on to note that similar companies had already been established in numerous countries, including Britain, America, France, Germany, Austria, the Netherlands, South Africa, India and in each of the Australian states (with the exception of Western Australia). "These companies," writes the journalist, "are in affiliation with each other, and a world-wide organisation has thus been established, which will have the sole control of the pictures taken in these countries.... The films comprise 40,000 to 50,000 different subjects." Although a shop had reportedly been leased at the corner of the Arcade and Rundle Street it is presently unclear whether this business proposal eventuated.⁴ Interestingly it was not until early 1904 that an Australasian Mutoscope Company Ltd was registered in Perth.⁵



Source:
Flipbook.info

THE MUTOSCOPE.

The ubiquitous "penny-in-the-slot" machine has for years past been a prominent factor in the amusement and, oftentimes, the existence of the masses, but seldom, perhaps, has the commercial value of the modest penny risen so high as it does in relation to the Mutoscope. As an example of applied science, the latter seems to be perfection, while in the realm of animated photography it combines the vivid realism of the cinematograph and bioscope without the attendant disadvantages which have militated against the fuller success of even the latest improvements. The mutoscope is simplicity itself. It has been introduced into all the Eastern capitals and large provincial towns, and the enterprising Company which has acquired the Australian rights has installed it in Perth. There are twenty-four machines in the Chamber in Illingworth's Buildings, Hay-street—a few doors west of Barrack-street. In appearance each resembles a large stereoscope fitted on an elaborate iron pedestal. A penny is placed in the slot, a handle turned, and in the soft glow of an electric light an animated picture, absolutely devoid of any semblance of the wonted sight-racking flicker, greets the delighted eyes of the investor. The pictures are attractive and healthy, and include historic scenes, places of interest, and humorous incidents from everyday life.

The Chamber was opened yesterday morning by the Mayor of Perth, and the proceeds of the day's exhibition were in aid of local charities. A large number of people patronised the machines, which should enjoy considerable popularity in Perth. The pictures will be regularly changed, and a visit to Illingworth's Chambers should be one of the special attractions of the Christmas holidays.

West Australian (Perth) 24 Dec. 1903, 3.

In early 1904 William Hollinworth, general manager of the Sydney branch of the Australasian Mutoscope Company, organised what was to be a vaudeville, Mutoscope and Biotint⁶ tour of the Australasian region. Led by tour manager Jack Campbell and headlined by magician Percy Verto, the troupe started in the North Queensland town of Cairns in mid-June and travelled south over the next few months, making it to Northern New South Wales before backtracking to Brisbane in September. The company's popularity with Brisbane audiences saw it move from Brisbane's Centennial Hall to the Theatre Royal in early October. No further reports of its movements have been located either in Australian or New Zealand newspapers after the Brisbane season, however.

⁴ "Adelaide Mutoscope Company." *Register* (Adelaide) 27 July 1903, 7.

⁵ "News and Notes." *West Australian* (Perth) 8 Feb. 1904, 4. [column 9]

⁶ The Biotint was one of several moving picture projectors in use around the Australasian region during the early 1900s. It is perhaps most associated with magician/entrepreneur Percy Verto who toured around regional Australia from 1901 through into the early 1910s.

As noted above, the Mutoscope continued to be manufactured in the USA until at least 1949. Its popularity with the Australian public appears to have diminished quickly, however. Although the machines were likely to have continued being used in amusement arcades and beachside fun parks for some time, they were almost certainly incorporated into [Prince's Court](#), Dreamland (Melbourne) and [Wonderland City](#) (Sydney), the Australasian Mutoscope Company did not last beyond 1907. In January that year the firm was forced into liquidation. Four months later it was officially wound-up.

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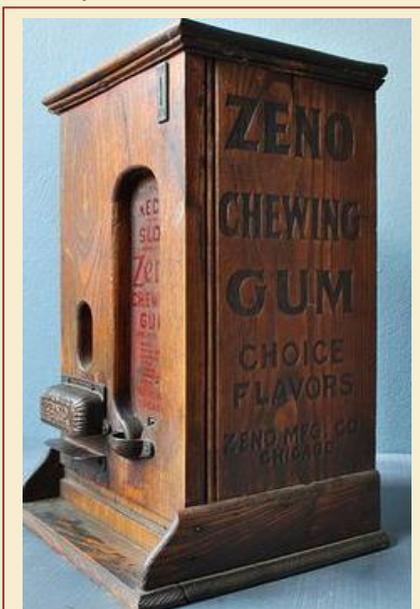
COIN-IN-THE-SLOT MACHINES

aka **Slot Machines, Vending Machines**

The concept of vending machines dates back to the first century A.D. when Greek mathematician and engineer Heron of Alexandria (ca. 10-75) invented an automated way to dispense holy water [see right]. Heron's machine saw an inserted coin fall on a lever, acting as a counterweight which opened a valve to allow water to flow down a spout. The mechanism returned to its closed position when the coin fell off the lever. Almost a thousand years later (ca. 1076), Chinese inventors developed a coin-operated pencil vendor.



By the early 1700s tobacco vending machines were introduced into England, finding commercial possibilities in taverns among other places. Two hundred years later a newspaper dispensing machine was invented by English bookseller Richard Carlile, and during that same century Englishman Simeon Denham patented the first stamp dispensing machine - also the first fully automated vending machine. By the mid-1880s Londoners could buy postcards, envelopes and notepaper from vending machines at railways stations and post offices. For Americans the first modern-style vending machines did not come into use, however, until 1888. These were gum dispensers located at New York City railway stations.

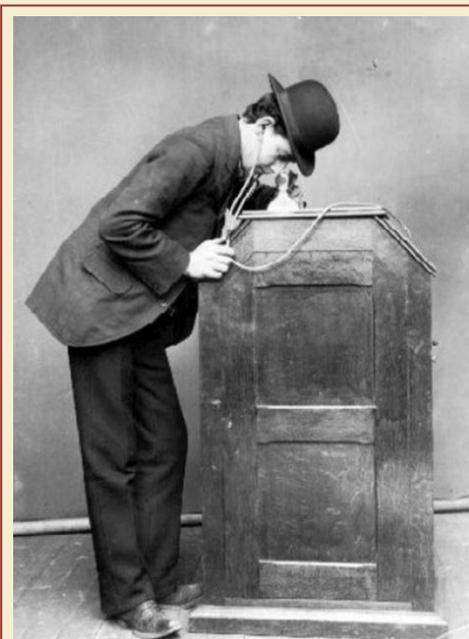


Late 1890's Zeno chewing gum vending machine.

Photo by agentgallery

Although gum and candy were available through vending machines as early as 1888 the famous gumball machine did not come into operation until 1907.

Vending machines began to diversify in the last decade of nineteenth century, with the range of products and services limited only by the imagination. Beverage vending machines operated in Paris, France, as early as 1890, offering beer, wine, and liquor, while the Kineograph and the Mutoscope (individual coin-in-the-slot peep shows) allowed Americans to see the first moving pictures from the early-1890s. In 1899 the first automatic photograph machine was imported into Australia from Europe.



An Edison Kinetograph
Source: John Strausbaugh



Automatic Photograph Machine
Evening News (Sydney) 10 Aug. 1899, 7.

A New York company, Sittman and Pitt, developed the first gambling machine in 1891. A precursor to the modern slot machine, it contained five drums holding a total of 50 card faces and was based on the game of poker. The term slot machine is derived from the slots on the machine where coins were inserted and retrieved. By the early twentieth century, coin-operated machines had been developed which allowed people to play games, have their fortunes told, test their strength and tell them their weight.

Since the early twentieth century automatic dispensing machines have offered clothing, flowers, milk, cigars and cigarettes, postage stamps, condoms, cologne, baseball cards, books, live bait for fishermen, comic books, cassettes and CDs, lottery tickets, and cameras and film. Some modern vending machines dispense hot foods such as pizza, popcorn, and even French fries.

A FORTUNE TO BE MADE.—THE AUTOMATIC MACHINE CO., 163 E. 32nd St., New York, wants everywhere agents for American Novelties and Inventions, as well as collectors to place and supervise their penny-in-the-slot Machines in spare time, sharing profits. Special knowledge unnecessary.

Advocate (Melbourne) 18 Oct. 1902, 22.

Coin-operated vending machines made their first appearance in Australia during the 1890s, but were largely confined to the capital cities, and even then within the confines of the central business districts. Prior to their availability in regional centres country folk had two options for viewing or using these machines - during visits to the "big smoke," or via travelling shows-including variety and film companies, waxworks exhibitions, fairs and annual shows.

During his early South Wales and Queensland tours [Harry Clay](#) included penny-in-the-slot machines as part of the entertainment package, alongside waxworks, cosmoramas, and photographic exhibitions etc. Located in the foyer of whatever venue his company was playing, one of his machines reportedly offered delineations of a person's character, while another delivered bags of sweets.

The *Western Mail* [right] records that Leonard Davis incorporated vending machines as a novelty when he re-opened Perth's [Palace Gardens](#) in November 1905. That same year the Federal Waxworks and Vitascope Company, largely operating along the same lines as Harry Clay's touring company, also featured several penny-in-the-slot machines as part of its entertainment package.⁷

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ENTERTAINMENTS.

The [Palace Gardens and Theatre](#) were to have been re-opened on Thursday evening by Mr. Leonard Davis. During the last few weeks a vast number of improvements have been made both to the gardens and theatre. The theatre will be conducted on similar lines to those which obtain in the American music halls. A large number of novelties, including a waxworks exhibition of 50 figures, penny-in-the-slot machines of all descriptions, stereophones, picture-graphs, and two boxes of radium have been imported, and were to have been on view in the theatre. Mr. Davis states that it is his intention to provide a refined entertainment in the gardens each night presenting a programme to which not even the most fastidious could take exception. Every three weeks new artistes will appear. The company is headed by Gardner, Gibson, and Gardner, a musical comedy team.

cont...

Western Mail (Perth) 18 Nov. 1905, 2.

⁷ "The Vitascope Company." *Bunbury Herald* (WA) 17 July (1905), 2.