

# A History of Knowledge

## **Oldest Knowledge**

**What the Sumerians knew**

**What the Babylonians knew**

**What the Hittites knew**

**What the Persians knew**

**What the Egyptians knew**

**What the Indians knew**

**What the Chinese knew**

**What the Greeks knew**

**What the Phoenicians knew**

**What the Romans knew**

**What the Barbarians knew**

**What the Jews knew**

**What the Christians knew**

**Tang & Sung China**

**What the Japanese knew**

**What the Muslims knew**

**The Middle Ages**

**Ming & Manchu China**

**The Renaissance**

**The Industrial Age**

**The Victorian Age**

**The Modern World**

# What the Victorian Age knew Philosophy

Piero Scaruffi

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**Revised by Chris Hastings in 2013**

# What the Victorian Age knew

- European immigrants and their descendants occupy a large share of the planet, despite the fact that Europe is the smallest continent
- Between 1820 and 1930 more than 50 million Europeans emigrated to the Americas and to Oceania, certainly helped by the introduction of steamships

# What the Victorian Age knew

- Paris
  - Belle Epoque (40 years of peace 1871-1914)
  - Cafes (middle-class) replace salons (aristocracy)
  - Montmartre
    - Cafe-concert (Moulin de la Galette)
    - Dance halls (Moulin Rouge)
    - Brothels
    - Students
  - 1881: the Chat Noir cabaret opens in Paris
  - 1889: Moulin Rouge
  - 1894: the first strip-tease show
  - Chansonniers
  - Convergence of sex, art and politics

# What the Victorian Age knew

- Paris
  - Impressionism
    - Prodromes: Corot, Manet's "Olympia" (1865)
    - Claude Monet: "Impression: Sunrise" (1872)
  - Symbolism
    - Prodromes: Charles Baudelaire's "Les Fleurs du Mal" (1857)
    - Arthur Rimbaud: "Le Bateau Ivre" (1871)
    - Paul Verlaine: "Romances sans Paroles" (1874)
    - Stephane Mallarme` : "L'apres-midi d'un Faune" (1876)
    - Vincent van Gogh: "Sunflowers" (1888)
    - Paul Gauguin: "Vision after the Sermon" (1888)
  - Fauvism: Henri Matisse (1905)

# What the Victorian Age knew

- Paris
  - Cubism
    - Pablo Picasso: "Les Femmes d'Alger (O. J. R. M.)" (1911)
  - Futurism
    - Filippo Tommaso Marinetti's "Futurist Manifesto" (1909)
  - Dadaism
    - Tristan Tzara ("Dada") performs at the Cabaret Voltaire in Zurich (1916)
    - Anarchic
  - Surrealism
    - Andre Breton's "Surrealist Manifesto" (1924)
    - Sigmund Freud's influence: the unconscious, dreams
    - Automatism

# What the Victorian Age knew

- Berlin/ Physics
  - Germany had only one world-class university (Göttingen) until 1810
  - 1810: Founding of the University of Berlin
  - Wilhelm von Humboldt's school reforms: teachers must have a university degree, priority to research, doctorate
  - Specialist academic literature separate from general readership
  - Scientific renaissance in Germany
  - Hermann Helmholtz
  - Rudolph Clausius
  - Max Planck

# What the Victorian Age knew

- Berlin/ Physics
  - In 1909 Max Planck delivers a lecture in German at Columbia Univ: every physicist in the world was expected to understand German



# What the Victorian Age knew

- Berlin/ Electricity
  - 1847: Werner Siemens founds a company to exploit the telegraph
  - 1866: Siemens develops the first practical dynamo
  - 1873: Zénobe Gramme discovers how to use a dynamo as a direct current motor (Belgium)
  - 1879: Siemens demonstrates the first electric railway
  - 1880: Siemens builds the first electric elevator
  - 1881: Siemens demonstrates the first electric tram system
  - 1887: Emil Rathenau founds the Allgemeine Elektrizitäts Gesellschaft (AEG), specializing in electrical engineering, whereas Siemens specializes in communication and information

# What the Victorian Age knew

- Berlin/ Electricity
  - 1888: Nikola Tesla invents the alternating-current motor (USA)
  - 1890: AEG develops the AC motor and generator (first power plants) and alternating current makes it easy to transmit electricity over long distances
  - 1897: Karl Ferdinand Braun builds the first oscilloscope and invents the cathode-ray tube
  - 1910s: Greatest center of electrical production in the world (“Elektropolis”)

# What the Victorian Age knew

- Germany
  - 1910: Berlin third largest city in Europe
  - 1910: 60% of Germans live in cities
  - 1875: Germany's industrial output surpasses France's
  - 1900: Germany's industrial output surpasses Britain's
  - 1870: Britain has 32% of the world's industrial production
  - 1910: The USA has 35.3% of the world's industrial production, Germany has 15.9% and Britain 14.7%
  - 1912: The "Kongo", the largest battleship in the world

# What the Victorian Age knew

- Germany
  - Preeminence of German universities
  - Physics, Chemistry and Geology regarded as equal to humanities
  - The industrial research lab: Siemens, AEG, Bayer
  - Chemistry and engineering spawn a boom in dyes, pharmaceuticals and electrical devices

# What the Victorian Age knew

- Germany
  - 1827: Georg Ohm's electrical laws
  - 1845: Gustav Kirchhoff's electrical laws
  - 1847: Hermann Helmholtz's conservation of energy
  - 1850: Rudolf Clausius discovers entropy
  - 1866: Werner Siemens' dynamo
  - 1875-83: Robert Koch isolates the cause of anthrax, tuberculosis and cholera
  - 1876: Ferdinand Braun discovers semiconductors
  - 1886: Karl Benz's gasoline-powered car
  - 1890: AEG's alternate-current motor
  - 1897: Felix Hoffman's aspirin
  - 1897: Karl Braun's oscilloscope
  - 1900: Ferdinand von Zeppelin's dirigible
  - 1900: Max Planck's Quantum Theory
  - 1905: Albert Einstein's Relativity

# What the Victorian Age knew

- Berlin/ Expressionism
  - Prodromes: Victor von Falk's best-selling gore novel "The Executioner of Berlin"
  - Berlin's megalopolis: population grew from 1.9 million in 1890 to 3 million in 1910
  - 1918: Dada exported to Berlin
  - 1919: the Bauhaus opens in Weimar
  - 1919: "Das Kabinett von Dr Caligari" brings expressionism to cinema
  - 1924: Neue Sachlichkeit
  - 1925: Erwin Piscator produces "Trotz Alledem", a multi-stage multi-media event
  - 1926: Walter Gropius opens the new Bauhaus in Dessau
  - 1927: Bertold Brecht writes the manifesto of the "epic theatre"

# What the Victorian Age knew

- Berlin/ Great Depression
  - 1929: unemployment in Germany is 1 million
  - 1930: unemployment in Germany is 3 million
  - 1932: unemployment in Germany is 6 million

# What the Victorian Age knew

- Vienna
  - Music: Richard Strauss, Gustav Mahler
  - Painting: Gustav Klimt, Egon Schiele
  - Fiction: Arthur Schnitzler, Robert Musil
  - Psychology: Sigmund Freud
  - Physics: Ludwig Boltzmann, Ernst Mach
  - Philosophy: Edmund Husserl



# What the Victorian Age knew

- Alexandria



# What the Victorian Age knew

## Democracy

- USA: 1865
- France: 1875
- Britain: 1918
- but not for women

# What the Victorian Age knew

## Second industrial revolution

- Bessemer converter for mass-producing steel (England, 1855)
- Edwin Drake drills oil in Pennsylvania (1858)
- Werner von Siemens' first practical dynamo (Germany, 1866)
- Thomas Edison's first power plant (1882)
- Almarian Decker's alternate-current power plant (Redlands, CA, 1893)

# What the Victorian Age knew

## Second industrial revolution

- Bessemer converter for mass-producing steel (England, 1855)
  - A side-effect of the Crimea War
  - Cannons made of cast iron break easily
  - Need to make steel quickly to make cannons for the Crimean war
  - Removing impurities from molten pig iron by an air blast creates better steel
  - First process for inexpensively mass-producing steel
  - Demand increases rapidly during the US Civil War
  - Iron rails last 2 years, steel rails last 18 years

# What the Victorian Age knew

## Second industrial revolution

- Steel replaces iron
- Electricity replaces steam
- Machines replace humans
- Scientific laboratories at the service of industry
- Global business based on fast transportation and communication
- Imperialism

# What the Victorian Age knew

## Second industrial revolution/ The power plant

- Water wheels and steam engines did not allow for long-distance power distribution (they needed to be near the factory that used them)
- Electricity can be distributed over long distances
- The electrical power plant produces energy for multiple factories
- The factory does not need to take care of its own power production anymore
- Electricity allows factories to be located far from the production of energy
- Electricity enables the assembly line

# What the Victorian Age knew

## Second industrial revolution/ The power plant

- The electrical power plant produces energy for the entire city
- Energy production becomes centralized the way food production became centralized 5000 years earlier
- Power plants cause the price of electricity to fall
- Cheap and plentiful energy
- Democratization of electricity (homes can afford the energy that only factories used to have)
- Birth of “utility” companies that charge a fee for energy
- The same companies start selling electrical appliances to homes

# What the Victorian Age knew

Second industrial revolution/ The power plant

- Cheap and ubiquitous electricity enables the shift from public entertainment (theater, cinema, amusement park) to private entertainment (radio, phonograph and later television)



# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - Traditional methods: whale oil, candles, Etruscan lamps and gas lamps
  - Electric lighting:
    - Healthy (no fumes)
    - Cheap
    - Controllable
    - Less flammable
  - Tungsten filament (1904)

# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - 1876: Pavel Yablochkov (Paul Jablochhoff) invents an electric arc lamp
  - March 1878: His lamps light up the streets of Paris
  - The light from an arc lamp is produced by passing a large current between two electrodes (usually carbon)
  - Jablochhoff arc lamps are not practical for use in small locations such as the home

# What the Victorian Age knew

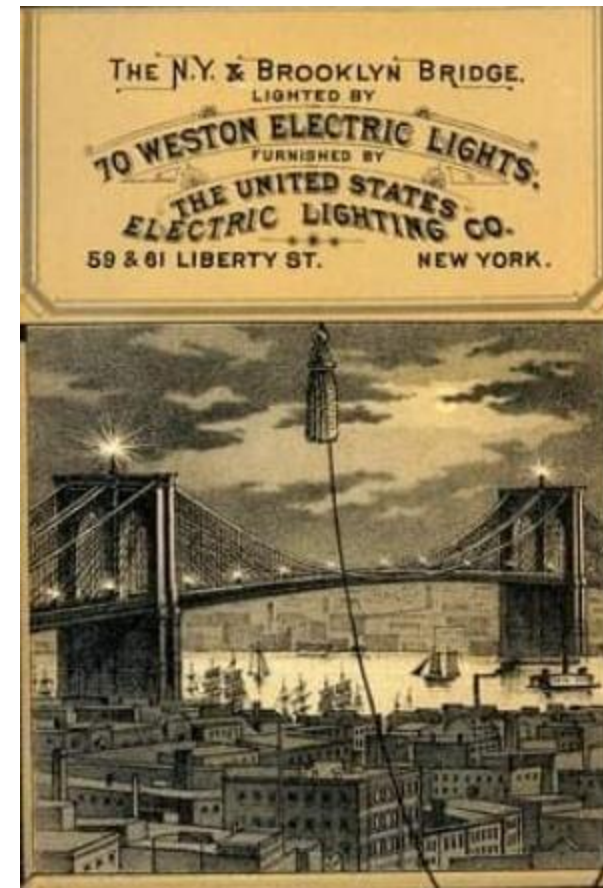
- Second industrial revolution/ Lighting
  - 1878: William Wallace's electric arc lamp (using a dynamo that converts water power from the river into electricity)
  - April 1879: Charles Brush's arc lamp demonstrated in a Cleveland park
  - The Brush lamp burns twice as long as the Yablochkov lamp
  - 1880: Brush lamps light up sections of Broadway in New York

# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - Dec 1879: Edison demonstrates a prototype of his incandescent arc lamp that burns for 13.5 hours (using a filament made of carbonized cotton)
  - Edison was producing bulbs that can last up to 1500 hours.
  - 1882: Edison demonstrates his bulbs that can last up to 1500 hours in the Manhattan offices of JP Morgan's investment firm

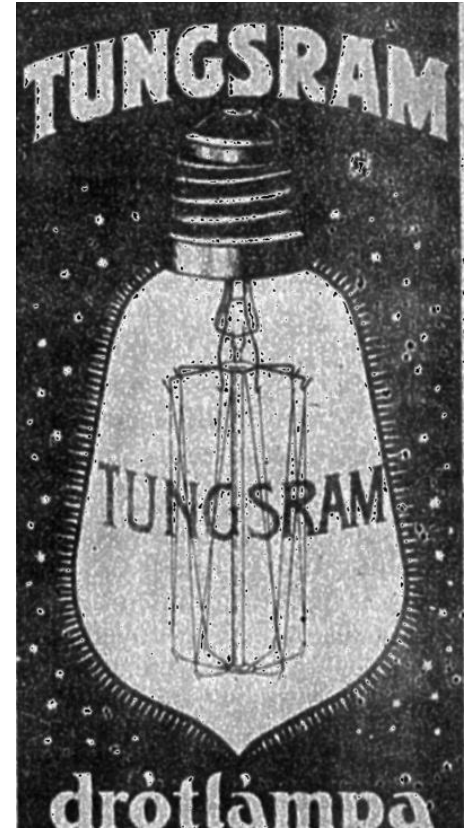
# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - 1882: Edward Weston invents the Tamidine filament (2000-hour life span) that remains the industry standard until the tungsten filament
  - 1883: Weston wins the contract for lighting the Brooklyn Bridge



# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - 1902: Werner von Bolton and Otto Feuerlien of Siemens and Halske invent a filament made from tantalum
  - December 1904: Sandor Just and Franjo Hanaman invent the tungsten filament that lasts longer and gives brighter light than the carbon filament
  - 1904: Hungarian company Tungstram markets their tungsten filament lamps (Hungary is part of Austria)
  - 1906: General Electric switches to tungsten-filament lamps



# What the Victorian Age knew

- Second industrial revolution/ Lighting
  - Artificial lighting provides the same intensity of light regardless of the time of the day/night and of the season.
  - Light drives the biological clock
  - Before electrical lighting, everybody could see the night sky.
  - After electrical lighting, the night sky becomes an exotic attraction for city folks
  - Light pollution

# What the Victorian Age knew

## The Great Monopolies of the USA

- Scientific organization of the corporation leads to economies of scale that change the world more than wars do
- Privately held monopolies pledge commitment to the public good
- Corporate titans reinvent capitalism as a quasi-divine mission to reform the world via technology, the monopoly as an agent of good for the whole society
  - Theodore Vail (AT&T, 1885-1919)
  - Henry Ford (Ford, 1899-1945)
  - John Rockefeller (Standard Oil Company, 1862-1897)



# What the Victorian Age knew

## The Great Monopolies of the USA

- Goal: to create the industrial equivalent of the British Empire, that brings "civilization" to the entire world.
- Adam Smith's "invisible hand" is destructive, competition leads to waste not efficiency:
  - "The public as a whole has never benefited by destructive competition" (Theodore Vail)
  - "There can be no greater absurdity and no greater disservice to humanity in general than to insist that all men are equal" (Henry Ford)
- The government's reaction: the Sherman Antitrust Act (1890), prosecution of Standard Oil (1909)

# What the Victorian Age knew

## Physics

- 1842: Julius Mayer discovers that heat can be converted into work (before Joule)
- 1843: James Joule establishes the equivalence of work and heat (energy can be transformed)
- 1847: Helmholtz popularizes Mayer's and Joule's proofs of the conservation of energy: electric, magnetic, heat and light energy are equivalent to mechanical work
- 1850: Rudolf Clausius discovers entropy
- 1851: Hippolyte Fizeau measures the speed of light
- 1859: Le Verrier discovers that the perihelion of the planet Mercury advances by 38" per century more than Newton's equations predict

# What the Victorian Age knew

## Physics

- 1859: Gaston Plante invents the lead-acid cell, the first rechargeable battery
- 1864: James Clerk-Maxwell formulates the laws of electricity and magnetism
- 1867: Georges Leclanché invents the zinc-manganese battery (forerunner of the alkaline battery)
- 1868: William Huggins discovers that galaxies are receding
- 1869: Dmitri Mendeleev's periodic table of elements (56 known elements and a law for discovering the next ones)
- 1878: Willard Gibbs' principles of thermodynamics

# What the Victorian Age knew

## Physics

- 1876: Ferdinand Braun discovers semiconductors
- 1886: Heinrich Hertz discovers that radio waves can be broadcast and received
- 1892: Hendrik Lorentz outlines the theory of the electron (the atom is not elementary but is made of smaller units that are electrical in nature)
- 1895: Wilhelm Roentgen discovers the X rays, light rays that are invisible to the human eye
- 1896: Antoine Henri Becquerel observes the radioactive decay of atomic nuclei (discovery of radioactivity)
- 1897: Joseph-John Thompson discovers that electricity is due to the flow of tiny negatively charged particles (discovery of the electron)

# What the Victorian Age knew

## Physics

- 1895: The X rays
  - William Crookes: “On the Relativity of Human Knowledge” (1897)
  - Camille Flammarion: “The Unknown” (1900)
  - Marie Curie (1904): *“The discovery of the phenomena of radioactivity adds a new group to the great number of invisible radiations now known, and once more we are forced to recognize how limited is our direct perception of the world which surrounds us, and how numerous and varied may be the phenomena which we pass without a suspicion of their existence until the day when a fortunate hazard reveals them”.*
  - Note: after 1895 painters start painting things that don’t exist (futurists, cubists, surrealists...)

# What the Victorian Age knew

## Physics

- 1898: Pierre Curie and Marie Curie isolate the radioactive elements polonium and radium (and coin the word “radioactivity”)
- William "Lord Kelvin" Thompson (1900): there are two small clouds on Physics
  - The speed of light is the same in all directions, i.e. no experiment reveals the existence of the ether (Michelson-Morley, 1887)
  - Decrease in energy emitted at short wavelengths by a "black" body (a body that does not reflect light)

# What the Victorian Age knew

## Physics

- 1900: Max Planck discovers that atoms can emit energy only in discrete amounts (first explanation of why chemical substances are made of discrete units, the elements)
- 1902: Ernest Rutherford discovers the radioactive decay law (the that every radioactive isotope has a specific “half life”)
- 1903: Konstantin Tsiolkovsky's "The Exploration of Cosmic Space by Means of Reaction Devices"

# What the Victorian Age knew

## Physics

- 1905: Albert Einstein explains the photoelectric effect as being the result of light being made of “photons”, their energy being proportional to frequency
- 1905: Albert Einstein explains Brownian motion, and proves the existence of John Dalton’s atoms
- 1905: Albert Einstein publishes "Special Theory of Relativity"



# What the Victorian Age knew

## Physics

- 1910: Heike Kamerlingh Onnes discovers superconductivity
- 1911: Ernest Rutherford discovers that the atom is made of a nucleus and orbiting electrons (a mini-solar system)
- 1913: Robert Millikan measures the charge of the electron
- 1913: Niels Bohr proves that electrons are permitted to occupy only some orbits around the nucleus of the atom

# What the Victorian Age knew

## Institutes for theoretical physics

University of Berlin (first director Gustav Kirchhoff in 1875, led by Max Planck in 1900)

Bonn (Heinrich Hertz until 1894)

Königsberg (first director Franz Neumann

Leipzig

Göttingen (led by Woldemar Voigt in 1900)

Munich (first director Arnold Sommerfeld in 1906)

Vienna (Ludwig Boltzmann since 1894)

Leiden (first director Hendrik Lorentz in 1877)

Cambridge (Joseph John Thomson since 1884)

University of Manchester (Ernest Rutherford since 1907)

University of Paris (Pierre Curie & Maria Sklodowska)

# What the Victorian Age knew

## Non-Euclidean Geometry

- Nikolai Lobachevsky's non-Euclidean geometry (1829)
- Janos Bolyai's "Absolute Science of Space" (1829)
- Arthur Cayley's "Analytical Geometry of n Dimensions" (1843)
- Bernhard Riemann's lecture "On the Hypotheses which lie at the Foundation of Geometry" (1854)
- Hermann von Helmholtz's lecture "On the Origin and Significance of Geometrical Axioms" (1870)
- Henri Poincaré's article "Non-Euclidean Geometries" (1891)

# What the Victorian Age knew

## Logic

- John Stuart Mill's "System of Logic" (1843)
- George Boole's "Mathematical Analysis of Logic" (1847)
- Charles Babbage's "difference engine" (1859)
- Gottlob Frege's "Begriffsschrift" (1879)
- John Venn's set diagrams (1880)
- Giuseppe Peano's "The principles of Arithmetic" (1889)
- David Hilbert's "23 Problems" (1900)
- Ernst Zermelo's set theory (1908)
- Alfred Whitehead's and Bertrand Russell's "Principia Mathematica" (1913)
- Thoralf Skolem's "Some Remarks on Axiomatized Set Theory" (1922)

# What the Industrial Age knew

- George Boole (1854)
  - Applying algebraic methods to a variety of fields (Leibniz's project)
  - Logical propositions denoted by symbols
  - Laws of logic denoted by operators
  - “All humans are mortal” translates into “All y are some x” or  $y=vx$ , and can be further derived:  $y-vx=0$ , “Non-mortal humans do not exist”
  - Systematic use of symbols eliminates the ambiguities of natural language
  - Logic becomes as rigorous as Mathematics

# What the Industrial Age knew

- Non-Euclidean geometries
  - Carl-Friedrich Gauss (1824, Germany): Euclid's postulate of the unique parallel can be replaced by the postulate that through any point there are an infinite number of parallels)
  - Nikolaj Lobachevsky (1826, Russia)
  - Janos Bolyai (1829, Hungary)
  - All of them: the sum of the angles of a triangle is less than 180 degrees

# What the Industrial Age knew

- Bernhard Riemann (1854 lecture at Gottingen)
  - General class of geometries (any number of dimensions in any kind of space), that comprises the classical Euclidean geometry as a special case
  - The geometry of the surface of a sphere in which all straight lines are great circles (no parallel lines at all, unless space is flat)
  - Spaces with any number of dimensions
  - Space can be curved instead of flat
  - The curvature of space is measured by a “curvature tensor”
  - The sum of the angles of a triangle is greater than 180 degrees

# What the Industrial Age knew

- Charles Babbage (1832)
  - Economic principles that regulate automation
  - Mass production implies a society of manufacturers not makers
  - Mass production requires division of labor
  - Progress will increasingly depend on the ability to calculate



# What the Industrial Age knew

- Charles Babbage: "Difference Engine" (1859),  
manufactured by Edvard Scheutz



# What the Industrial Age knew

- **Charles Babbage: the probability of miracles**

The probability of the witnesses speaking truth, and the event occurring, is therefore,

$$\frac{\left(1 - \frac{1}{p}\right)^n \frac{1}{m+2}}{\left(1 - \frac{1}{p}\right)^n \frac{1}{m+2} + \left(\frac{1}{p}\right)^n \frac{m+1}{m+2}} = \frac{(p-1)^n}{(p-1)^n + m+1}; \quad (A.)$$

and the probability of their falsehood is,

$$\frac{\left(\frac{1}{p}\right)^n \frac{m+1}{m+2}}{\left(1 - \frac{1}{p}\right)^n \frac{1}{m+2} + \left(\frac{1}{p}\right)^n \frac{m+1}{m+2}} = \frac{m+1}{(p-1)^n + m+1}. \quad (B.)$$

# What the Industrial Age knew

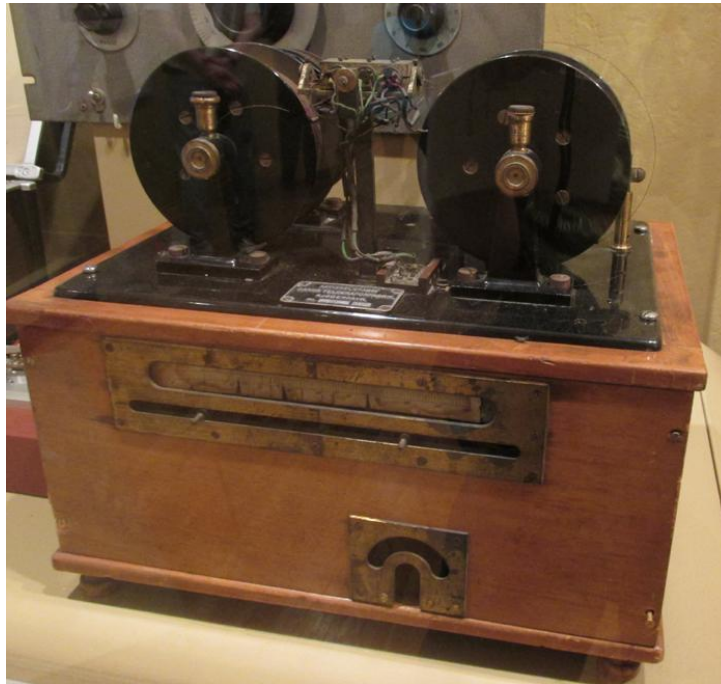
- Charles Babbage: “On the Economy of Machinery and Manufactures” (1832) predating the assembly line
  - *“The economy of human time is the next advantage of machinery in manufactures”*

# What the Victorian Age knew

- Electricity
  - Gustav Kirchhoff (1845): laws for the distribution of current in electric circuits (e.g., the sum of the currents into a given node equals the sum of the currents out of that node)
  - William Weber (1855): the ratio between the electrodynamic and electrostatic units of charge is the same number as the speed of light
  - Gustav Robert Kirchhoff (1862) coins the term "black body radiation"
  - Thomas Edison (1879) invents the light bulb with carbon filaments, replacing the old expensive inefficient electric lamps

# What the Victorian Age knew

- Electricity
  - Valdemar Poulsen (1898) invents the telegraphone



# What the Victorian Age knew

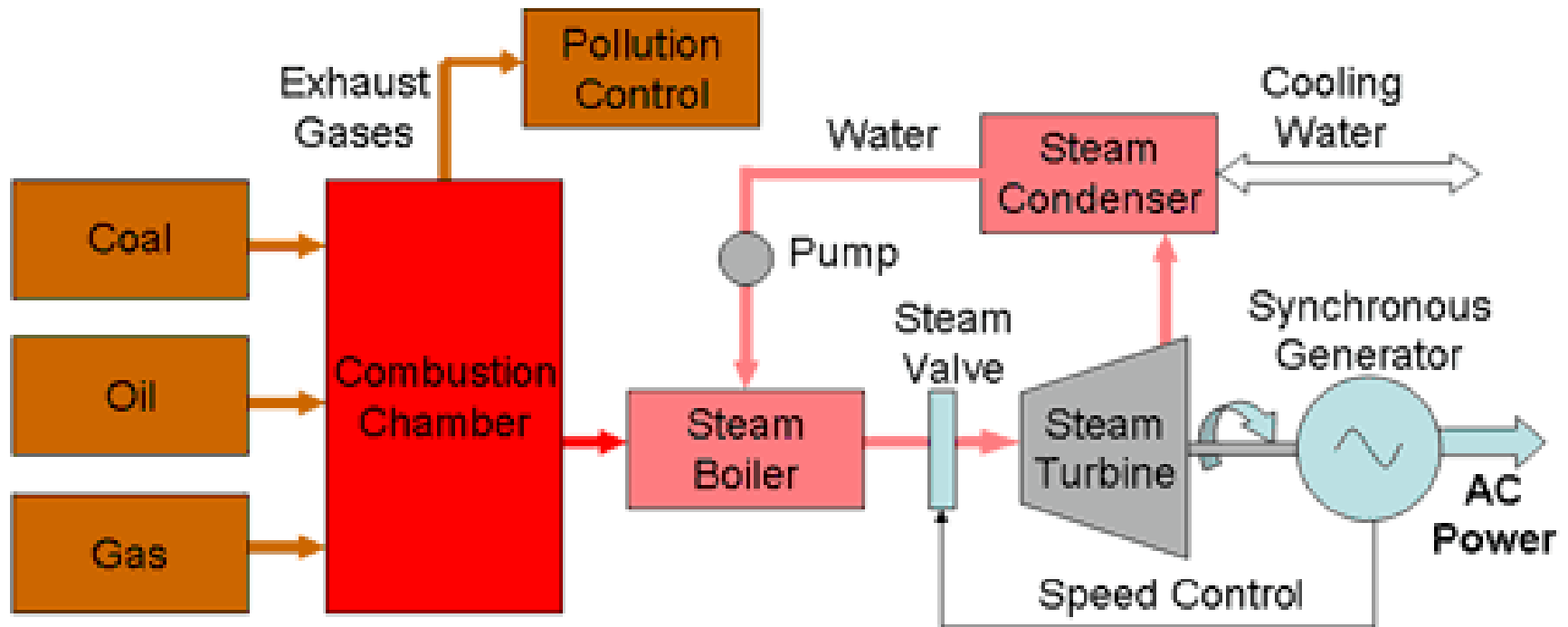
- Electricity: power generation
  - 1832: Benoit Fourneyron invents the turbine water wheel (50 horsepower)
  - 1849: James Francis (Lowell, USA) improves the water turbine
  - 1879: Lester Pelton (Gold Country, California) improves the impulse water turbine
  - Water turbines replace waterwheels to harness waterpower
  - Water turbines generate electricity
  - The world's first hydroelectric power plant uses water turbines (Niagara Falls, 1886)
  - Steam turbines (propelled by fossil fuels) generate electricity (Charles Parsons, 1885, Newcastle)

# What the Victorian Age knew

- Electricity: power generation
  - Electricity is a form of energy that is easily stored and transmitted
  - Electricity creates new industrial sectors

# What the Victorian Age knew

- Electricity: power generation



**Fossil Fuel Powered Steam Turbine Electricity Generation**



# What the Victorian Age knew

## Biology/ Medicine

- Matthias Schleiden discovers that all living beings are made of cells (1839)
- Louis Pasteur (1865): diseases are caused by germs
- Robert Koch (1875): isolates the cause of anthrax
- Robert Koch (1882): discovers the tuberculosis bacillus
- Robert Koch (1883): discovers the cholera bacillus
- Jaime Ferran's cholera vaccine (1885)
- Paul Ehrlich (1909): Salvarsan for the treatment syphilis (de facto discovers the principles of antibiotics and the immune system)
- Enabler: a new generation of German microscopes (Carl Zeiss' microscopes of the 1870s, the 1906 ultramicroscope of Richard Zsigmondy)

# What the Victorian Age knew

## Biology/ Medicine

- Germ theory of disease (Louis Pasteur, Robert Koch)
  - The 2,000-year old miasma theory is finally put to rest
  - Cures for incurable diseases emerge
  - Until the 20<sup>th</sup> century, it was common to lose a child to disease
  - Death becomes more typical of old age than of childhood
    - 1800: 43.3% of children die
    - 1880: 20% of children die within their first year
    - 2000: 1% of children die

# What the Victorian Age knew

## Vaccines

- Smallpox

- Variolation (smallpox inoculation) well known in the Ottoman Empire as a protection against smallpox (whether the Ottomans learned it from the Chinese or more likely from the Africans).
- 1713 and 1715 respectively two ethnic Greek doctors of Istanbul, Emmanuel Timonis and Iakobos Pylarinos (known in Italy as Giacomo Pylarini), independently write about it the Royal Society of London
- 1718 Lady Mary Wortley Montagu, who is living in Istanbul (her husband was the British ambassador), "varioliates" her child. In 1721 she varioliates her daughter in London, the first person to be variolated in Europe.
- 1721 Zabdiel Boylston spearheads variolation when smallpox spreads in Boston. Boylston inoculates his 13-year-old son, the first person to be variolated in America.

# What the Victorian Age knew

## Vaccines

- Smallpox

- Christian zealots claim that smallpox was God's punishment for human sins and object to interfering with God's will
- This argument failed in Britain and the USA, but was somehow successful in continental Europe
- 1754 variolation formally approved in Britain
- 1860s Robert Sutton improves variolation
- The widespread use of variolation helps population grow faster in Britain than in France.
- The first major non-British European to accept variolation is the Russian empress Ekaterina
- 1777: George Washington mandates inoculation for all soldiers
- 1796: British scientist Edward Jenner invents the smallpox vaccine
- 1805: Napoleon mandates smallpox vaccination for all his troops across Europe

# What the Victorian Age knew

## Vaccines

- Cholera
  - Until the 18th century the most lethal pandemics in Europe were caused by bubonic plague.
  - Cholera is the major disease of the 19th century and the first one for which the worldwide spread can easily be documented (Europeans control most of the world, rise of the newspaper)
  - Spread by Kumbh Mela pilgrimage (India, 1817) and by Haji pilgrimage (Muslim world, 1831)

# What the Victorian Age knew

## Vaccines

- Cholera

- India, 1817-24 (200,000 dead)
- Hungary 1829-31 (100,000 dead)
- Russia 1830-31 (500,000 dead)
- Egypt 1831 (150,000 dead)
- Britain 1831-32 (55,000 dead)
- Britain 1846-47 (52,000)
- Russia 1847-51 (one million dead)
- England 1849 (20,000 dead)
- Mexico 1849 (200,000 dead)
- Russia 1852-1860 (one million dead)
- London 1853-4 (10,738 dead)
- Spain 1854-5 (236,000)
- Japan 1858-60 (150,000 dead)
- Russia 1866 (90,000 dead)
- Austria 1866 (165,000 dead)
- Italy 1867 (113,000 dead)
- Algeria 1867 (80,000 dead)
- Russia, Prussia, Austria, Hungary 1867 (225,000 dead)
- Germany and Austria-Hungary 1873 (230,000 dead)
- Russia 1892 (267,890 dead)
- Germany 1892 (140,000 dead)
- Philippines 1902-1904 (200,000 dead)
- Ukraine 1910 (110,000 dead)

# What the Victorian Age knew

## Vaccines

- Germ theory of disease

- 1546 Italian anatomist Girolamo Fracastoro's "De Contagione et Contagiosis Morbis"
- 1762 Austrian physician Marcus Antonius von Plenciz's "Opera medico-physica"
- 1835 Italian entomologist Agostino Bassi discovers that a microorganism is responsible for spreading a silkworm disease ("Del mal del segno, calcinaccio o moscardino")
- Galen's miasma theory blames instead poor hygienic conditions causing "miasmas"
- Contagionists believe in quarantine
- 1793 Benjamin Rush anticontagionist after Philadelphia's yellow-fever epidemic
- 1799 anticontagionist Philadelphia Academy of Medicine founded
- 1802 French troops annihilated by yellow fever in Haiti prove anticontagionists right
- 1802 Alexander von Humboldt sides with the anticontagionists

# What the Victorian Age knew

## Vaccines

- Germ theory of disease

- 1821 Robert Jackson studies the Spanish epidemic of yellow fever and argues it is not caused by contagion ("Observations of the Yellow Fever in Spain", 1821)
- 1825 French physician Nicolas Chervin reaches the same conclusion about the Spanish epidemic
- 1828 French Academy of Science (leading medical institution of the era) sides with Chervin
- English sanitarians (anticontagionists): Edwin Chadwick's report "Report on The Sanitary Condition of the Labouring Population of Great Britain" 1842 leads to the Public Health Act 1848
- 1850 French physician Casimir Davaine identifies the bacterium that causes anthrax, the first association of a microorganism with a disease
- 1854 British physician John Snow proves that London cholera outbreak of 1849 can be traced back to a single contamination with human feces of the drinking water supply, i.e. the rest was contagion
- 1854 Italian anatomist Filippo Pacini isolates the cholera bacterium *Vibrio Cholerae*



# What the Victorian Age knew

## Vaccines

- Germ theory of disease: vaccines
  - 1870s French chemist Louis Pasteur proves the germ theory of disease,
  - 1879 Using a microscope, German bacteriologist Robert Koch identifies the bacillus that causes anthrax
  - 1881 Pasteur develops a vaccine for anthrax
  - 1881 Cuban physician Carlos Finlay proposes that yellow fever is spread by mosquitoes
  - 1882 Koch identifies the bacillus that causes tuberculosis
  - 1883 Koch rediscovers *Vibrio Cholerae*
  - 1885 Pasteur develops a vaccine for rabies
  - 1890: Emil von Behring and Shibasaburo Kitasato discover the existence of antibodies
  - 1896 Almroth Edward Wright, Richard Pfeiffer and Wilhelm Kolle develop the typhoid vaccine
  - 1897 British physician Ronald Ross proves that malaria is spread by mosquitoes
  - 1900 a US team led by Walter Reed proves that Finlay was right

# What the Victorian Age knew

## Vaccines

- Germ theory of disease: vaccines
  - 1892 Dmitri Ivanovsky discovers the first virus, a “plant” virus
  - 1898 Ivanovsky’s student Martinus Beijerinck“ realizes that Ivanovsky’s microorganism is not a bacterium and names it "virus”
  - 1898 Prussian scientists Friedrich Loeffler and Paul Frosch discover the virus that causes the foot-and-mouth disease of cows, the first "animal" virus
  - 1901: Italian pathologist Eugenio Centanni and his student Ezio Savonuzzi discover the avian influenza virus
  - 1903: Paul Remlinger discovers the virus of rabies
  - 1907: Percy Ashburn and Charles Craig discover the dengue virus
  - 1909: Austrian immunologist Karl Landsteiner and Erwin Popper discover the poliomyelitis virus
  - 1911: John Anderson and Joseph Goldberger discover the virus of measles

# What the Victorian Age knew

## Sanitary revolution/ milk

- 1858: Frank Leslie in New York publishes an essay about people killed by milk
- 1865: Louis Pasteur invents pasteurization
- 1892: Nathan Straus opens the Pasteurized Milk Laboratory in New York to produce pasteurized milk at scale
- 1909: Chicago becomes the first city of the USA to require pasteurization of milk
- 1935: Infant-mortality rate in the USA is half what it was in 1915

# What the Victorian Age knew

## Sanitary revolution / water

- 1908: Typhoid is responsible for 30 deaths per 100,000 people in the USA
- 1908: John Leal adds chlorine to the public reservoirs in Jersey City
- 1912: Chicago chlorinates public reservoirs
- 1938: Typhoid is responsible for 3 deaths per 100,000 people

# What the Victorian Age knew

Sanitary revolution / cholera

- 1906: intravenous hypertonic solutions reduces cholera's mortality rate to 40%

# What the Victorian Age knew

## Chemistry

- 1825: Michael Faraday identifies benzene - birth of organic chemistry
- 1842: Crawford Long demonstrates that ether can be used as an anesthetic
- 1847: Ascanio Sobrero invents nitroglycerin
- 1848: Charles Mansfield isolates benzene from coal tar (Britain)
- Industrial chemicals multiply, mostly derived from benzene (dyes, soap, mothballs...)
- 1856: William Perkin, still a teenager, accidentally invents the first synthetic dye, mauve (Britain)
- 1860s: Chemistry becomes a popular subject to study in universities

# What the Victorian Age knew

Chemistry/ future use in photography

- 1855: Alexander Parkes invents celluloid (Britain)
- 1869: John Wesley Hyatt's celluloid for mass production (originally to produce billiard balls, false teeth, piano keys, etc)

# What the Victorian Age knew

## Chemistry/ medicine

- 1897: Felix Hoffman discovers acetylsalicylic acid (introduced by Bayer in the form of water-soluble tablets as “aspirin”)
- 1898: Bayer introduces commercially a drug made from opium, diacetylmorphine, under the name "heroin"
- 1909: Sahachiro Hata and Paul Ehrlich discover arsphenamine, the first scientific treatment for syphilis (marketed by Hoechst as Salvarsan)



# What the Victorian Age knew

## Chemistry/ materials

- 1901: Frederick Kipping names “silicones” (Britain)
- 1908: Jacques Brandenberger invents cellophane (Switzerland)
- 1915: Jesse Littleton of Corning invents pyrex glass

*New Glass Biscuit and Cookie Dish*

**You Really Can't Get Along Without This Pyrex Biscuit Dish**

**PYREX**  
The Original Transparent Ovenware

**YOU** will never know how good your biscuits can be until you try baking them in this new Pyrex Biscuit Dish. Besides, you can't possibly have too many Pyrex dishes. Every new one you get means added ease to you, added zest to your food, and added cleanliness to your kitchen.

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**Pyrex Sales Division**  
CORNING GLASS WORKS, Corning, New York  
Originators and Patentees of Oven Glassware

*Buy another piece of Pyrex each week until you have your home.*

# What the Victorian Age knew

## Chemistry/ Germany

- 1870s: the German chemical industry pioneers the industrial research lab
- 1890: Germany's chemical industry focuses on synthetic products (including gasoline) based on coal
- 1900: the German chemical industry (BASF, Bayer, Hoechst) dominates the world market for synthetic dyes (90% of the world supply of dyestuffs in 1913)
- 1913: Fritz Haber's and Carl Bosch's process for the manufacture of ammonia
- 1925: the German chemical industry consolidated in IG-Farben, which remains the world's largest chemical company until World War II
- 1939: German scientists have won 15 of the 30 Nobel Prizes awarded in Chemistry

# What the Victorian Age knew

## Organic chemistry/ Agricultural revolution

- Guano from South America is the main fertilizer of the 1850s (it contains 30 times more nitrogen than manure)
- Then sodium nitrate from Chile (nitrate railway of 1871)
- Justus von Liebig's nitrogen-based fertilizers (19th c): plants feed on nitrogen and ammonia is a source of nitrogen (plants get their food from the atmosphere and one can add it directly to the soil to increase production)
- 1913: Fritz Haber's and Carl Bosch's process for the manufacture of ammonia (at BASF), kept secret until World War II

# What the Victorian Age knew

Organic chemistry/ Agricultural revolution

- IG-Farben is the world's largest chemical company until World War II
- After World War II: Ammonia replaces depleted nitrogen in the soil with nitrogen from the air
- Ammonia becomes the #1 fertilizer in the world
- Food production has no limit
- Ammonia drives population explosion

# What the Victorian Age knew

## Psychology

- Spencer, Herbert: "Principles of Psychology" (1855)
- Helmholtz, Hermann: "Handbuch der Physiologischen Optik" (1867)
- Brentano, Franz: PSYCHOLOGY FROM AN EMPIRICAL STANDPOINT (1874)
- Wundt, Wilhelm: "Principles of Physiological Psychology" (1874)
- Ebbinghaus, Hermann: "Memory" (1885)
- James, William: PRINCIPLES OF PSYCHOLOGY (1890)
- Dewey, John: "The Reflex Arc Concept in Psychology" (1896)
- Titchener, Edward: "Outline of Psychology." (1896)
- Freud, Sigmund: The Interpretation of Dreams (1900)
- Shaler, Nathaniel: "The Individual - A Study of Life and Death" (1901)

# What the Victorian Age knew

## Psychology

- Rank, Otto: "The Myth of the Birth of the Hero" (1909)
- Thorndike, Edward: ANIMAL INTELLIGENCE (1911)
- Adler, Alfred: "Individual Psychology" (1911)
- Jung, Carl: "Psychology of the Unconscious" (1912)
- Selz, Otto: "On the Laws of the Orderly Thought Process" (1913)

# What the Victorian Age knew

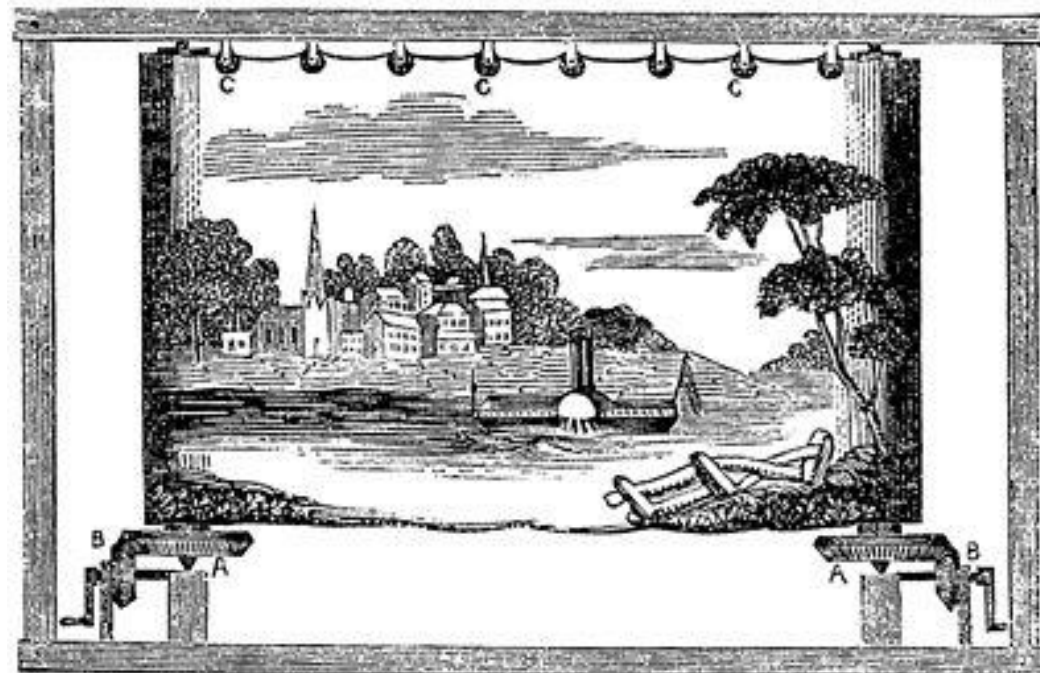
Private Life

Board games of the 1880s



# What the Victorian Age knew

Moving panoramas: before cinema and before virtual reality – see renaiart.ppt

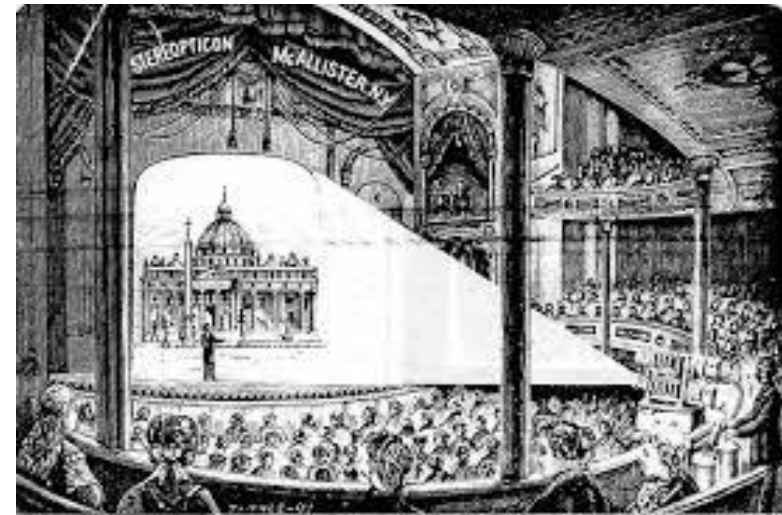


Banvard's panorama



# What the Victorian Age knew

- 1838: Charles Wheatstone invents the stereoscope (an (early form of three-dimensional photograph)
- 1851: David Brewster demonstrates his stereoscopes at the Great Exhibition of 1851
- 1850: Frederick Langenheim's stereopticon
- 1862: Oliver Holmes starts selling hand-held stereoscopes



# What the Victorian Age knew

- 1900: cineorama at the Paris World Exhibition (ten films projected simultaneously to form a 360 degree image)
- 1922: Laurens Hammond's televue for projecting stereoscopic films



# What the Victorian Age knew

- Modernity = the visual (camera obscura, panorama, photography, cinema...)

# What the Victorian Age knew

- Urbanization
  - 1800: 12% of Europeans live in towns
  - 1910: 41% of Europeans live in towns

# What the Victorian Age knew

- Gas
  - 1867: Paris is lit by 20,000 gas lamps
  - 1890: Liverpool introduces the slot meter, a meter that provides a fixed amount of gas when a coin is inserted
  - 1892: London installs the first slot meters
  - The consumption of gas by the working class increases rapidly after the invention of the slot meter
  - Gas-lighting enters the homes of ordinary people
- Water
  - 1870: London introduces high-pressure water supply to homes (water around the clock, on demand)

# What the Victorian Age knew

- Furniture
  - Michael Thonet (1796, Austria) : elegant, lightweight and comfortable furniture



# What the Victorian Age knew

## Beauty

- 1840: Guerlain introduces the first lipstick
- 1846: David Hough invents a hoop skirt supported by a dome-shaped crinoline
- 1852: The first public bathhouse opens in New York
- 1856: W.S. Thompson invents the steel-frame cage crinoline
- 1869: Steam molding enables stiffer corsets
- 1872: The bustle becomes more popular than the crinoline
- 1875: Charles Michel uses electrolysis for removal of facial hair
- 1875: The long-waisted corset is introduced
- 1888: Mum introduces the first deodorant
- 1889: Teresa Dean publishes "How to be Beautiful"
- 1890: Charles Gibson's illustrations of the "Gibson Girl" promote the S-shaped tall and slender woman as fashionable, and therefore the swan-bill corset

# What the Victorian Age knew

## Beauty

- 1892: The fashion magazine Vogue debuts
- 1892: Burroughs Wellcome introduces the first vanishing cream, "Hazeline Snow"
- 1894: Paul Unna discovers the relationship between sun exposure and skin aging,
- 1896: Colgate introduces toothpaste in tubes
- 1903: Helena Rubinstein begins selling her Valaze anti-aging cream
- 1907: Pond begins to sell a day beauty cream and a night beauty cream
- 1907: Australian swimmer Annette Kellerman is arrested on a Boston beach for wearing a one-piece swimsuit
- 1907: Eugene Schueller (founder of L'Oreal) invents the first synthetic hair dye
- 1909: Diaghilev's ballets in Paris popularizes mascara
- 1910: Paul Poiret introduces his girdle



# What the Victorian Age knew

## Beauty

- 1911: Oskar Troplowitz's Beiersdorf introduces the Nivea anti-aging cream, the first stable water-in-oil emulsifier
- 1912: Suzanne Noel performs the first "face-lift" cosmetic surgery
- 1912: Coco Chanel proclaims that women should dress for themselves and not only for men
- 1914: Mary Phelps-Jacobs files the first patent for a bra
- 1914: Cutex introduces liquid nail polish
- 1915: A portable lipstick container is marketed by Scovill
- 1915: Gillette introduces the Milady razor for women to remove underarm hair
- 1915: Elizabeth Arden introduces the Ardena Skin Tonic lotion and the Venetian Cream Amoretta beauty cream
- 1917: Maybelline mascara makes mascara affordable for everybody
- 1918: By the end of World War I the popularity of the corset has dramatically declined, replaced by the girdle

# What the Victorian Age knew

## Chocolate

- 1828: Coenraad van Houten (Holland) invents the cocoa press
- 1847: J. S. Fry' chocolate bar (England)
- 1866: John Cadbury's cocoa powder
- 1875: Daniel Peter's milk chocolate (Switzerland)
- 1879: Rodolphe Lindt's conching machine

# What the Victorian Age knew

- Transportation
  - 1830: The world's first commercial **railroad** opens (George Stephenson's Liverpool-Manchester)
  - 1840s: Boom of railways in Britain
  - 1857: Steamships take only 9 days to cross the Atlantic (1857)
  - 1866: Robert Whitehead invents the torpedo
  - 1869: The Union and Central Pacific railroads create the first transcontinental railroad (USA)
  - 1869: The Suez canal (impassable by sail boats) boosts sales of steamboats

# What the Victorian Age knew

- Transportation
  - 1876: Nikolaus Otto's four-cycle internal combustion engine
  - 1879: The first steel steamboat crosses the Atlantic
  - 1882: Britain invades Egypt and takes control of Suez
  - 1914: The USA inaugurates the Panama Canal

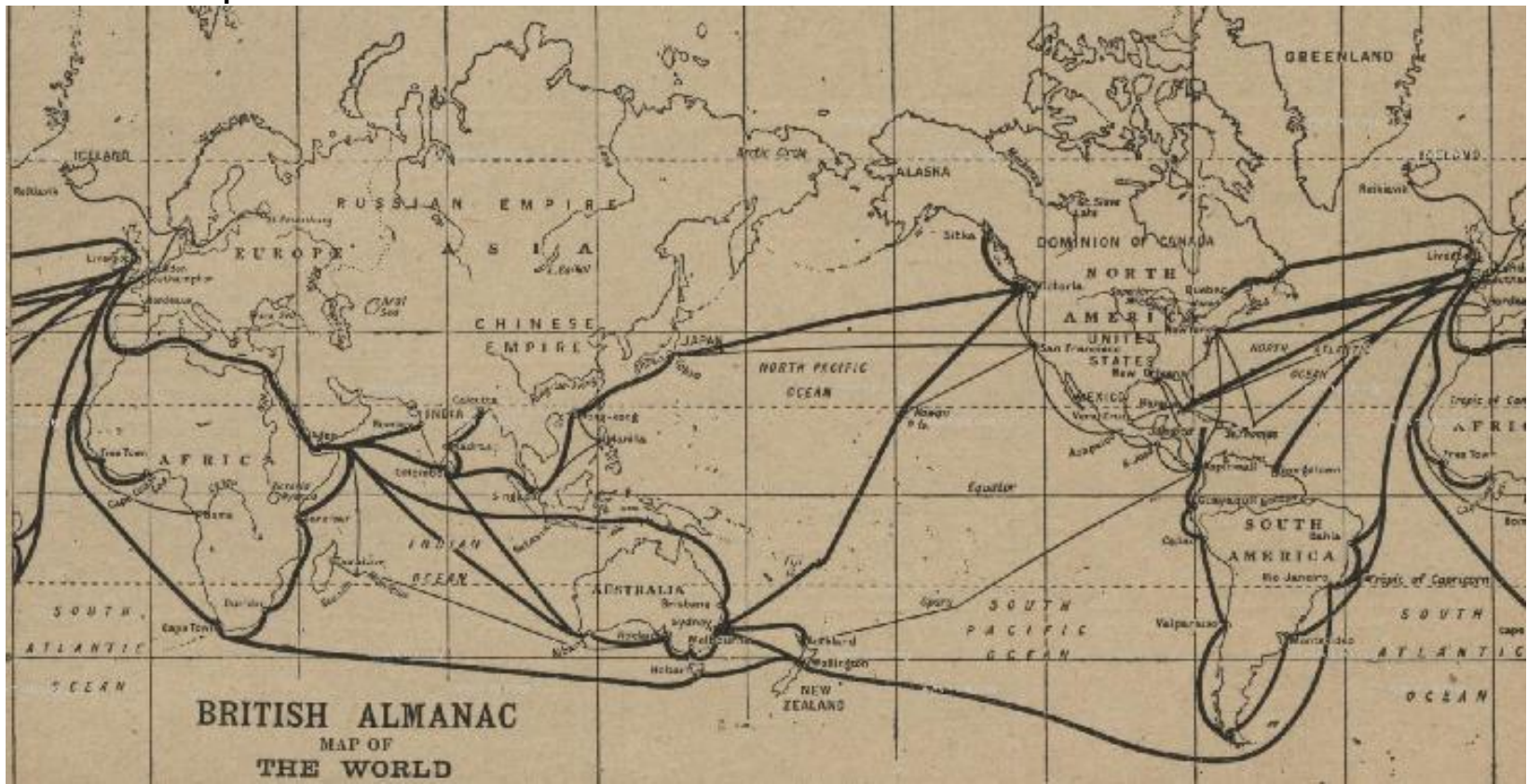
# What the Victorian Age knew

- Transportation



Transcontinental railway

Steamship routes



# What the Victorian Age knew

- Transportation
  - Steamship of 1915

**PACIFIC MAIL STEAMSHIP  
COMPANY**

THE SUNSHINE BELT TO THE ORIENT

Steamers Leave San Francisco Every Week for  
**HONOLULU - JAPAN - CHINA - PHILIPPINES**



PACIFIC MAIL S. S. "MONGOLIA"—ONE OF THE "BIG FOUR"

<b>MONGOLIA</b> 27,000 Tons	<i>Twin Screws</i>	<b>MANCHURIA</b> 27,000 Tons
<b>KOREA</b> 18,000 Tons	<i>Twin Screws</i>	<b>SIBERIA</b> 18,000 Tons

Also { **NILE, 11,000 Tons**  
**CHINA, 10,200 Tons**  
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THESE MAMMOTH VESSELS, the largest and steadiest on the Pacific, afford every luxury, convenience and safety known to modern ocean steamship travel. Electric lights in each berth. Electric fans in each stateroom. Filipino Band Concerts every afternoon and evening. Cuisine under direct supervision of the world famous caterer, Mr. V. Moroni. Each ship carries an experienced surgeon and stewardesses.

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In Every Direction at Very Low Rates

NEW FEATURE TOURS AND TRIP DEPARTMENT  
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**PACIFIC MAIL STEAMSHIP COMPANY**  
(PANAMA LINE)  
NEW DIRECT EXPRESS SERVICE TO PANAMA  
Fourteen Day Voyage from San Francisco,  
Semi-Monthly Sailings.

1915

# What the Victorian Age knew

- Transportation
  - Between 1830 and 1920 more than 60 million Europeans emigrate to the Americas
  - Emigrants help colonize the Americas
  - Emigrants reduce unemployment in Europe
  - The Suez Canal links Britain and India
  - Steamships and railroads allow Britain to unite the entire Indian subcontinent
  - Steamships allow Britain to link India and China (e.g. opium)
  - The British navy (steam + steel + torpedo) is virtually invincible

# What the Victorian Age knew

- Transportation
  - 1885: Gottlieb Daimler and Wilhelm Maybach invent the **motorcycle**
  - 1885: John Kemp Starley's bicycle
  - 1886: Karl Benz builds a gasoline-powered **car**
  - 1888: The Orient Express train connects Paris and Istanbul
  - 1888: John Dunlop's pneumatic tire
  - 1890: The first electrical **subway** (London)
  - 1892: Britain tonnage and seatriade exceeds the rest of the world together
  - 1900: Ferdinand von Zeppelin builds the first rigid dirigible
  - 1903: Wilbur and Orville Wright fly the first **airplane**
  - 1913: Henry Ford installs the first assembly line



# What the Victorian Age knew

- Transportation/ car
  - The car inherits technology invented for the bicycle (steel tubes, differential gearing, chain drive)
  - Initially a French-dominated industry (garage, chauffeur, chassis, automobile) because of a good network of “paved” roads and a poor railway network
  - Gasoline, electric and steam vehicles compete (the electric engine is silent, clean and it is smell-free; the steam engine has a lot of power and doesn’t require the transmission)
  - The car is a toy for wealthy sportsmen
  - Michigan is the center for carriage and wagon manufacturing thanks to its forests

# What the Victorian Age knew

- Transportation/ car
  - Gasoline-power cars win because of
    - Charles Kittering's electric starter (1912) that makes car easy to operate by women
    - Boom of oil
  - Consequences
    - The assembly line (soon applied to farm machinery too)
    - The rubber industry moves to Ohio
    - Gas stations
    - Repair shops
    - Highways (also boosted by WWI)

# What the Victorian Age knew

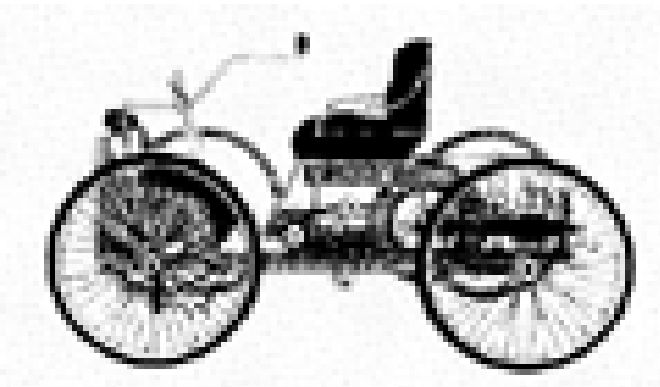
## Transportation



**Benz's car of 1886 (a carriage without horses)**



**The USA's first commercial automobile (Duryea, 1893)**



**Henry Ford's first automobile (1896)**

# What the Victorian age knew

- Transportation
  - The Railway
    - Conductors, drivers, engine fireman
    - Railway stations
    - Signalmen
    - Maintenance crews
    - Telegraph
    - Engineers

Coal locomotive of 1893 ("Engine 999" for the "Empire State Express") that reached 181 km/h  
(Museum of Science, Chicago)



# What the Victorian age knew

- Transportation
  - Railway companies are the first modern corporations
  - Railways stimulate the internationalization of financial markets
  - 1869: Transcontinental railroad in the USA
  - 1903: The Trans-Siberian railway from Moscow to Vladivostok



Horse streetcar of 1870  
(Museum of Science, Chicago)



Conestoga wagon  
(Museum of Science, Chicago)

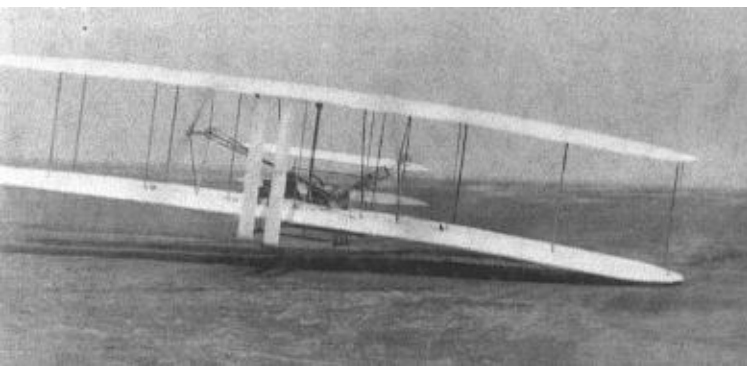


Stagecoach  
(Museum of Science, Chicago)

# What the Victorian age knew

- Transportation
  - The Airplane
    - 1903: Wilbur and Orville Wright fly the first airplane
    - 1909: Louis Bleriot crosses the English Channel in a monoplane
    - 1914: Robert Goddard invents the liquid-fuel rocket
    - 1915: German zeppelins bomb Britain (first air raid)
    - 1915-18: France builds 67987 planes, Britain 58144, Germany 48537, Italy 20000 and the USA 15,000

Wright brothers, 1903



Germany's Fokker combat aircraft (1918)



# What the Victorian age knew

- Transportation
  - The Aerospace Industry
    - 1909: The Wright Brothers found their own company in New York (but with a factory in Ohio)
    - 1909: Glenn Curtiss and Augustus Herring found in New York state the Herring-Curtiss Company (later Curtiss Aeroplane Company)
    - 1912: Glenn Martin founds Martin in the Los Angeles area
    - 1915: The USA establishes the National Advisory Committee on Aeronautics (NACA)



# What the Victorian age knew

- Transportation
  - The Aerospace Industry
    - 1916, the Wright Company merges with Glenn Martin's company to form the Wright-Martin Aircraft Corporation (later Wright Aeronautical)
    - During WWI most airplane engines are built by the car industry
    - 1918: The Curtiss Aeroplane Company has become the largest aircraft manufacturer in the world
    - 1929: Curtiss is absorbed into Curtiss-Wright

# What the Victorian Age knew

## Telegraph

- 1815: The Battle of New Orleans between the British and US army takes place 15 days after the war has ended because news of the peace treaty has not yet reached the USA
- 1830: John Henry uses a battery and an electromagnet to send an electrical signal over a long wire
- 1837: William Cooke and Charles Wheatstone demonstrate an electric telegraph
  - 5 needles write 20 letters of the alphabet
  - Transmission requires 6 wires
- 1838: Cooke and Wheatstone install the first commercial telegraph (for the Great Western Railway in London)

# What the Victorian Age knew

## Electric Telegraph

- 1844: Samuel Morse sends the first message in the USA
- 1846: First use in the US-Mexico war
- 1851: First undersea cable (Dover to Calais)
- 1852: First transnational telegram (Paris to Berlin)
- 1852: John Brett's underwater cable connects London and Paris
- 1854: Josiah Clark's pneumatic tube to send telegrams around London
- 1858: Charles Wheatstone's automatic telegraph (that doesn't require knowledge of the Morse code)
- British hegemony until WWI

# What the Victorian Age knew

## Telegraph

- 1861: Telegraph line between Washington and California
- 1864: Telegraph line to India (Britain)
- 1866: Cyrus Field's transatlantic telegraph cable
- 1868: Telegraph line from Malta to Egypt (Britain)
- 1869: Japan's first telegraph line (Tokyo-Yokohama)
- 1870: Telegraph line to Japan (Britain)
- 1871: Telegraph line to Australia (Britain)
- 1900: Telegraph line Germany-New York (Germany)
- 1902: British transpacific cable
- 1903: US transpacific cable from San Francisco to Manila via Honolulu

# What the Victorian Age knew

## Telegraph

- Second major revolution in information technology after the printing press
- The virtual movement of information replaces the physical movement of people
- Transportation and communication get decoupled
- Information travels faster than transportation
- Information becomes a commodity
- Unlike books, the telegraph doesn't tell a story and doesn't discuss a topic: it simply transmits information

# What the Victorian Age knew

## The news agency

- 1835 Agence France-Press (French empire, Mediterranean countries, Latin America)
- 1846: Five daily newspapers in New York City create the Associated Press to share the cost of transmitting news of the Mexican-American War by boat, horse express, and telegraph
- 1851 Reuters (British and Dutch empires)

# What the Victorian Age knew

- Mass Media
  - 1903: Alfred Harmsworth creates the first "tabloid" newspaper, the Daily Mirror, in London

# What the Victorian Age knew

- The invention of childhood
  - John Locke’s “Some Thoughts Concerning Education” (1693): a child’s mind is “tabula rasa”
  - Industrial revolution: children work in factories (instead of farms)
  - 1762: Jean-Jacques Rousseau’s “Emile” – children are closer than adults to the state of nature
  - 1763: Prussia introduces a compulsory system of education
  - 1774: Johann Pestalozzi opens a school for poor children, the Neuhof



# What the Victorian Age knew

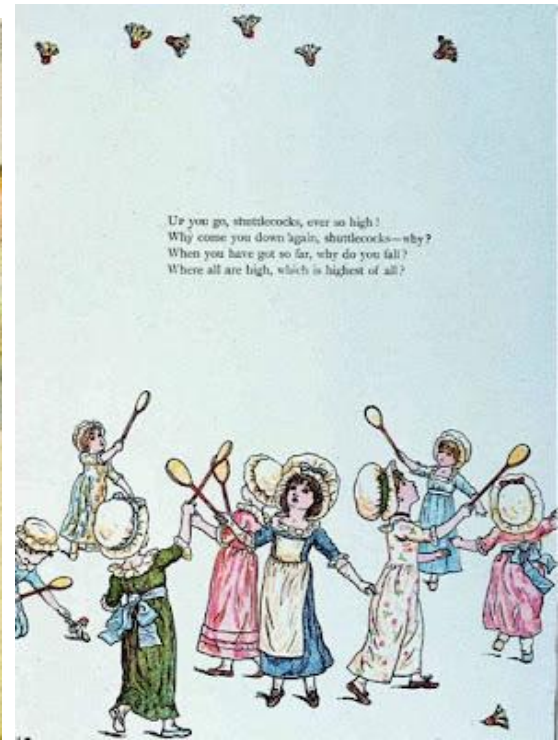
- The invention of childhood
  - 1779: Johann Oberlin and Louise Scheppler found a kindergarten in Strassbourg (France)
  - Automation and wealth reduce the need for child labor
  - Mid 19th century: kindergarten and orphanages spread in Germany and England
  - Infant Life Protection Act (Britain, 1872)
  - Second half of the 19th century: Mandatory education for children in USA, France, Britain

# What the Victorian Age knew

- The invention of childhood
  - Minimum working age of 16
  - 1904: Stanley Hall's book "Adolescence"

# What the Victorian Age knew

- The invention of childhood
  - Kate Greenaway (Britain): “Under the Window: Pictures & Rhymes for Children” (1879)



# What the Victorian Age knew

- The invention of childhood
  - Products target childhood

Even cigarettes:



# What the Victorian Age knew

## Speed

- Airplanes, trains, steamships and cars transport people faster than ever
- Telegraph, telephone and radio transmit messages faster than ever
- Electricity transmits power faster than ever

# What the Victorian Age knew

## Electronics

- Albert Michelson (1879): the speed of light in a vacuum is 299,792,458 meters per second
- Hendrik Lorentz (1892): the atom is not elementary but is made of smaller units that are electrical in nature (theory of the electron)
- Robert von Lieben (1906): creates the first triode amplifier by adding a third electrode to the diode (birth of electronics)
- Ernest Rutherford (1911): the atom is made of a nucleus and orbiting electrons (a mini-solar system)
- Robert Millikan (1913): the charge of the electron

# What the Victorian Age knew

## Electronics

- Mystery: why the electrons don't fall into the nucleus of the atom (as required by Maxwell's equations)?
- Mystery: why the "black body radiation" is not infinite?
- Mystery: why the speed of light is the same for all directions of motion?

# What the Victorian Age knew

## Appliances

1886: Josephine Cochrane invents the dishwasher

1893: The first electric kitchen is exhibited at the Chicago World Fair (1893)

1902: Willis Carrier invents the air conditioner

1907: The washing powder Persil

1908: Hurley Machine introduces the first washing machine



# What the Victorian Age knew

## Appliances

1911: General Electric introduces the first commercial refrigerator

1913: Fred Wolf builds an electric refrigerator for the home, the Domestic Electric Refrigerator or Domelre

1914: Nathaniel Wales founds Electro-Automatic Refrigerating Company (later Kelvinator) in Detroit to produce electric refrigerators for the home

1916: Alfred Mellows founds the Guardian Frigerator Company (later Frigidaire) in Indiana to produce the self-contained refrigerator

# What the Victorian Age knew

## Sport

1824: first sporting journal (Pierce Egan, London)

Hunting

Boxing

1896: the French philanthropist Pierre DeCoubertin  
revives the Olympic Games

1903: the first Tour de France of cycling

1930: the first World Cup of football is held in  
Uruguay

# What the Victorian Age knew

## Media

The music industry

1877 Edison invents the phonograph (that plays cylinders)

1887 Emile Berliner invents the gramophone (that plays records)

1889 Columbia (USA)

1892 Tin Pan Alley and the boom of popular music

1894 Billboard magazine

1898 Deutsche Gramophon (Germany)

1898 The Gramophone Company (Britain)

1901 Emile Berliner's Victor (USA)

1904: A recording of Enrico Caruso is the first record to sell a million copies

1927: 104 million records are sold in one year in the USA

Before the phonograph, songs spread via itinerant singing troupes and sheet s of music

# What the Victorian Age knew

## Media

Thomas Edison and his phonograph (1877, Bettmann archive)



Thomas Edison holding a record (cylinder)



# What the Victorian Age knew

## Media

1861: Johann Reis invents the telephone

1876: Alexander Bell demonstrates his telephone

1877: Thomas Edison invents the phonograph

1890: Telephone line Paris-London

1888: the first consumer camera is introduced by Kodak

1892: popular music becomes big business

1895: the Lumiere brothers invent cinema

1898: Valdemar Poulsen demonstrates magnetic recording



# What the Victorian Age knew


## Media/ Victrola

**Victor Exclusive Talent**


The best friends you can have—who cheer you with their music and song, who unfold to you all the beauties of the compositions of the great masters, who through their superb art touch your very heart strings and become to you a well-spring of inspiration.

Patented subject from the Chicago Tribune column of John T. McCutcheon

Copyright by Victor Talking Machine Co., Camden, N. J.



**Victor-Victrola**



# The Voice of the Victor



The Trade Journal of the Victor Talking Machine Co., Camden, N. J.  
Vol. VIII FEBRUARY, 1913 No. 2



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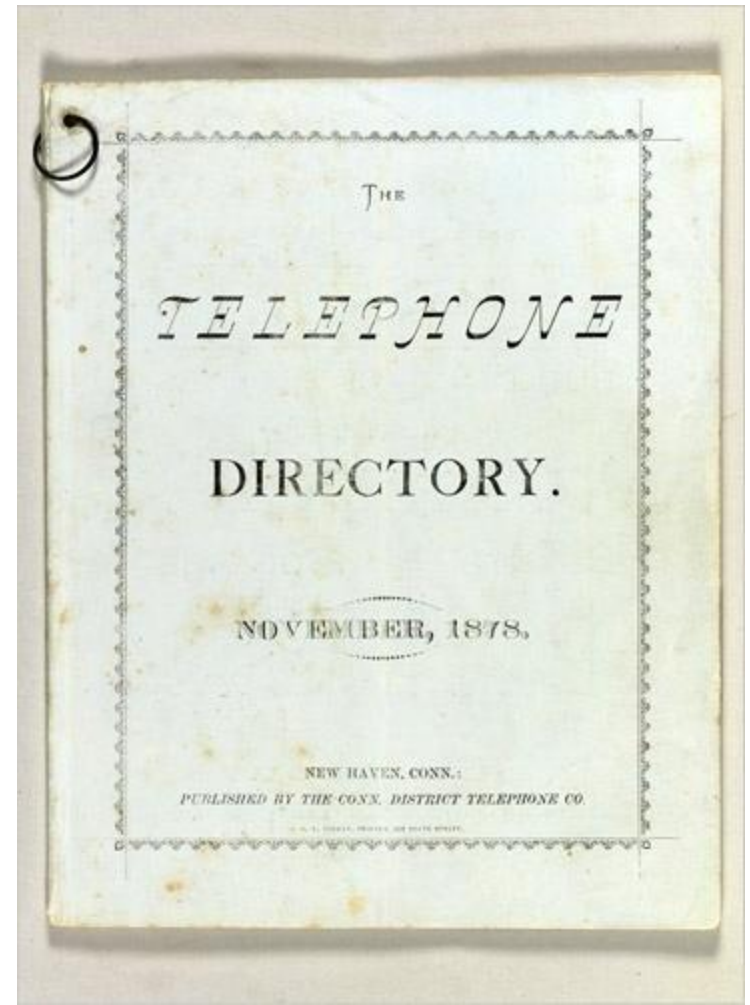
Caruso, Scotti and the Victrola (See page 17)

# What the Victorian Age knew

- Telephone



Bell on the phone



The first telephone directory (1878)

# What the Victorian Age knew

- Telephone
  - Until 1956 transatlantic telephone service is radio-based
  - 1956: Britain's TAT-1 (Transatlantic No. 1) the first transatlantic telephone cable (between Scotland and Canada's Newfoundland)



# What the Victorian Age knew

## The Radio

1895: Guglielmo Marconi invents a device to broadcast radio signals at long distances

1900: Reginald Fessenden makes the first amplitude modulation (AM) transmission

1901: Guglielmo Marconi conducts the first transatlantic radio transmission

Unlike the telegraph, no need for a code: radio can transmit voice

Unlike the telegraph (that requires a station and knowledge of the Morse code), the radio can be owned and used by anybody to receive and send messages



# What the Victorian Age knew

## Media

1904: John Ambrose Fleming's two-electrode vacuum tube

1906: Reginald Fessenden makes the first two-way radiotelegraphic communication across the Atlantic Ocean

1907: Lee DeForest's triode vacuum tube

The vacuum tube enables long-distance phone lines and radio transmissions

Specialized magazines and clubs create a geographically-dispersed community

# What the Victorian Age knew

## Media

1916: David Sarnoff envisions the radio receiver as alternative to home phonograph

Phonograph makers adopt amplifier, microphone and loudspeaker technology developed for the radio leading to the all-electric phonograph

Radio causes a massive crisis in record industry

# What the Victorian Age knew

## Sound recording

- 1877 Edison's phonograph was meant as a telegraph that transmitted voice recordings rather than coded messages
- Meant for the office, not the home
- The phonograph transmitted sound by purely mechanical operation (no electricity)
- 1886: Alexander Bell's wax cylinder
- 1889 Louis Glass invents the coin-operated phonograph for penny arcades where people can listen to prerecorded Edison cylinders
- Unreliable recordings: the cylinders degrade after just a couple of listening experiences, and hand cranking can never be smooth causing distortions

# What the Victorian Age knew

## Sound recording

- 1890 Columbia sells Edison's cylinders and phonographs
- 1887 Emile Berliner 's gramophone uses a flat disk, more expensive to manufacture
- Meant for mass production of prerecorded music
- 1896 Edison founds National Phonograph
- 1895 Records made of shellac (cheaper than rubber)
- 1901 Eldridge Johnson founds Victor Talking Machines

# What the Victorian Age knew

## Sound recording

- Shift from active sound recording towards passive music listening
- The opposite of the camera: the camera is used to MAKE pictures, the record is made to LISTEN to sound
- Many people make photographs and many view them
- Few people make records and many more listen to them.
- The photograph is normally a personal object
- The record is a mass-market object
- The record creates celebrities that are known by millions of people

# What the Victorian Age knew

## Sound recording

- The camera ends up being mainly a tool to remember the past while the record becomes a way to be part of the present (what is made on records is mainly what is fashionable today, the novelty)
- The short duration of records (two minutes) favors music that can be enjoyed in two minutes

# What the Victorian Age knew

## Sound recording

- National (New Jersey), Columbia (Connecticut) and Victor (New Jersey) create vertically integrated supply chains
- Edison philosophy: the real product is the phonograph (the hardware), not the music that it plays
- Victor philosophy: the real product is the music (the software)
- Victor has two lines: classical music (red seal) and Tin Pan Alley music (black seal)



# What the Victorian Age knew

## Sound recording

- 1904: Caruso has sold one million records
- 1906: Victor's Victrola, a piece of furniture that fits in the Victorian drawing room
- 1911: Victor IV a cheap phonograph that the middle class can easily afford (no profit for Victor but a way to make the middle class buy Victor records)
- Recorded music separates the music from the ritual of performing music (church, concert hall, cafe', saloon, nightclub, drawing room...)
- Listening to music is no longer synonym with social gathering

# What the Victorian Age knew

## Sound recording

- Music is heard, but the performers are not seen
- In the past only the blind could hear music without seeing the performers: now everybody is blind
- Recorded music is disembodied
- Music before the records was performed at specific times in specific places
- Recorded music is music that can be played at any time in any place
- Recorded music is music that is liberated from traditional settings
- Recorded music is decontextualized
- Recorded music increases the importance and impact<sup>138</sup> of the celebrity, decreases the role of the community

# What the Victorian Age knew

## Sound recording

- Phonograph makers adopt amplifier, microphone and loudspeaker technology developed for the radio leading to Victor's all-electric phonograph of 1928
- Radio causes a massive crisis in the record industry
- 1929 Victor sold to RCA

# What the Victorian Age knew

## Photography

1824: Nicéphore Niépce invents photography

1839: Louis Daguerre invents the daguerreotype

1841: William Talbot's calotype, the first negative-positive process

Daguerre thinks that photography is only for buildings and nature, things that don't move (exposures take 3 to 5 minutes)

1846 Louis-Nicolas Ménard and Florès Domonte invent collodion

1854: Frederick Archer's collodion process, which reduces exposure time, and produces a negative that can be reproduced many times

# What the Victorian Age knew

## Photography

1860: Jean-Marie Taupenot's practical collodion dry plates

1861: Carleton Watkins' mammoth-plate camera (18×22 inch glass plates) to make panoramic pictures of Yosemite

1869: Louis Ducos makes the first color photograph

1871 Richard Maddox's gelatin emulsion further reduces time of exposure

One can take photos of people instead of just buildings

The camera becomes a vehicle for nostalgia

# What the Victorian Age knew

## Photography

1873 Eadweard Muybridge (hired by Leland Stanford) deploys multiple cameras to photograph the motion of a horse



# What the Victorian Age knew

## Photography

1883 George Eastman mass-produces photosensitive glass and sets up facilities to print photos for photographers (Rochester, NY)

1887 Hannibal Goodwin, a pastor, invents the celluloid film roll

1888: Eastman's Kodak camera (\$25), which takes 100 pictures on a preloaded celluloid film (the photographer then sends the camera to Eastman to develop photos and recharge the camera with a new film)

1889: George Eastman's practical celluloid film in roll form goes on sale

1895 \$5 Pocket Kodak

1898 Kodak Brownie for children \$1



# What the Victorian Age knew

## Photography

The Kodak revolution: mass consumption by amateur photographers

1929: Edwin Land (later founder of Polaroid) develops a light-polarizing technology

1935: Mannes and Godowsky invent the process later marketed by Kodak as Kodachrome

1936: Agfa introduces Agfacolor films



# What the Victorian Age knew

## Photography

- Photography democratizes portraits, that used to be the privilege of rich families
- Anyone can have a portrait taken by a photographer
- "The humblest servant girl may now possess a picture of herself such as the wealth of kings could not purchase 50 years ago" (Frederick Douglass)
- But the person must be standing still for a long time

# What the Victorian Age knew

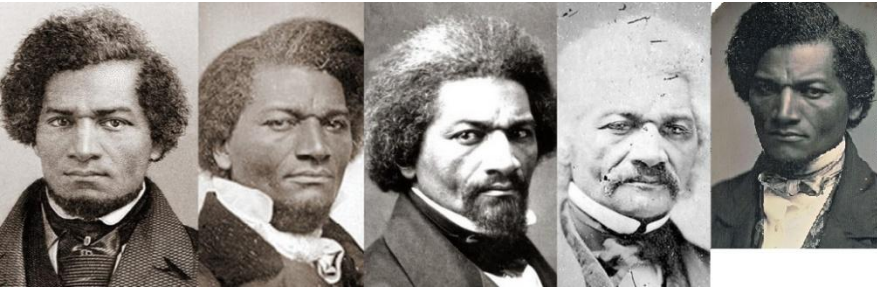
## Photography

- Black abolitionist activist Frederick Douglass is one of the most photographed people because he believes in the power of photography to dispel caricatural and stereotypical representations of black people
- Douglass gives four talks about the subject: "Lecture on Pictures", "Life Pictures", "Age of Pictures", and "Pictures and Progress"
- Photography is objective

Trivia: taking pictures of black people was challenging until the 1970s because the chemical process was designed to capture white faces and left black faces underexposed (ie de facto extended the old demeaning caricatures in another medium)

# What the Victorian Age knew

## Photography



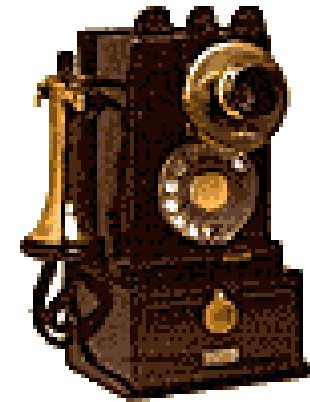
Jubilee singers at Fisk University, in Nashville, Tennessee, 1871

# What the Victorian Age knew

## Media



Queen Victoria (1854)  
Photograph by Roger Fenton



Public telephone, 1909



In 1908 people in the USA mailed 677,777,798 postcards out of a population of 148 88,700,000 (the postcard had been invented only in 1900)

# What the Victorian Age knew

Photography: first photographed wars

Crimean War (1853 – 56)

“American” Civil War (1861 – 65)

Timothy O’Sullivan: A Harvest of Death, Gettysburg



Roger Fenton: Crimean war



# What the Victorian Age knew

Photography:

Gaspard-Félix Tournachon "Nadar"  
(1820, France)

1855: photographic studio in Paris

1858: the aerial photographer (on  
a balloon)

1870 (during the German Siege of  
Paris): the world's first air-mail  
service

1874: the first exhibition of the  
Impressionists takes place at his  
studio



# What the Victorian Age knew

Photography:

Félix Nadar (1820, France)



Claude Debussy



Charles Baudelaire



Hector Berlioz



Sarah Bernhardt



Peter Kropotkin



Franz Liszt



Mikhail Bakunin



Jules Verne



Zola



Mallarmé



Manet



Monet



Rodin

# What the Victorian Age knew

## Telephone



First commercial telephone, 1877  
(Bell installs the world's first  
commercial telephone service)





# What the Victorian Age knew

## Media



(Stanford Archive of Recordings)



# What the Victorian Age knew

## Media

### Grammophone:

- The appearance reveals the workings
- The design reveals the engineering
  - A round piece of vinyl encodes the sound
  - A handle makes the platter turn
  - A needle picks up undulations in the grooves
  - A horn amplifies the sound



### Camera:

- The design hides the engineering
- *“You press the button, We do the rest”*



# What the Victorian Age knew

## The radio

- Initially used just to bring people together (one to one communication)
- Radio creates a virtual community that is geographically distributed
- Radio becomes family entertainment
- Also a worldwide community of ham-radio hobbyists (600,000 in the USA in 1922)
- Later used for one-to-many communications (e.g., news)
- Later used for control and propaganda
- The same evolutionary path of writing: from the personal sphere to the public sphere

# What the Victorian Age knew

## The radio

- Theodor Adorno criticizes the “atomized” listening of the radio listener
- Radio Physiognomics: democratizing media like the radio produce passive, obedient, mindless citizens
- Marx’s opiate of the masses is not religion but popular culture
- "On Jazz" (1936), "On Popular Music" (1941) vs "serious music"
- The standardization of the cultural product leads to the standardization of the audience.

# What the Victorian Age knew

- Radio



First commercial radio, 1920



# What the Victorian Age knew

## The Illusion of Motion

- John Paris ' Thaumatrope (London, 1825)
- Joseph Plateau's Phenakitoscope (Belgium, 1832)
- William Horner 's Zoetrope (England, 1834)
- Eadweard Muybridge's rotating disc of pictures that creates the illusion of motion (1880)



# What the Victorian Age knew

## The Illusion of Motion

- 1880s: Search for a chemical process fast enough to take pictures in rapid sequence
- Gelatin-based photosensitive film reduces exposure time to seconds
- Celluloid roll of infinite length
- 1890: Etienne-Jules Marey's roll film projector
- 1894 Edison's kinetograph - continuous motion of an electric motor, marketed to arcades to make kinetoscope parlors



Edison Home Kinetoscope  
22mm, hand cranked, 1912  
the first home movie projector

# What the Victorian Age knew

## The Illusion of Motion/ Cinema

- 1895: Luois and Auguste Lumiere - first motion picture projector for popular amusement
- Films are shorter than 10 minutes and mostly shown in vaudevilles
- Films target the working-class
- Films are about showing the spectacular (exotic, grotesque), not about telling a story, except for famous stories like war battles or bios of famous people
- Films are influenced by the sunday comic strips



# What the Victorian Age knew

## The Illusion of Motion

- Nickelodeons
- Entertainment that used to be seasonal (depending on the tournees of circuses and singers and comedians and magicians) become a daily experience

# What the Victorian Age knew

## The Illusion of Motion/ Cinema

- Nickelodeons
- Entertainment that used to be seasonal (depending on the tournees of circuses and singers and comedians and magicians) become a daily experience

# What the Victorian Age knew

## The Illusion of Motion/ Cinema

- 1907 Decline of Edison and rise of Hollywood independents
- 1908 Edison and Biograph form the MPPC
- 1912 Carl Laemmle forms Universal
- 1914 Adolph Zukor forms Paramount
- 1915 William Fox forms Fox
- 1916 The court condemns the MPPC and Hollywood benefits
- 1923 Three brothers form Warner Brothers

# What the Victorian Age knew

## The Illusion of Motion/ Cinema

- Films get longer and nickelodeons get bigger: need for narrative films with complex plots
- Influence of theatrical melodrama and pulp fiction
- New target: the middle class
- 1910 Carl Laemmle launches the first Hollywood star, Florence Lawrence

# What the Victorian Age knew

## The Illusion of Motion/ Cinema

- 1912 Zuckor shows the four-reeler "Queen Elizabeth" from France featuring a star, Sarah Bernhardt
- 1913 Italian film Quo Vadis is a blockbuster in the USA (45 minutes in the USA, 3 hours in Italy)
- 1915 Griffith's Birth of a Nation, three hours and 15 minutes

# What the Victorian Age knew

- Victorian revolutions

- 1829: The Age of the Railway is born with the "Rocket" steam engine for the Liverpool-Manchester railway
- 1838: The Age of Image is born when Louis Daguerre take a picture of the Boulevard du Temple from a window of the Diorama
- 1859: The Age of Oil is born when Drake strikes oil in Pennsylvania
- 1866: The Age of Electricity is born with Werner von Siemens' dynamo
- 1875: The Age of Steel is born with the opening of the Carnegie Bessemer steel plant in Pittsburgh
- 1877: the Age of Sound is born with Thomas Edison's phonograph
- 1901: The age of Radio is born when Marconi sends a message from Canada to England across the Atlantic Ocean
- 1908: The Age of Mass Production begins with the production of the first Ford Model-T in Detroit

# What the Victorian Age knew

- The Amusement Park
  - The ancient festival coincides with trade fair and has a multitude of attractions
  - Carnival
  - 1661 Pleasure garden at Vauxhall
  - 1843 Tivoli Gardens in Copenhagen
  - 1866 Prater Park in Vienna
  - 1851 World's Fair at London's Crystal Palace to display scientific and technological progress
  - The World's Fair is a “festival” to welcome the new

# What the Victorian Age knew

## The Rollercoaster

- 1846 Frascati Gardens in Paris
- 1872 Switzerland of America in Mauch Chunk
- 1884 LaMarcus Thompson's switchback rollercoaster
- 1895 Flip Flap at Coney Island
- 1902 Racer at Cedar Point



# What the Victorian Age knew

- The Amusement Park
  - 1895 Sea Lion Park at Coney Island (New York)
  - 1897 Steeplechase Park at Coney Island
  - 1903 Frederic Thompson's Luna Park at Coney Island with electric lighting and "Trip to the Moon"
  - 1904 four million visitors at the Luna Park of Coney Island in New York
  - The Amusement park is a multisensorial experience
  - Technologically sophisticated outdoor mass-entertainment center for all social classes, a communal experience (no first class tickets!)
  - Revolt against high-brow culture
  - 1896 Blackpool in Britain

# What the Victorian Age knew

- The Amusement Park
  - Coney Island
    - Large-scale outdoor reenactments of historical events (floods, battles)
    - Fire spectacles with hundreds of performers simulating firefighters and a building on fire: "Fire and Flames" at Luna Park (heroic figure of the fireman who risks his life to save the way of life of ordinary families)

# What the Victorian Age knew

- Entertainment creates new public spaces
  - The music hall
  - The cinema
  - The amusement park: Tivoli Garden in Copenhagen (1843), Coney Island in New York, Blackpool
  - The stadium
  - The velodrome
  - The dance hall

# What the Victorian Age knew

- Consumerism
  - 1815: After Napoleon's defeat, Britain creates a large free-trade zone extending over all continents.
  - Britain has a very large middle class
  - High wages encouraged consumerism
  - High wages encouraged automation
  - And automation enabled mass production to satisfy mass consumption
  - The first consumeristic empire

# What the Victorian Age knew

- Consumerism
  - Transition from "collecting" to "consuming": the aristocracy used to collect (especially ancient and exotic items), the middle class consumes (especially novelties)
  - 1846: Britain repeals the Corn Laws that protect its agriculture from imports and becomes a free-trade country
  - The steamship and the railroad make it easier and cheaper to import goods from distant regions
  - Slavery makes it cheap to mass produce crop
  - Late 19th century: prices plummet for wheat, sugar, clothes, etc

# What the Victorian Age knew

- Department Store
  - Harrods in London (1849),
  - Le Bon Marche' in Paris (1852), Marshall Field's in Chicago (1852)

Bon Marche'



# What the Victorian Age knew

- Department Store
  - The department store pioneers new technologies: electric lighting, elevator, escalator, conveyer belt, mail-order catalog
  - The department store is a museum of objects
  - Street vendors are forced into market halls
  - Shopping creates new public spaces

Bon Marche'



# What the Victorian Age knew

- Thanks to trains, cars and airplanes, the individual can quickly travel anywhere
- Thanks to the radio and the telephone, the individual can simultaneously be anywhere



# What the Victorian Age knew

## Office

1868: Christopher Latham Sholes invents the first practical typewriter

1879: James Ritty invents the cash register

1881: David Gestetner invents the stencil duplicator, the first office machine to duplicate documents

1885: William Burroughs develops an adding machine

1890: Herman Hollerith builds an electrical tabulating device (Hollerith's company acquired by IBM in 1911)



Burroughs' calculator (1897)  
(Museum of Science, London)

# What the Victorian Age knew

Office

The Chinese typewriter (1916)



A typewriter with no keyboard

# What the Victorian Age knew

International standards

1874 Universal Postal Union

1875 International Commission for Weight and Measures adopts the metric system

1879 International Regulation of Sea Routes

1881 International Electricity Show (to decide the universal units of measurement for electrical quantities like voltage)

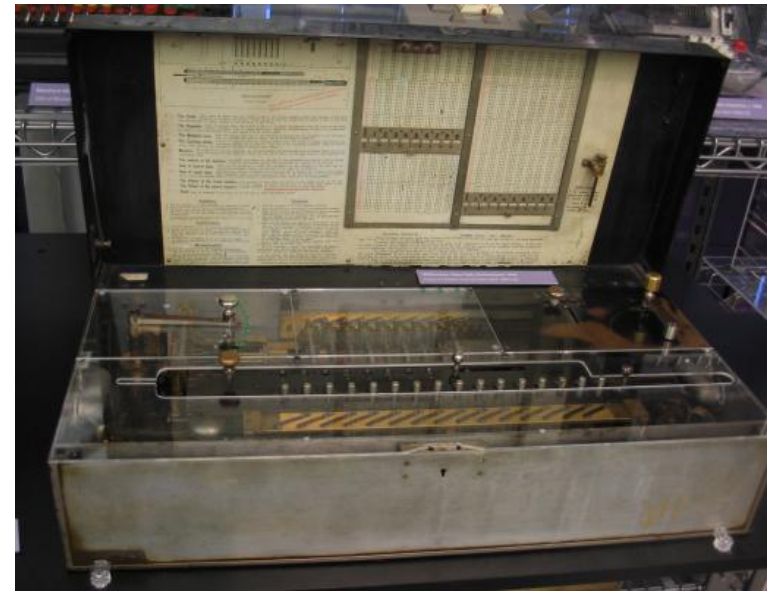
1884 International time zones

1890 International Rail Transport

# What the Victorian Age knew



Herman Hollerith's Census Machine (1899)  
(Computer History Museum, Mountain View)



Hans Egli's Millionaire Calculator (1899) <sup>180</sup>  
(Computer History Museum, Mountain View)

# What the Victorian Age knew

## Coin-operated machines



Mills Novelty of Chicago:  
Whiffs of Fragrance (1916)



Automatic Clerk  
(New Haven, 1901)

# What the Victorian Age knew

Coin-operated machines



Western Weighing (Cincinnati, 1894): Improved Nickel Tickler

Pulver (Rochester, 1903): Too Choos



Caille Bros (Detroit, 1905)



# What the Victorian Age knew

## Coin-operated machines



Caille Bros: Log Cabin (1902)



Jackson Vending  
(Chicago, 1906):  
Safety matches



Midland (Chicago,  
1899): Electricity is  
Life

# What the Victorian Age knew

## Coin-operated machines



Watling (Chicago, 1902):  
Brownie

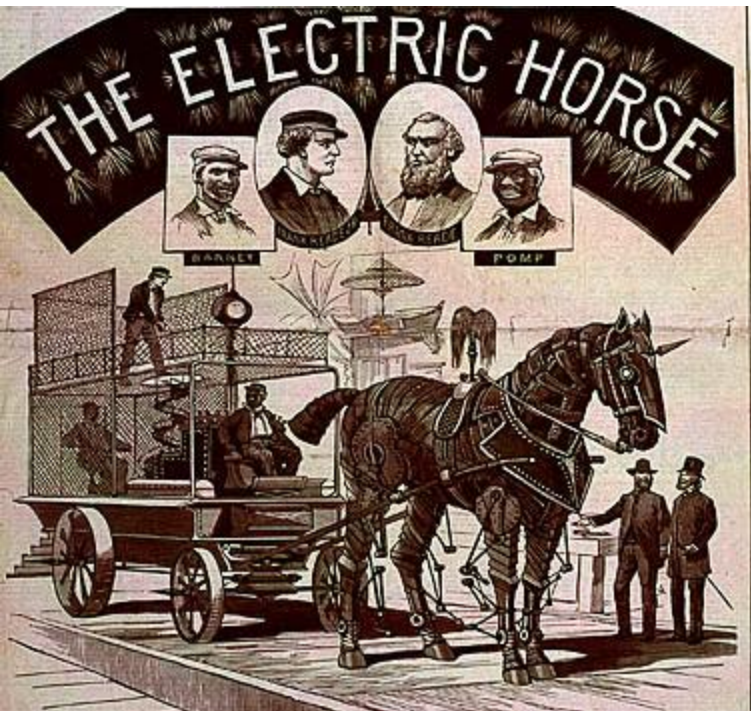


# What the Victorian Age knew

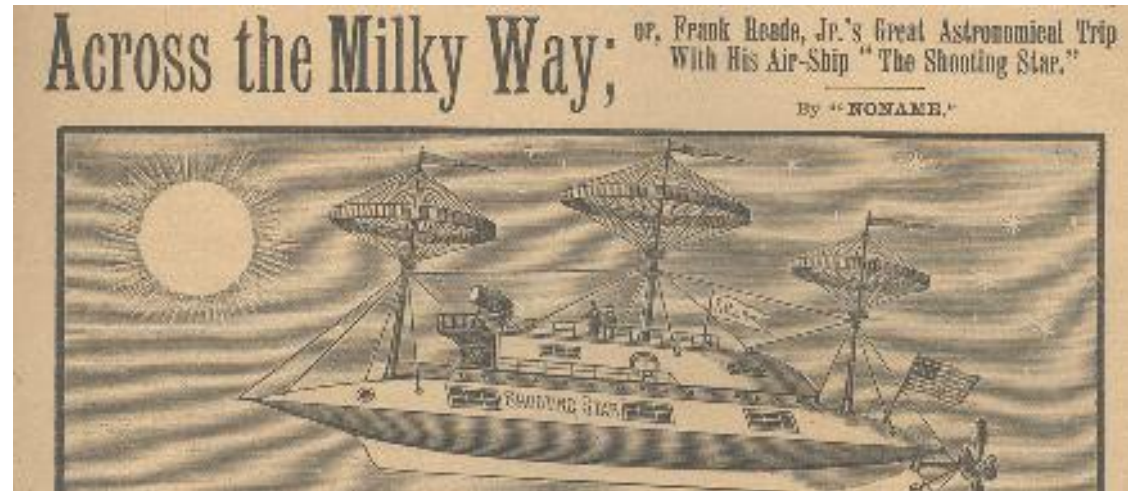
- The Invention
  - Invention of the concept of invention and of the figure of the inventor

# What the Victorian Age knew

- The Press
  - Luis Senarens' imaginary inventions of imaginary inventor Frank Reade



(1887)



(1892)

# What the Victorian Age knew

- Sensationalist pulp
  - The penny dreadfuls
  - Serialized novels about psychokillers ("The Man Eater of Scotland" about Sawney Beane, 1825;
  - "The String of Pearls" about Sweeney Todd, 1846)
  - Marie Tussard's was museum (1833)
  - Weekly tabloids specializing in murders and executions (Illustrated Police News, 1864)
  - Public executions are a popular attraction for both the aristocracy and the masses

# What the Victorian Age knew

## Consumerism

1872: First mail order catalog (Aaron Montgomery Ward)

1886: Kodak camera

1888: Chewing gum

1892: Coca Cola

1893: First shopping center (Cleveland)

1897: First movies to advertise products

1901: King Camp Gillette invents the razor

1917: 40% of American households have a telephone

1920: eight million Americans own a car

# What the Victorian Age knew

## Customs

Gentleman/lady not by birth but by good manners

The dandy (modeled after Bryan “Beau” Brummell of the 1800s)

# What the Victorian Age knew

## Spiritualism

Pioneers: Emanuel Swedenborg, Franz Mesmer

1847: Andrew Jackson Davis' "The Principles of Nature" (clairvoyance and communication with the dead)

1848: Kate and Margaret Fox in New York state  
Spiritualism becomes popular among Quakers and socialists

Charles Elliott's "Mysteries" (1852) and Catherine Crowe's "The Night Side of Nature" (1853)

Allan Kardec's "The Life of The Spirits" (1857) and "The Book of Mediums" (1861)

# What the Victorian Age knew

## Spiritualism

1873: Adelpa Vay's Hungarian Spiritualist Association

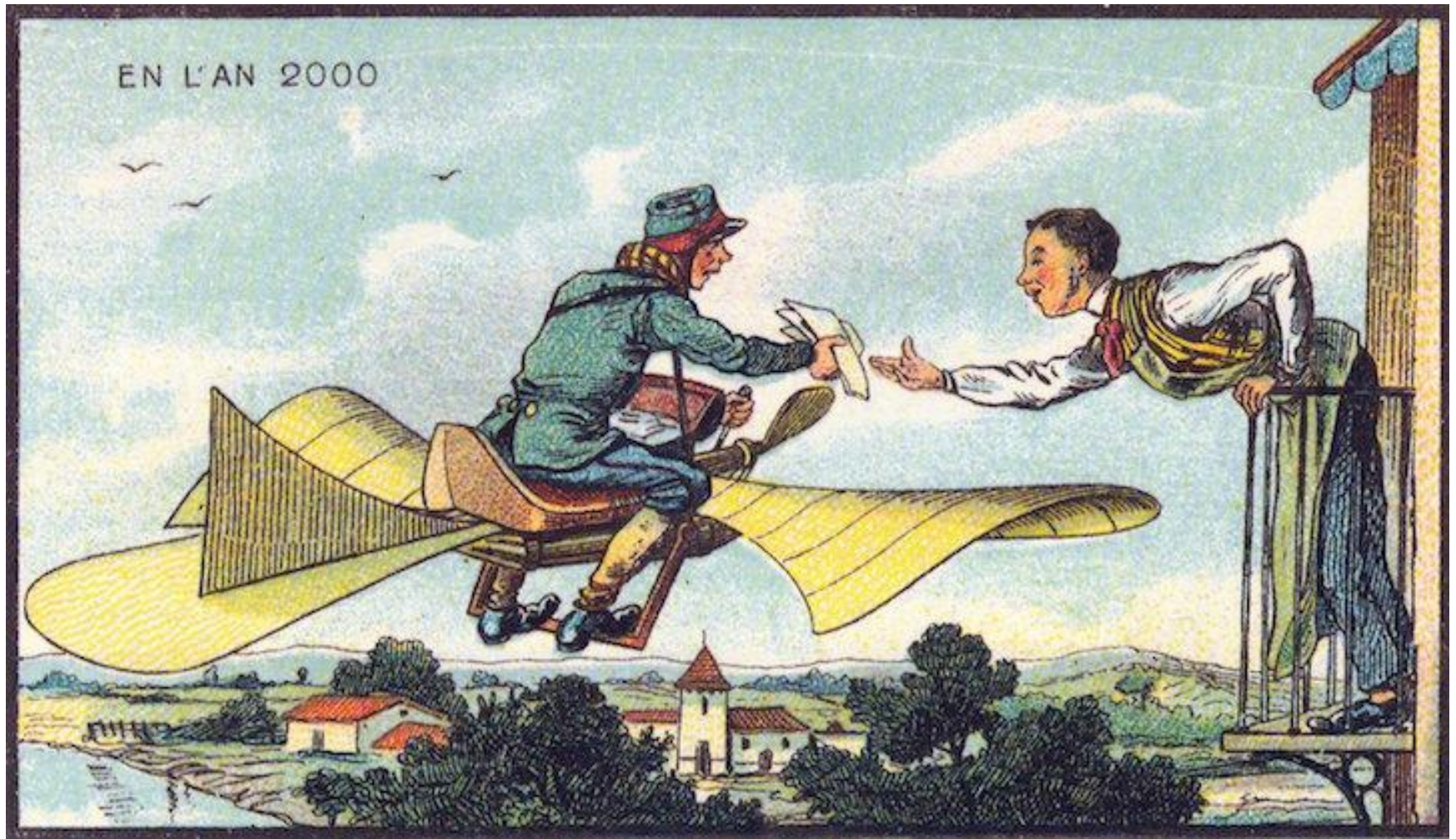
Italian medium Eusapia Palladino famous all over Europe (even in Russia)

Emma Hardinge Britten chronicles the movement in "Nineteenth Century Miracles" (1884)

1882: Society for Psychical Research (SPR) founded in 1882 in London by a group of intellectuals including psychologist Edmund Gurney, poet Frederic Myers (the one who coined the term 'telepathy'), philosopher Henry Sidgwick and physicist William Fletcher Barrett, to study: thought-transference, mesmerism, mediumship, Reichenbach phenomena, ghosts, seances

# What the Victorian Age knew

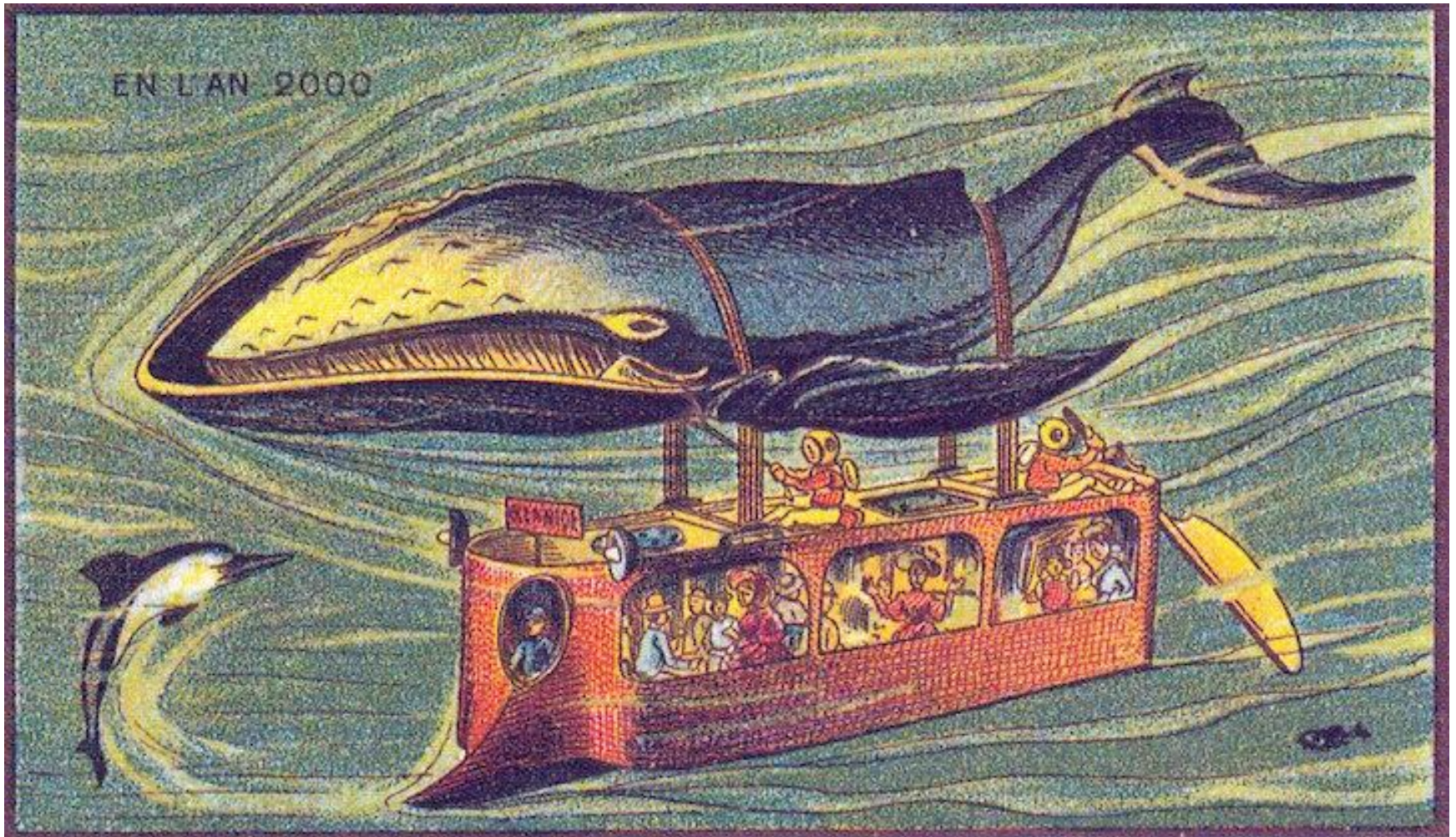
Jean-Marc Côté paints how the world will be in the year 2000 (1900-10)





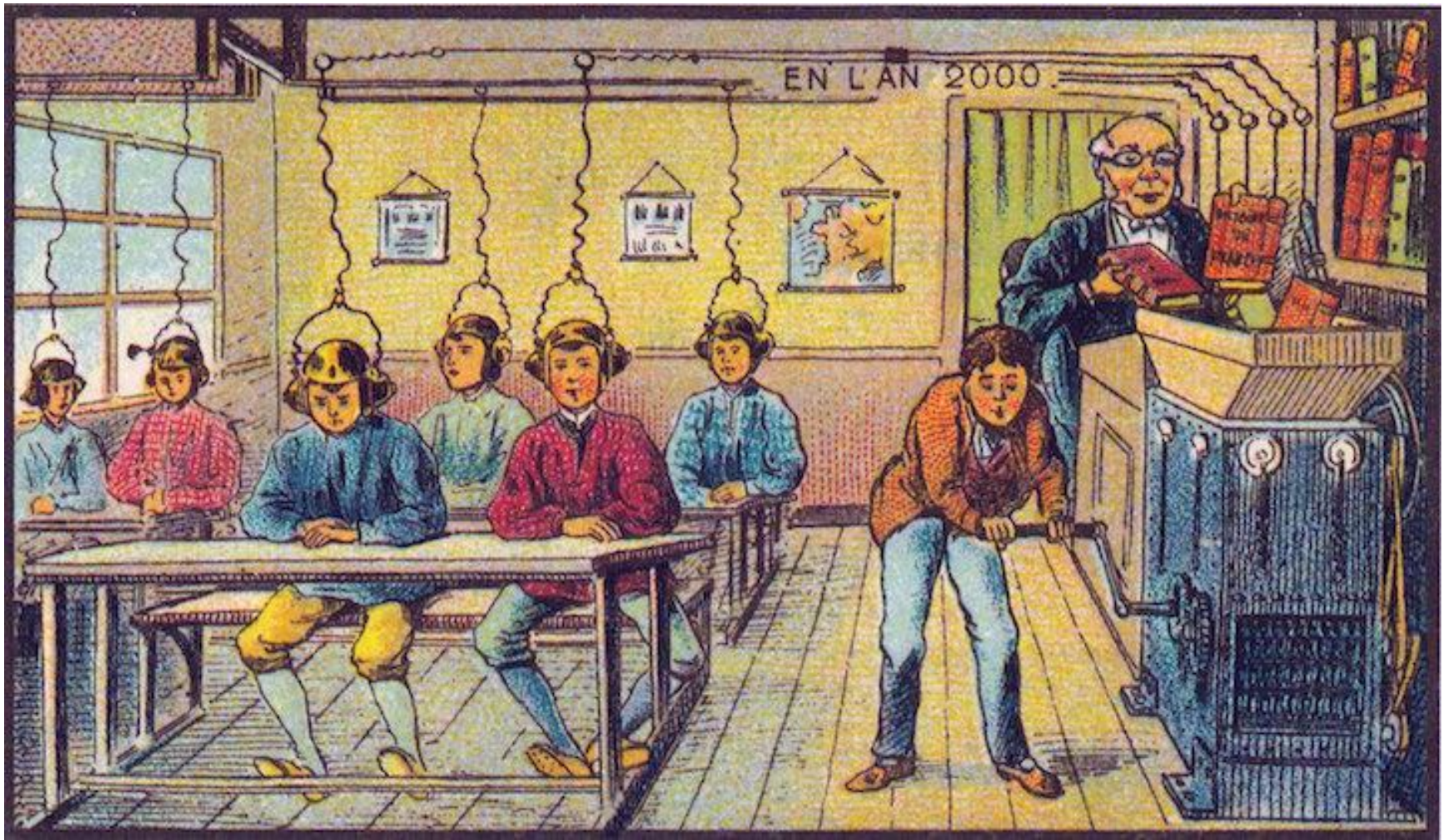
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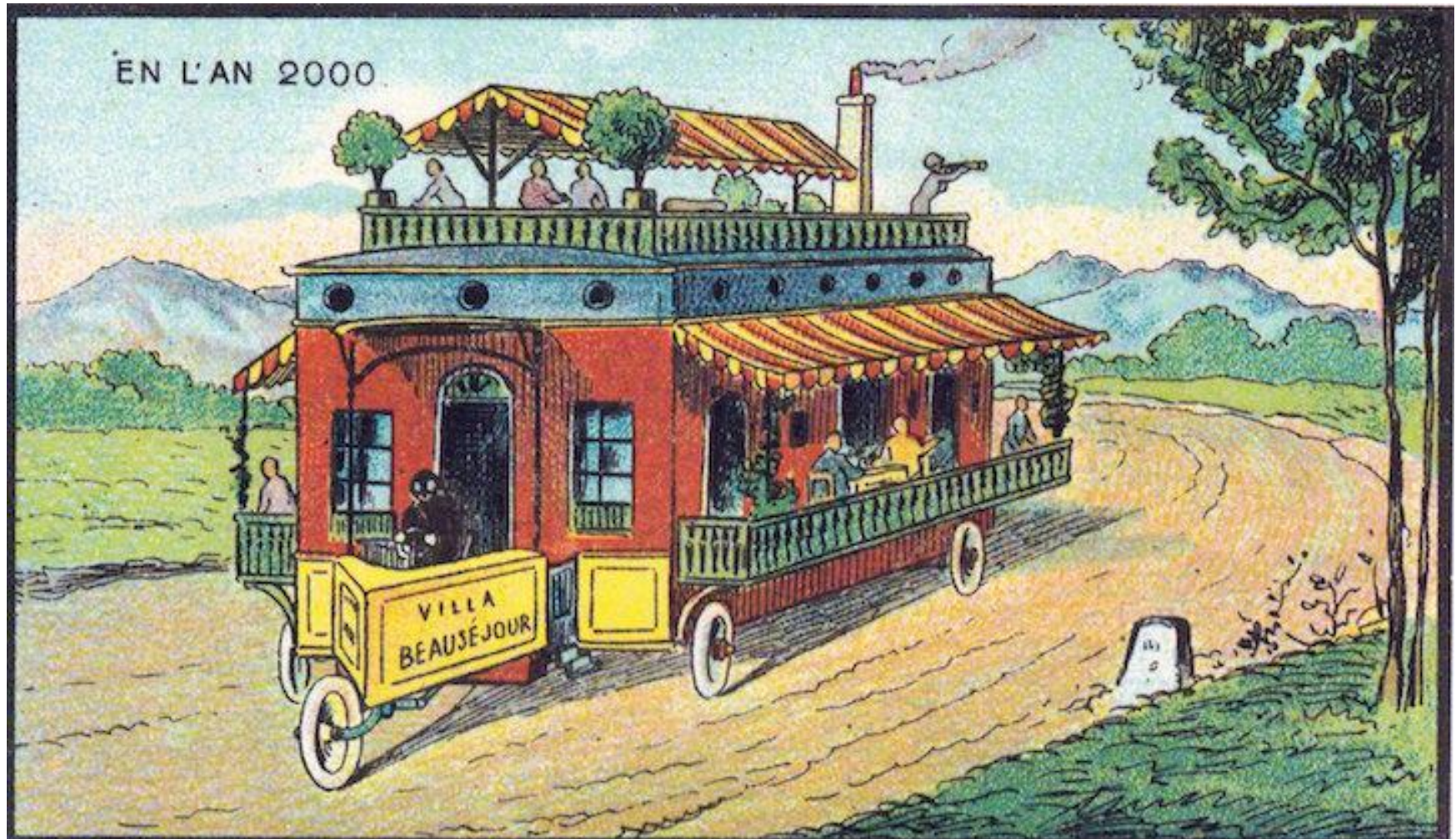
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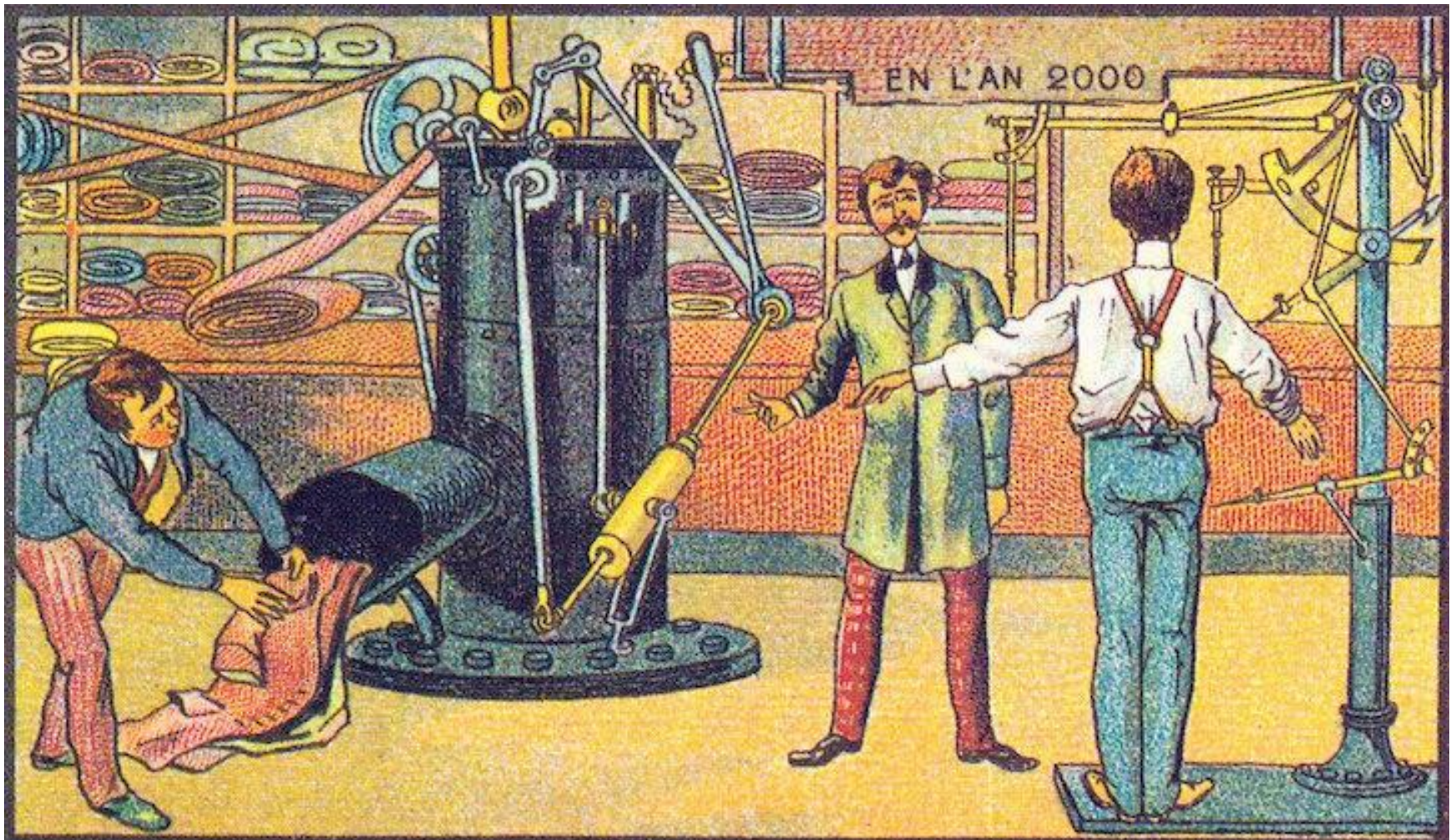
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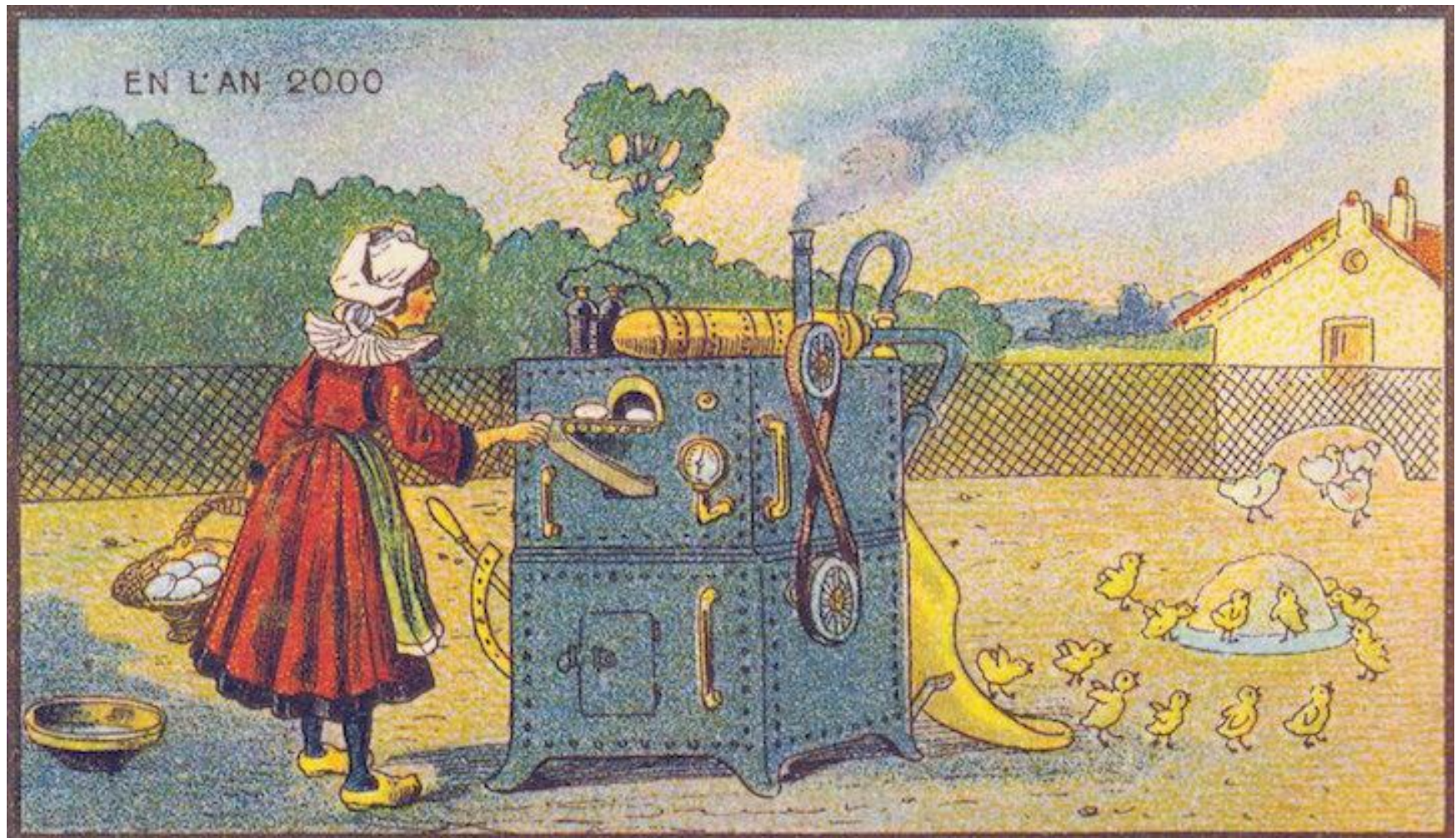
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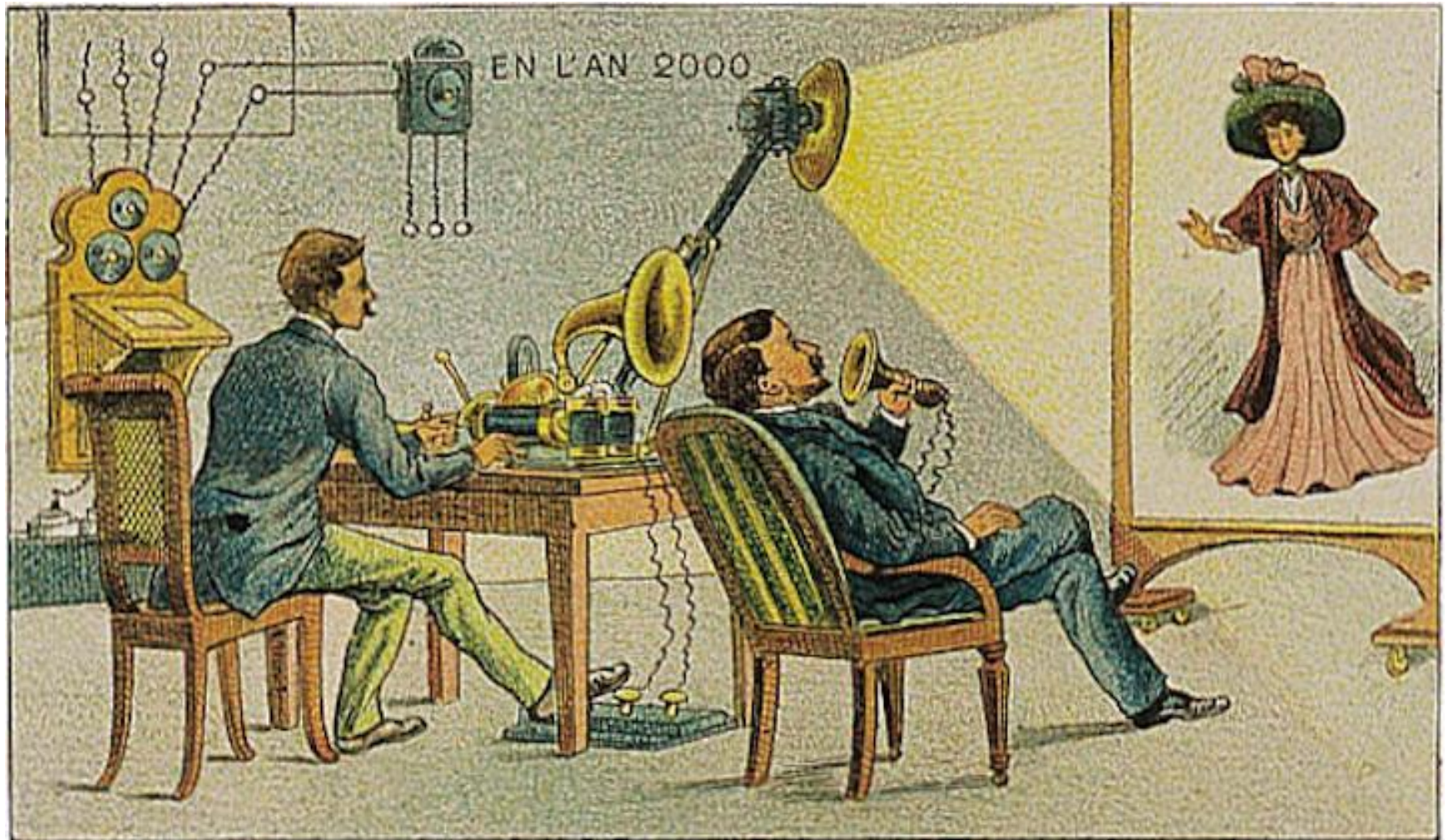
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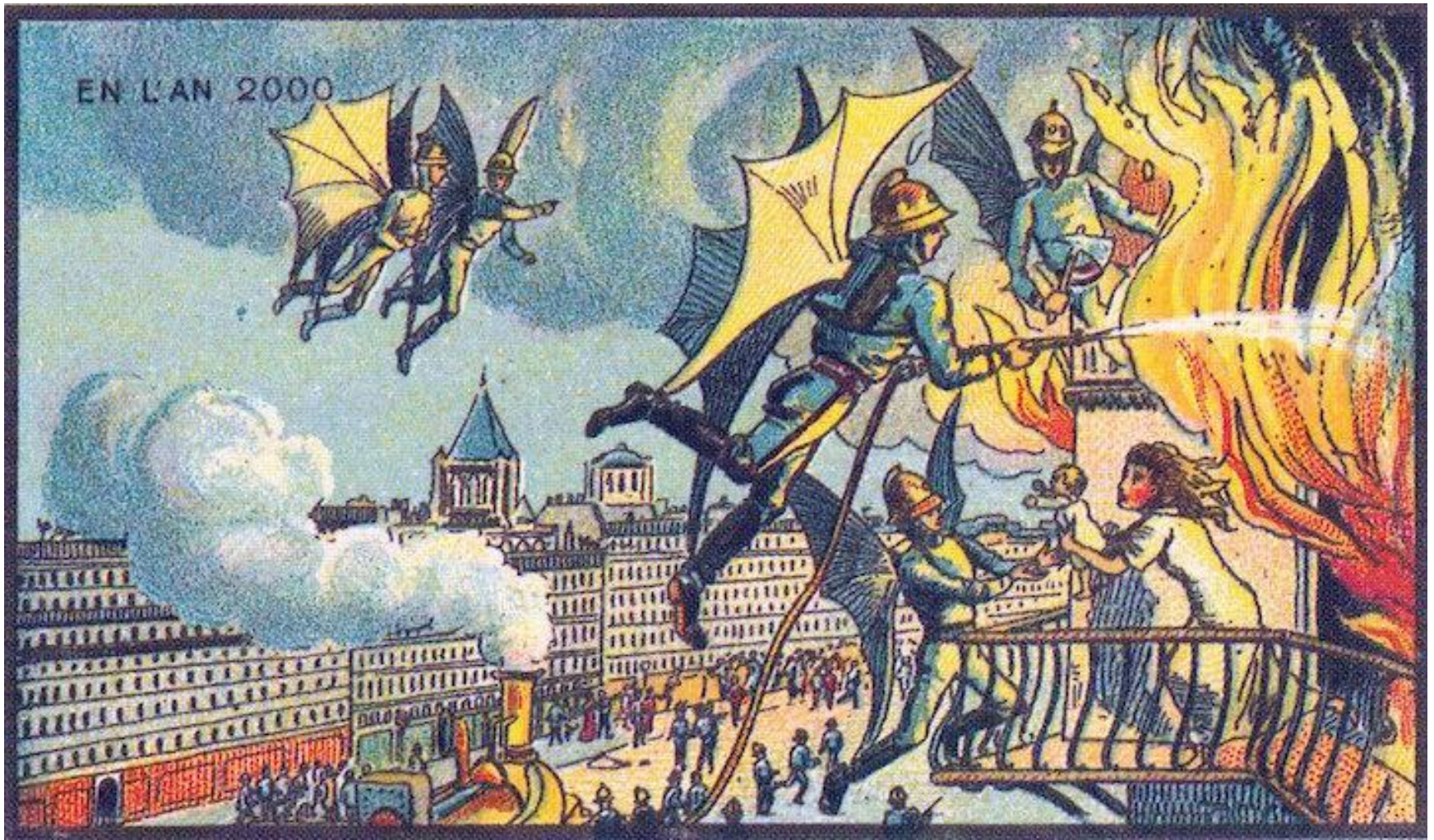
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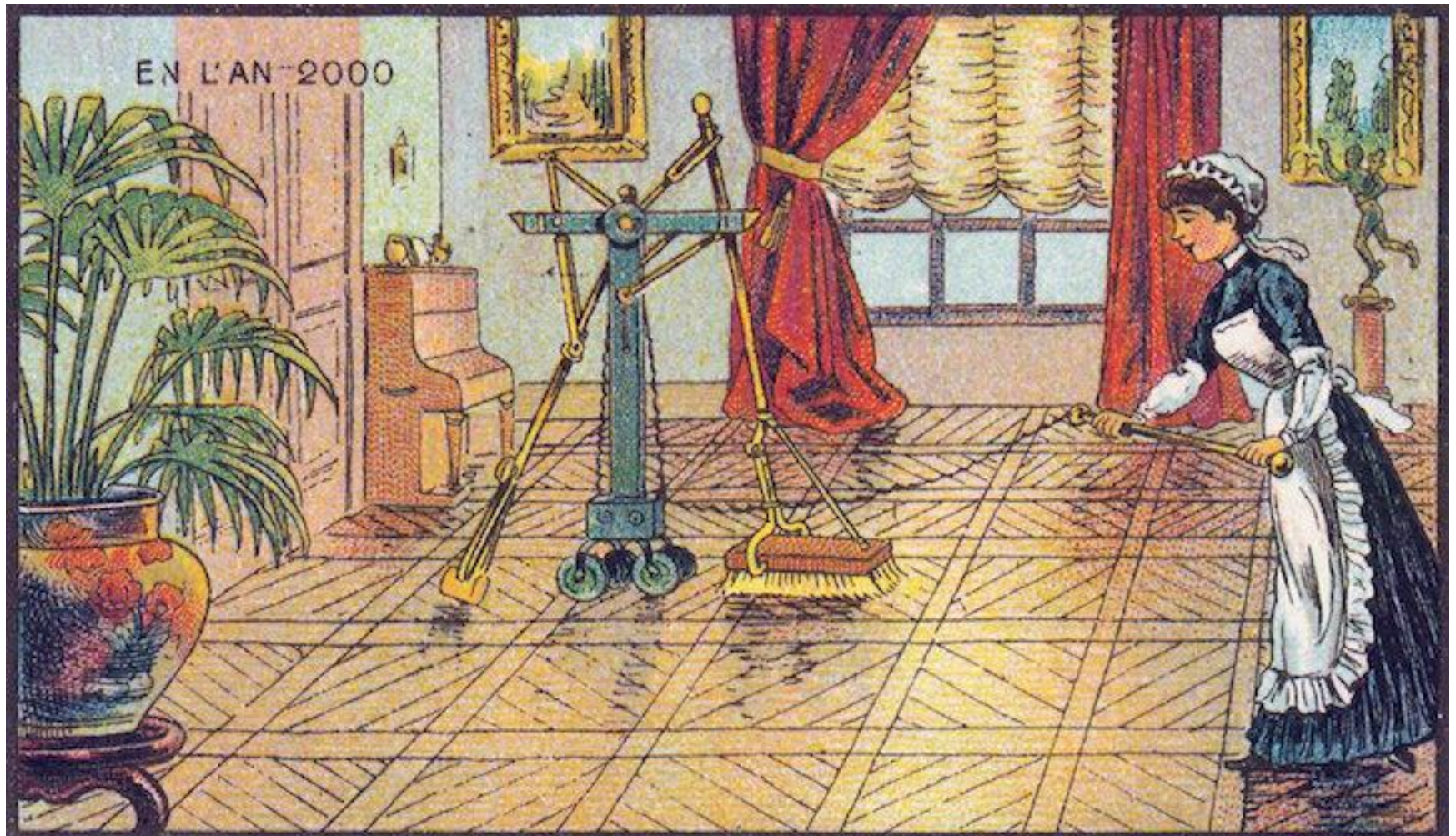
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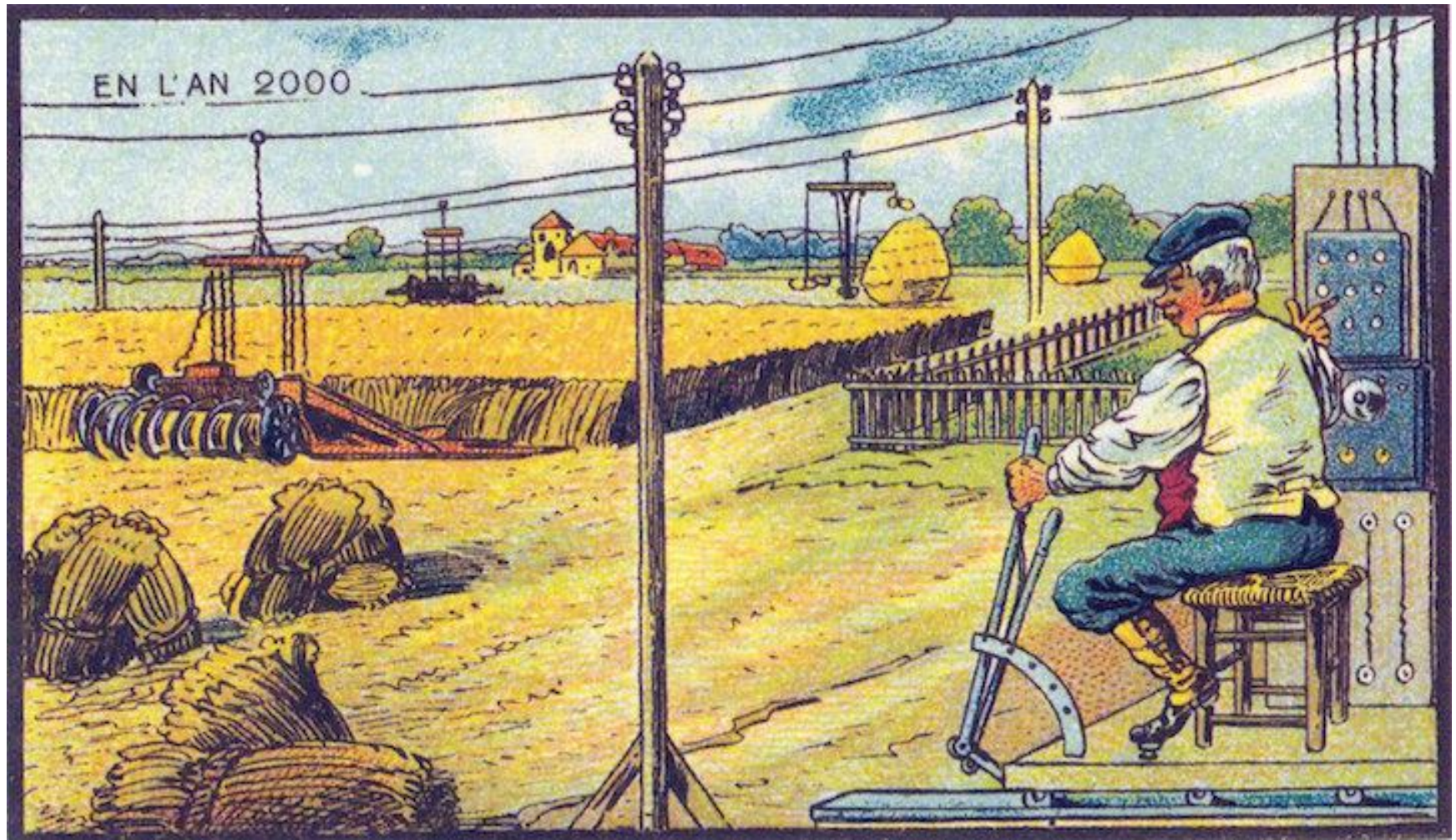
Jean-Marc Côté paints how the world will be in the year 2000 (1900-10)





# What the Victorian Age knew

Jean-Marc Côté paints how the world will be in the year 2000 (1900-10)



# The Victorian Age

Piero Scaruffi

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