Association of Moving Image Archivists Presentation

August 25th, 2012

Gigantic Ideas

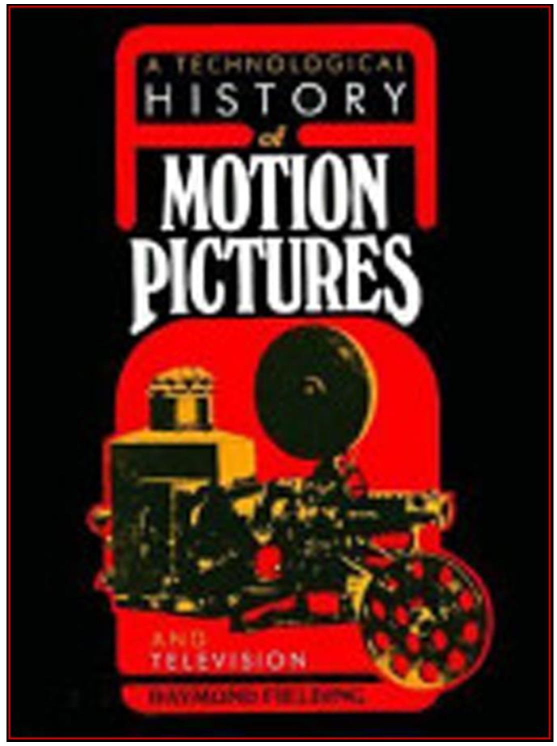
by

Jonathan Erland

About ten years ago, the Scientific and Technology Council tasked me with presenting a program on “Pre-Cinema.” On the Sci-Tech. Awards Committee (yes, I’m on a lot of committees) we have a process where we form surrogate committees, special sub-committees, to investigate specific areas of film technology for awards consideration, and I’ve done a lot of those. So the assignment seemed very similar to that process. Investigate and report on pre-cinema. What could be simpler. And when we’ve completed our investigations we submit a nice report that starts out something like “we’re pleased to submit the following findings..” And so on.

Of course, I didn’t realize that my first citation would be a magic lantern projector in fourteen twenty! Leaving me with nearly six hundred years to cover!

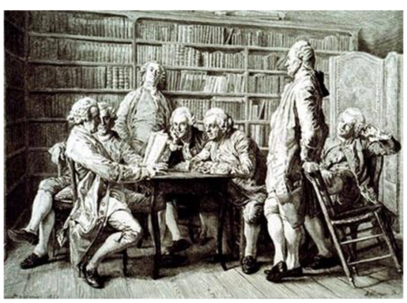
Of course it wouldn’t be true to suggest that I started these investigations just ten years ago. I’ve always been interested in history as it lights our way into the future. And our history, cinema history, is especially interesting. But preparing for that program ten years ago, propelled me into a fascinating journey of discovery that seemed to pose two new questions for every one that it answered. What I’ll present here, therefor, is still only a work very much in progress. It’s also a perspective, very much my own, and is not authorised or endorsed by any institution.



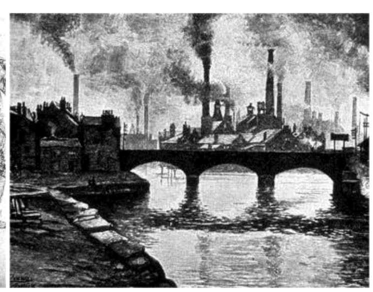
The first thing my investigation revealed is the statement of Dr. Ray Fielding in his, “Technological History of Motion Pictures,” that, “we know more about the Greco-Roman civilizations of antiquity than we do about the early years of the motion pictures”.

Well, Ray, we’re working on that. The next realization was that, trying to pin down any definitive “ah-ha” moment of conception for motion pictures was like trying to pin the tail on a live donkey - it’s a very good way to get kicked. Myriad elements were connected to yet more myriad elements. The relative significance of Edison and Muybridge and Marey and Eastman quickly faded before the insistent clamor of yet more seminal events. Rather than “an inventor” we find, “a whole community of inventors.” Many ‘items of invention; but none that signify “that moment.”

It’s all about context.








And our context, our place in time where the notion of moving pictures fits like an element in the periodic table, is the renaissance of science that occurred in conjunction with the age of enlightenment and the industrial revolution and which came to flower during the second, or “communication phase” of that revolution, beginning around the same time as the reign of Queen Victoria. The present phase, what we call the "information age" is the third phase of a revolution that is still ongoing. Or was until we arrived at the "financial meltdown" phase!

The communication phase of the industrial revolution is, of course, the electric age, and so we're going to begin our narrative with a pre-eminent figure in the field of electricity and this country's first great scientist: Ben Franklin!

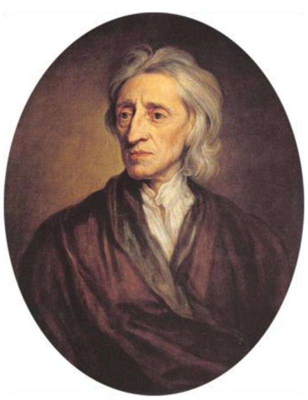
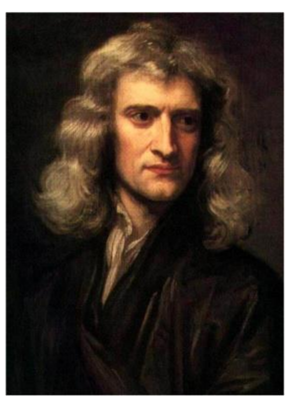
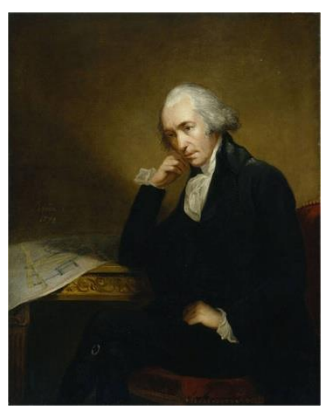
Walter Isaacson called him, "the most accomplished American of his age." Franklin is remembered in history for many things but not principally as a scientist. Natural enough as the very term"scientist" did not come in to existence until the eighteen-thirties, well after his death. However, every kid in school knows about his experiments with kites and lightning. In reality he was a very serious and dedicated scientist and would soon be recognized as such.

At about the same time as he began his interest in lightning, events took him to England where he represented the interests of no less than four separate colonies in a role essentially that of a lobbyist, a role he may well have created. He'll spend nearly twenty years doing this.

His home in London is the only surviving Franklin residence.

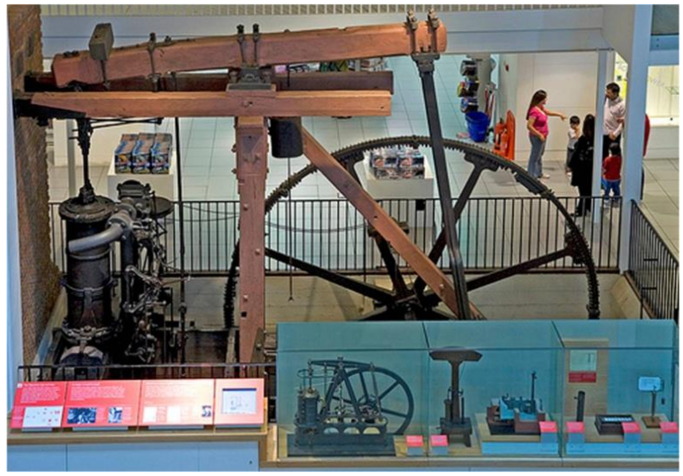

In England he fell in with a remarkable group known as the “Lunar Men” which included a number of the protagonists of the scientific and industrial revolution such as James Watt, Josiah Wedgwood, Joseph Priestley, Mathew Boulton, William Murdock.

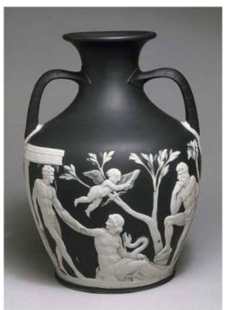
They got the name, “Lunar Men” from the fact that they met monthly and on the night of the full moon, so that they would be able to find their ways home in the wee hours of the night. Among the Lunar men was, Dr. William Small who had taught Thomas Jefferson at William and Mary College in America and about whom Jefferson had said,“a man profound in most of the useful branches of science, with a happy talent of communication, correct and gentlemanly manners, and a large and liberal mind... from his conversation I got my first views of the expansion of science and of the system of things in which we are placed”.


Small not only introduced Jefferson to the science of Isaac Newton but also, the philosophy of John Locke, probably the most influential mind of the Enlightenment, and arguably the inspiration for what would soon become - the United States of America.

Wedgwood’s installation of Watt’s steam engine in his pottery factory in 1782 was a seminal event in industrialization. Pottery was a major industry in England the Wedgewood firm would last for some eight generations.





Josiah’s son William, born around the time Franklin was visiting with Wedgewood, will publish, in 1802, one of the first “photographic” papers, “An Account of a Method of Copying Paintings Upon Glass,” the beginnings of an idea that will incubate and grow in significance. It introduces the idea of silver nitrate as a photosensitive, image forming material. William was certainly able to make what we’d call photograms, but he also attempted to make images with a camera obscura but simply couldn’t, in 1802, achieve enough sensitivity. Although the term had not been conceived yet, it’s arguable the “Lunar Men” represented the beginnings of what we’ve come to know as a “scientific community.”

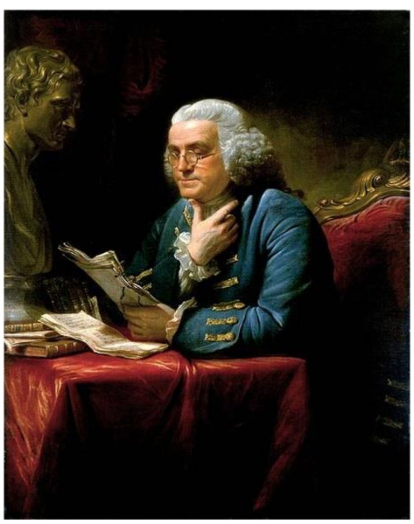
An Account of a method of copying Paintings upon Glass, and of making Profiles, by the agency of Light upon Nitrate of Silver. Invented by T. WEDGWOOD, ESQ. With Observations by H. DAVY.

White paper, or white leather, moistened with solution of nitrate of silver, undergoes no change when kept in a dark place; but on being exposed to the daylight, it speedily changes colour, and after passing through different shades of grey and brown, becomes at length nearly black.

The alterations of colour take place more speedily in proportion as the light is more intense. In the direct beams of the sun, two or three minutes are sufficient to produce the full effect. In the shade, several hours are required, and light transmitted through different coloured glasses acts upon it with different degrees of intensity. Thus it is found that red rays, or the common sunbeams passed through red glass, have very little action upon it: Yellow and green are more efficacious, but blue and violet light produce the most decided and powerful effects.*

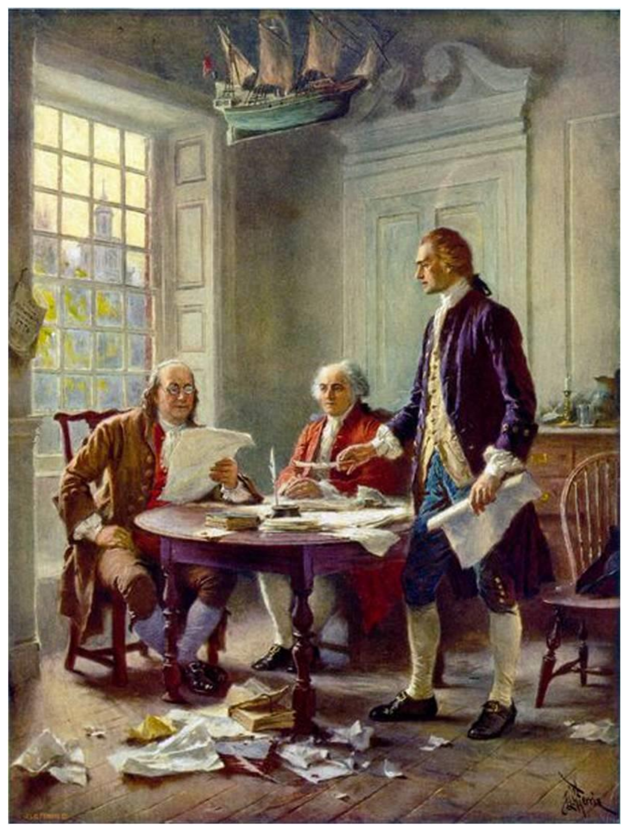
Another Franklin friend among the “Lunar Men” was Erasmus Darwin, a doctor who actually began developing the beginnings of the theory of evolution that his grandson Charles would unravel and make famous. Erasmus and Ben could be found wading around gleefully in the bog trying to capture methane that bubbled up in the ponds (though it wasn’t called methane yet).

For Franklin, being among such science minded friends was like turning a kid loose in a candy store. His scientific enquiries and experiments make him well known and respected and he’s elected a fellow of the Royal Society, and is awarded their Copely Medal for the advancement of scientific knowledge.



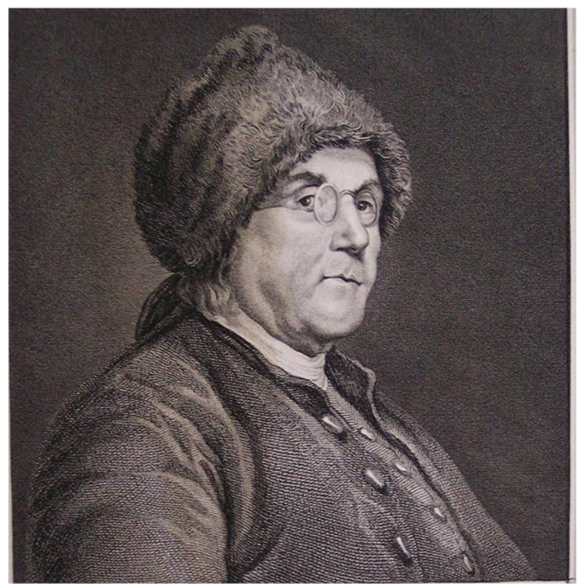
Eventually he sits on the Governing Council of the Society. He’s also acquainted with this gentleman, who thinks very highly of him.

He returns, and rather hastily of course, to America in March, 1775. The eighteenth century version of the “red-eye.” Indeed, the speed of his return may be attributed to his own study of the Atlantic ocean currents leading to his naming of the Gulf Stream which can add over five knots to your speed if you know how to navigate it. Franklin made eight trans-Atlantic trips in the course of his life so he had plenty of time to study the ocean. He also had a pragmatic incentive for this study because, in1753 King George had appointed him Deputy Postmaster for the Royal Mail in the Colonies. He inaugurated, in 1755, a monthly mail packet service between England and the Colonies. He probably made at least some of these trips in a boat like this as they also carried a few passengers. Importantly, as a newspaper publisher himself, he ensured the economical dissemination of newspapers throughout the colonial postal service which he extended from Maine to Florida. The rapid dissemination of news throughout the colonies, of course, would prove crucial to the success of the revolution.

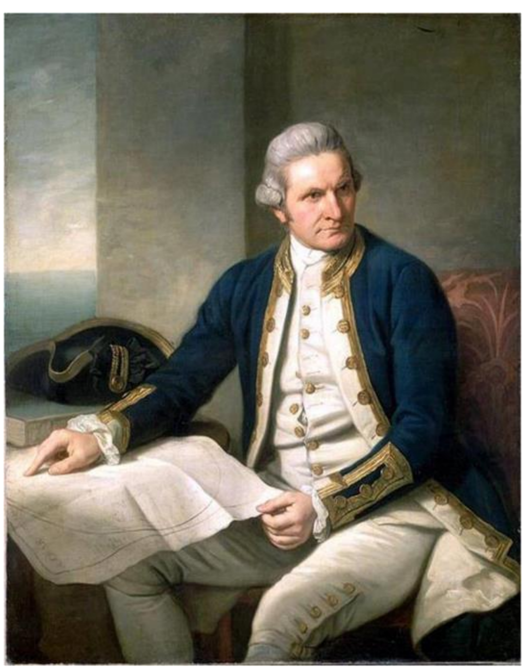


Back in America he turns his attention to entirely different matters, for quite a different community, but the change of focus was not lost on Thomas Jefferson who wrote of Franklin, “Nobody can conceive that nature ever intended to throw away a Newton upon the commonplace drudgery of governing, a work which may be executed by men of an ordinary stature, such as are always and everywhere to be found.”

Nevertheless, on July 26, 1775, the Continental Congress votes to appoint a Postmaster General for the United Colonies and immediately names Americas "Newton" Ben Franklin, to the post. Franklin was back in America for less than two years before being dispatched back across the Atlantic, in December 1776, this time to France to negotiate, successfully, for their assistance, where again, his renown was as a scientist rather than as a statesman.



However, in France, besides being known as a scientist and in spite of his seventy years he also became known as something of a ladies man. But that's another story, or, as they say, "what happened in France, stayed in France." Notice, that in France, he projects a completely different persona; fur rather than silk. Possibly that explained his new attraction to ladies.

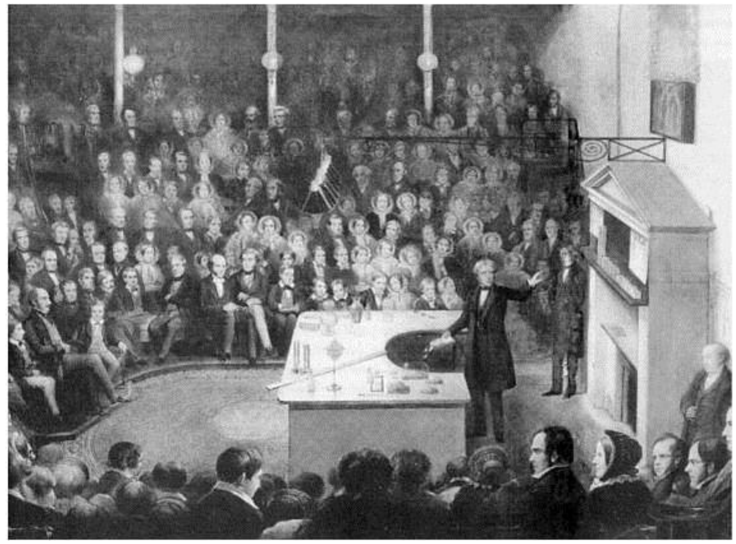


So great was the status of scientists in that era, that, even with the Revolutionary War in progress, Ben Franklin was able to command American naval captains that might come in contact with Captain James Cook's ship "Resolution", not to engage her but to "treat the said Captain Cook and his people with all civility and kindness, . . . as common friends to mankind."

Unfortunately for Cook, the Hawaiian Islanders didn't quite share Franklin's view.

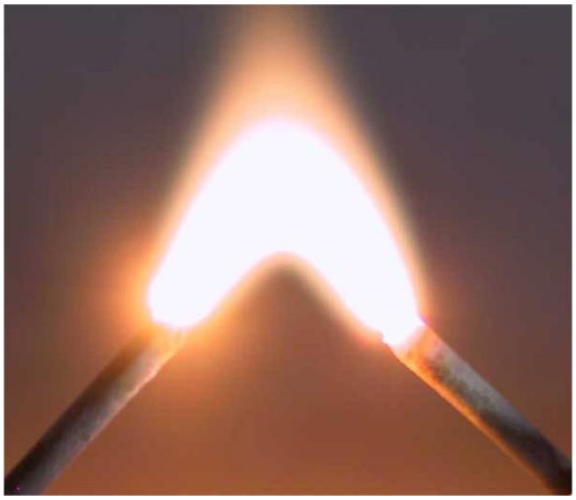
Meanwhile, back in England the pace and popularity of science quickened dramatically. In 1799 The Royal Institution was founded to "further the application of science to the common purposes of life."

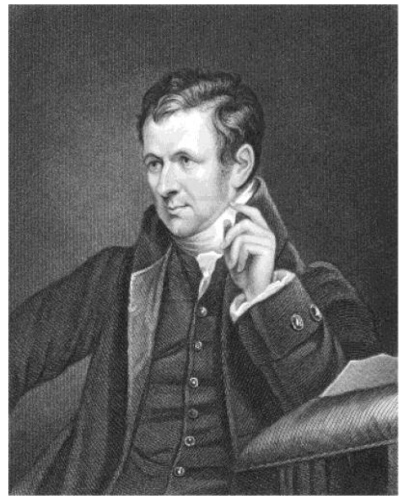
Extensive laboratories were built as well as a very large hall that could accommodate hundreds and the lectures there became so popular that in 1808, in order to unclog the tangle of carriages, Albermarle Street became the first One-Way street.



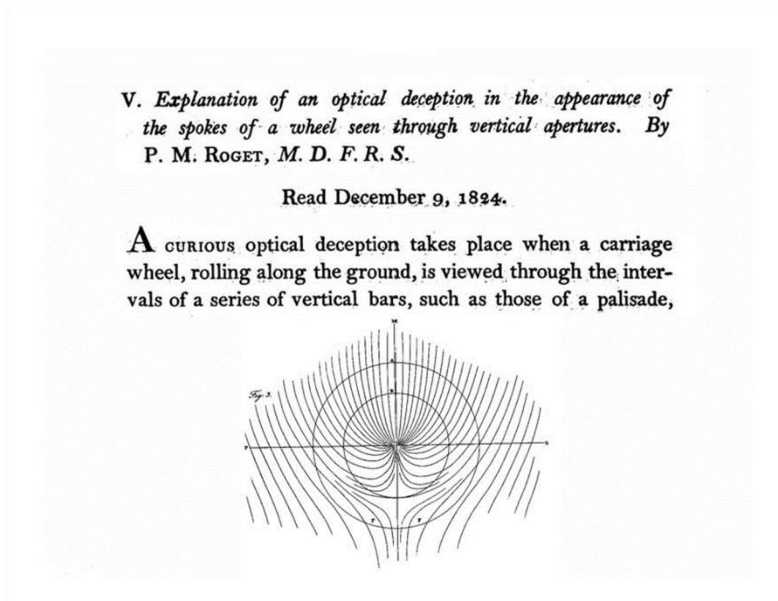
And in our little narrative, the pre-cinema thread will weave back and forth several times through this Institution, around which will emerge a group, not unlike the Lunar Men of half a century before.

In 1801 the twenty-eight year old Thomas Young was already professor of natural philosophy (today we'd call it physics) at the Institution and the very next year he would deliver a lecture that laid out the theory of light as a wave. He'd also hypothesize the three receptors of colour in the eye. He'd begun to pursue these theories some ten years earlier, while still in his teens but of course, such ideas put him in conflict with Newton so he had to wait until he was old enough to be taken seriously. Didn't help, he got into a load of trouble about it anyway. Newton, of course, had described light as "corpuscles" or particles and so the two ideas were mutually exclusive. Today we acknowledge both ideas are "right" : at one and the same time, light is a wave and a particle that is vibrating. This wave–particle duality is one aspect of the concept of complementarity, that a phenomenon can be viewed in one way or in another, but not both simultaneously.





It was also in this Institution, around 1809, that Sir Humphrey Davy first demonstrated the Arc light, which he actually named the “arch” light because of the characteristic “arch,” we see here.



V. *Explanation of an optical deception in the appearance of the spokes of a wheel seen through vertical apertures.* By P. M. ROGET, *M. D. F. R. S.*

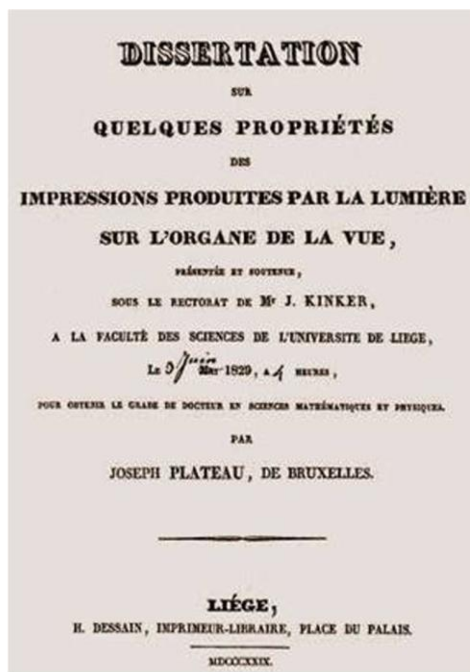
Read December 9, 1824.

A CURIOUS optical deception takes place when a carriage wheel, rolling along the ground, is viewed through the intervals of a series of vertical bars, such as those of a palisade,

In 1824, the secretary of the Royal Institution, Peter Mark Roget - yes, the same gentleman who gave us the Thesaurus - presented a paper entitled “Explanation of an optical deception in the appearance of the spokes of a wheel seen through vertical apertures”   With this paper, Roget began the process of explaining human visual perception. Others had certainly made rudimentary observations about such phenomena, but here began a scientific enquiry of what’s involved.

Charles Babbage then recounts that John Herschel demonstrated that you can see the two sides of a shilling when spun. Babbage recounts all this to Dr. Fitton, a fellow cryptographer and colleague of Charles Darwin, who comes back bearing a small cardboard toy.

The “Thaumatrope.” Which was first sold at the Royal Institution. These became enormously popular for the rest of the century and came in many designs,



DISSERTATION

SUR

QUELQUES PROPRIÉTÉS

DES

IMPRESSIONS PRODUITES PAR LA LUMIÈRE

SUR L'ORGANE DE LA VUE,

PRÉSENTÉE ET SOUTENUE,

SOUS LE RECTORAT DE Mr J. KINKER,

A LA FACULTÉ DES SCIENCES DE L'UNIVERSITÉ DE LIEGE,

Le 3 Juin ~~Mai~~ 1829, à 4 heures,

POUR OBTENIR LE GRADE DE DOCTEUR EN SCIENCES MATHÉMATIQUES ET PHYSIQUES,

PAR

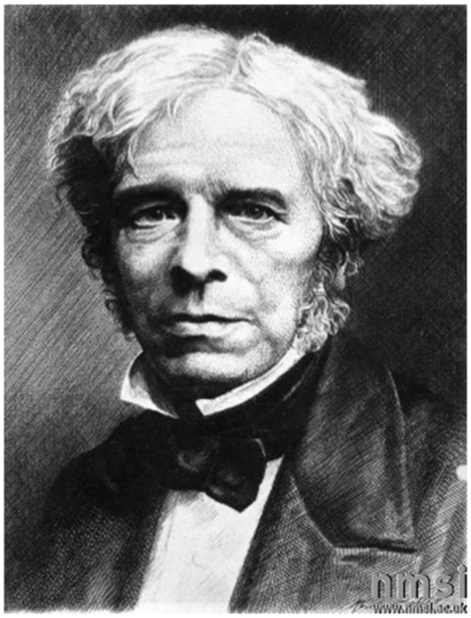
JOSEPH PLATEAU, DE BRUXELLES.

LIÉGE,

H. DESSAIN, IMPRIMEUR-LIBRAIRE, PLACE DU PALAIS.

MDCCCXXIX.

Joseph Ferdinand Plateau, defended his doctoral thesis at the University of Liége, on “Some Properties of the Impressions Produced by Light on the Eye.”



CA[BA] The Royal Institution from the author Feb. 7 1859

EXPERIMENTAL RESEARCHES

IN

CHEMISTRY AND PHYSICS.

BY

MICHAEL FARADAY, D.C.L., F.R.S.,

FULLERIAN PROFESSOR OF CHEMISTRY IN THE ROYAL INSTITUTION OF GREAT BRITAIN.

HON. MEM. R.S.ED., CAMB. PHIL., AND MED. CHIRURG. SOCC., F.G.S., ORD. BORUSS. "POUR LE MÉRITE" EQ., COMMANDER OF THE LEGION OF HONOUR, INSTIT. IMP. (ACAD. SC.) PARIS. SOCIUS, ACADD. IMP. SC. VINDOB. ET PETROP., REG. SC. BEROL., TAURIN., HOLM., MONAC., NEAPOL., AMSTELOD., BRUXELL., BONON., ITAL. MUT., SOCC. REG. GOTTING., ET HAFN., UPSAL., HARLEM. ACAD. AMER. BOST., ET SOC. AMER. PHILAD. SOCIUS, ACAD. PANORM., SOCC. GEORG. FLORENT., ET PHILOM. PARIS., INSTIT. WASHINGTON., ET ACAD. IMP. MED. PARIS. CORRESP., ETC.

REPRINTED FROM THE PHILOSOPHICAL TRANSACTIONS OF 1821—1857; THE JOURNAL OF THE ROYAL INSTITUTION; THE PHILOSOPHICAL MAGAZINE, AND OTHER PUBLICATIONS.

LONDON:
RICHARD TAYLOR AND WILLIAM FRANCIS,
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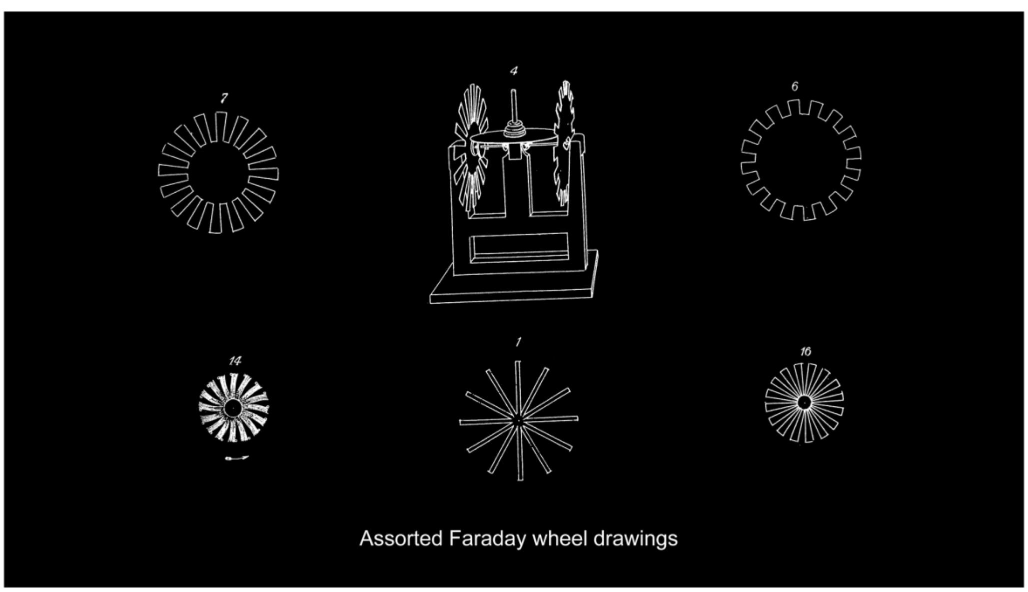
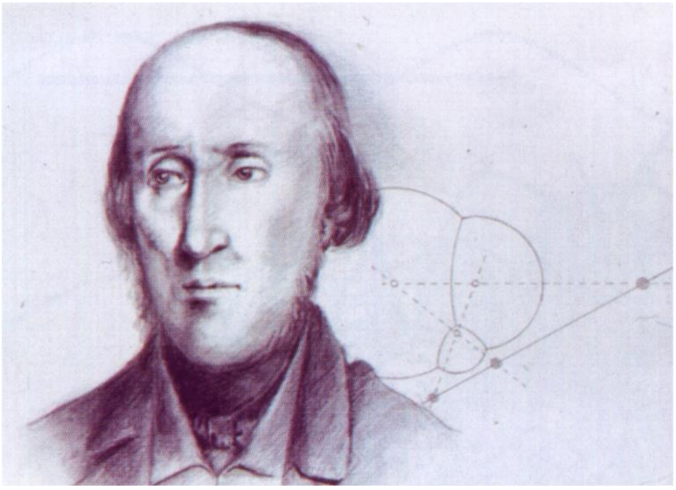
RED LION COURT, FLEET STREET.
1859.

And in 1830, the brilliant Michael Faraday weighed in with a talk at the Institution, " On a Peculiar Class of Optical Illusions." With this paper Faraday provided one of his famous "wheels" which demonstrated, what in the "cinema" era we call the "wagon wheel" effect, where wagon wheels appear to go forward, or backward, out of all relation to reality. Faraday's wheel survived into the present era in the form of the way in which we all timed our phonograph turntables, before the CD outmoded them.



Assorted Faraday wheel drawings

Faraday made two more wheels in 1831 the last looking much like this. So that if you stood in front of a mirror and rotated it, the notches would appear to stand still.

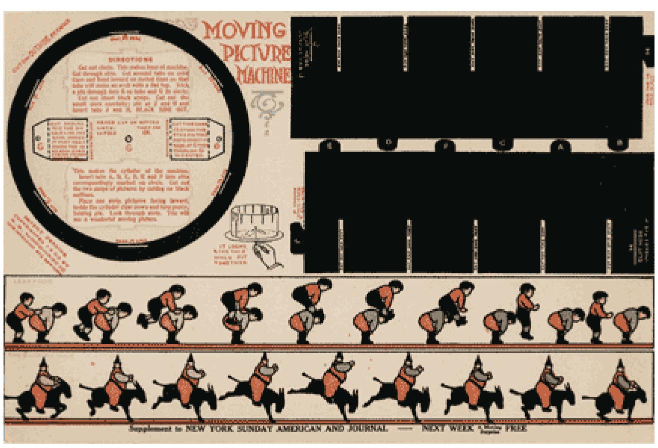


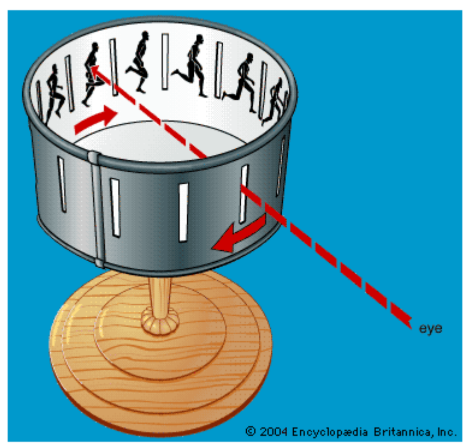
Plateau examined this wheel in Brussels in December of ‘32 and made a gigantic connection between the science of the physiology of human vision and the art of, “Beguiling Optical Entertainment” He realized first; that if a picture were placed in the space between the notches it would be more interesting .

And then; a breakthrough - as Plateau realized that the pictures could represent a series of stages of a moving object like this. Plateau named it the, “Phenakistiscope”.

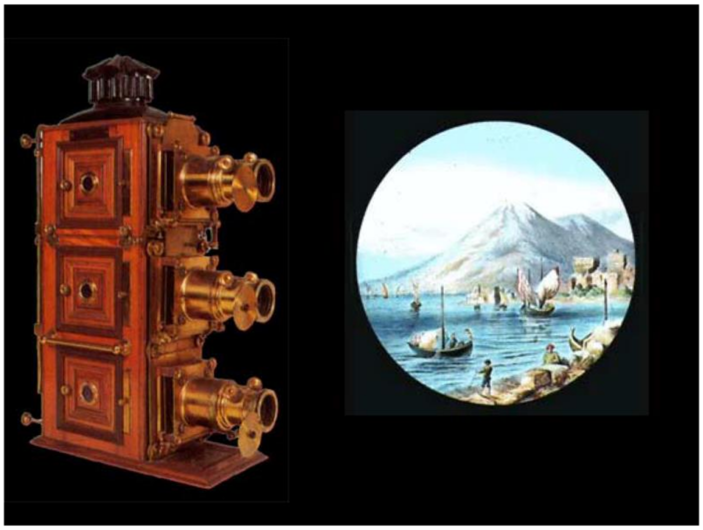
Meanwhile in Vienna Simon Stampfer, also inspired by Faraday’s wheel, had reached the same conclusion as Plateau and produced…

…the Stroboscopic disc.

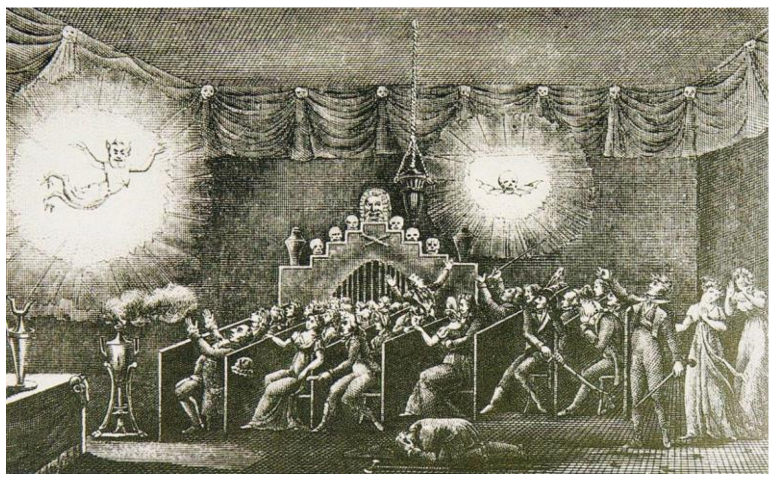




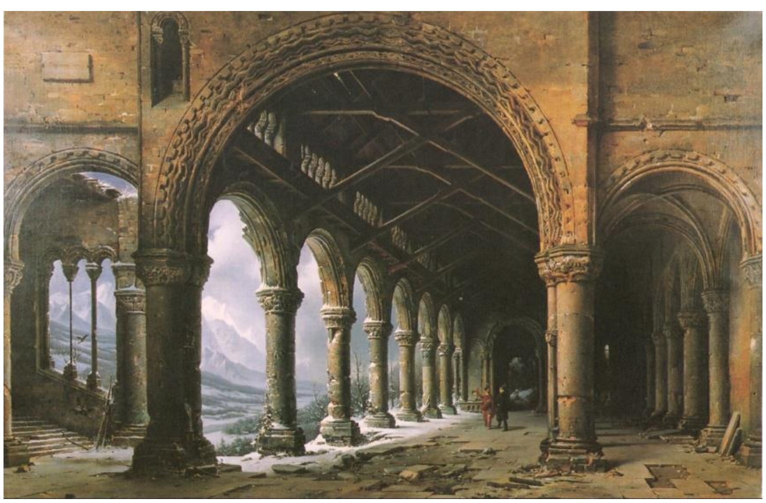
By taking the disc and transforming it into a cylinder, George Horner dispensed with the mirror and voila! The Zoetrope!



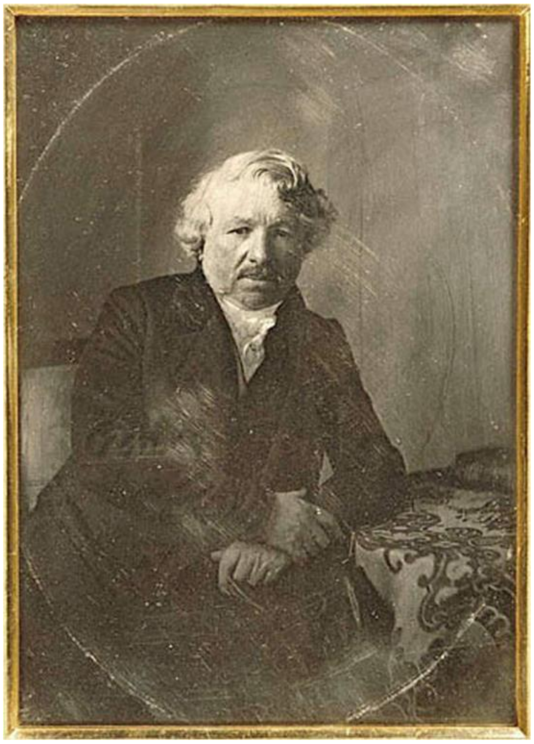
From the dawn of time humans have indulged in Beguiling Optical Entertainment such as the 1420 magic lantern we saw earlier. By the nineteenth century techniques included multiple projectors with moving slides, such as this example



As well as the spectacular “Phantasmogoria”. Nothing short of a multi media extravaganza of front and rear projection; projection onto smoke; with ghosts and ghouls the featured characters.

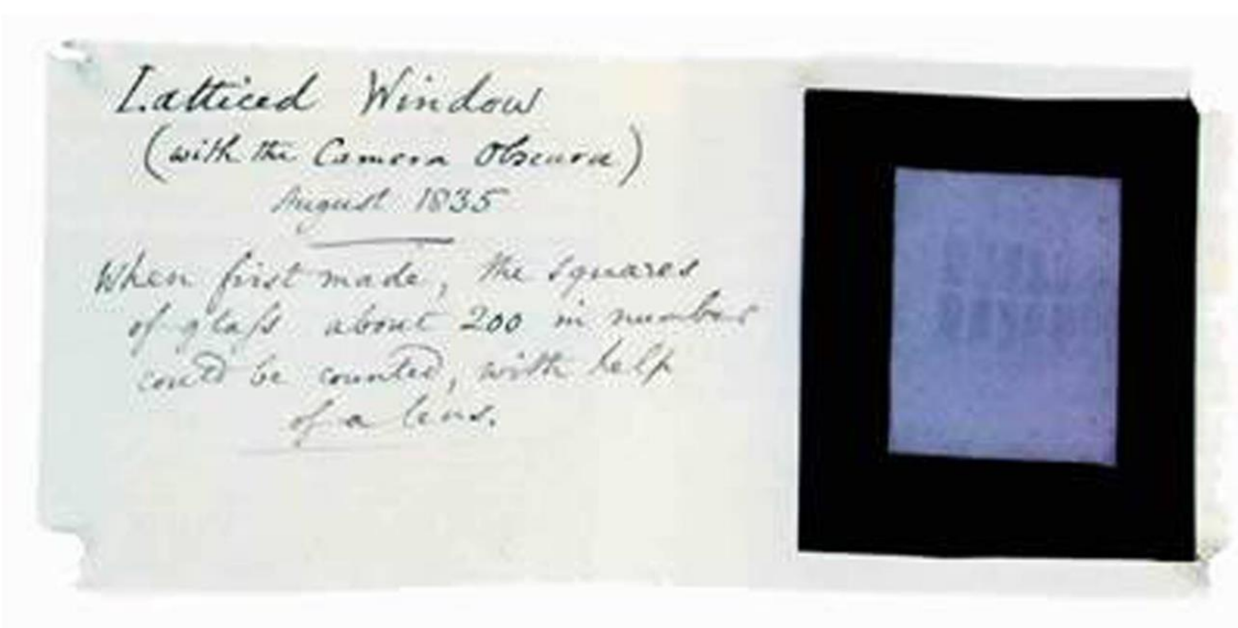


The Diorama and the Panorama, on the other hand, while dramatic, were much more genteel and designed for the “carriage trade” These, often vast productions of scenes or 360° vistas, combined painting with three dimensional settings cunningly designed to transport you into its world. One of the leading designers of the Diorama was Louis Daguerre. He believed that Joseph Nicéphore Niépce’s efforts to “capture” images in a camera obscura, could be very useful in the design of the Diorama. They form a partnership and the result is…

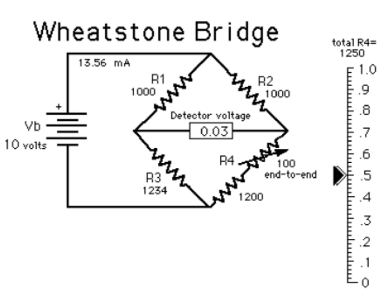


The Daguerrotype. Here is Daguerre portrayed in a daguerrotype. France buys the intellectual property rights from Daguerre and makes it a gift to the world. Just stop and think about that for a moment, in this era of patent trolling, - a gift to the world.

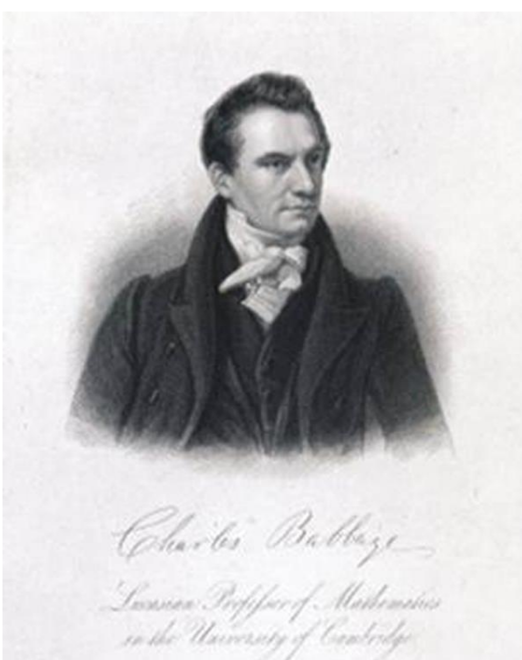
Meanwhile, in England, Fox Talbot is beginning to have success with his “photographic” process, as is Sir John Herschel who solves the problem that had confounded William Wedgewood, that of “fixing” photographs so they remain permanent.



Herschel, another of our Royal Institution band, also gives us the terminology we still use: “photography” and “positive” and “negative” as well as “snapshot”.   Meanwhile, Charles Wheatstone (who besides being famous for the “Wheatstone Bridge” also invented the “Concertina” and a telegraph system…



… persuades Ada Augusta, Countess of Lovelace and the daughter of the poet (George Gordon,) Lord Byron, to translate a paper from Italian describing their mutual friend Babbage's "Analytical Engine" The Italian, Menabrea, was reporting on Babbage designs for what today we call the computer. Menabrea described this as, "a gigantic idea" ..and said, "this is nothing less than a machine capable of analysis, the imagination is astounded."



Wheatstone knew quite well that no one on the planet besides Babbage knew the "Analytical Engine" as well as Ada, and that she was, in fact, far more fluent in explaining it than was the somewhat less poetical mathematician Babbage himself.

Sketch of

The Analytical Engine

Invented by Charles Babbage

By L. F. MENABREA
of Turin, Officer of the Military Engineers

from the *Bibliothèque Universelle de Genève*, October, 1842, No. 82

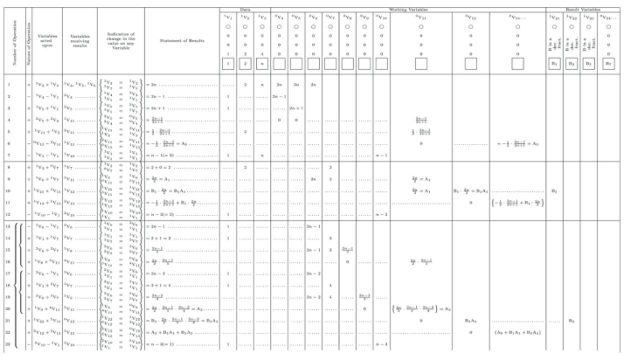
With notes upon the Memoir by the Translator
ADA AUGUSTA, COUNTESS OF LOVELACE

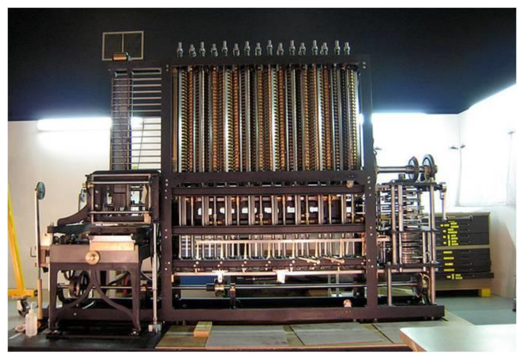
Those labours which belong to the various branches of the mathematical sciences, although on first consideration they seem to be the exclusive province of intellect, may, nevertheless, be divided into two distinct sections; one of which may be called the mechanical, because it is subjected to precise and invariable laws, that are capable of being expressed by means of the operations of matter; while the other, demanding the intervention of reasoning, belongs more specially to the domain of the understanding. This admitted, we may propose to execute, by means of machinery, the mechanical branch of these labours, reserving for pure intellect that which depends on the reasoning faculties. Thus the rigid exactness of those laws which regulate numerical calculations must frequently have suggested the employment of material instruments, either for executing the whole of such calculations or for abridging them; and thence have arisen several inventions having this object in view, but which have in general but partially attained it. For instance, the much-admired machine of Pascal is now simply an object of curiosity, which, whilst it displays the powerful intellect of its inventor, is yet of little utility in itself. Its powers extended no further than the execution of the first four operations of arithmetic, and indeed were in reality confined to that of the first two, since multiplication and division were the result of a series of additions and subtractions. The chief drawback hitherto on most of such machines is, that they require the continual intervention of a human agent to regulate their movements, and thence arises a source of errors; so that, if their use has not become general for large numerical calculations, it is because they have not in fact resolved the double problem which the question presents, that of *correctness* in the results, united with *economy* of time.

Struck with similar reflections, Mr. Babbage has devoted some years to the realization of a gigantic idea. He proposed to himself nothing less than the construction of a machine capable of executing not merely arithmetical calculations, but even all those of analysis, if their laws are known. The imagination is at first astounded at the idea of such an undertaking; but the more calm reflection we bestow on it, the less impossible does success appear, and it is felt that it may depend on the discovery of some principle so general, that, if applied to machinery, the latter may be capable of mechanically translating the operations which may be indicated to it by algebraical notation. The illustrious inventor having been kind enough to communicate to me some of his views on this subject during a visit he made at Turin, I have, with his approbation, thrown together the impressions they have left on my mind. But the reader must not expect to find a description of Mr. Babbage's engine; the comprehension of this would entail studies of much length; and I shall endeavour merely to give an insight into the end proposed, and to develop the principles on which its attainment depends.

I must first premise that this engine is entirely different from that of which there is a notice in the 'Treatise on the Economy of Machinery,' by the same author. But as the latter gave rise to the idea of the engine in question, I consider it will be a useful preliminary briefly to recall what were Mr. Babbage's first essays, and

Babbage agreed, saying Ada was abundantly capable of writing a scientific paper in her own right – never mind translating one. So the upshot was that Ada translated the paper and then appended some "Notes" by the translator.Today, of course, it's the theme of her "notes" - much more comprehensive, and much longer, than the original paper - that echo down through the years right up to the present.

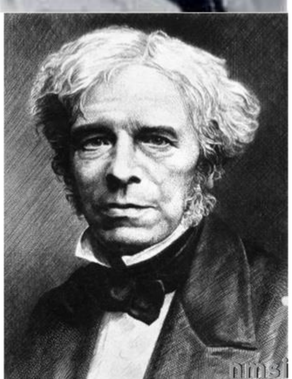




For Ada's contribution to the "Analytical Engine" concept was nothing less than computer programming, "software" and implicit in her concept was the fact that such a process would be capable of creating art, such as music and graphics. In fact, it was a very conscious tribute to her contributions that the US-Dept of Defence called their new programming language "ADA

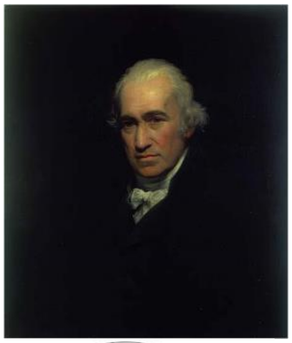
Doron Swade MBE is a museum curator and author, specialising in the history of computing. He is especially known for his work on the computer pioneer Charles Babbage, Here he is, in May of this year, discussing Ada and showing his replica of the Babbage

"Difference Engine No. 2," which essentially produced log tables. He's now trying to build the ultimate Babbage "gigantic idea," the Analytical Engine" computing machine. Swade has devoted many years to the restoration or recreation of Babbage works. He expects the Analytical Engine to take some twenty years.

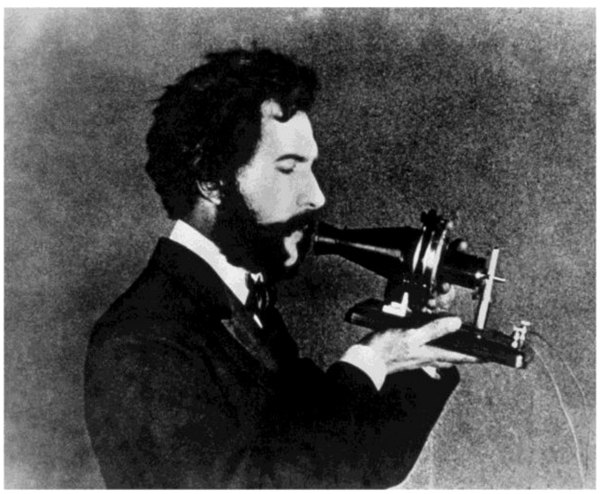


As one's familiarity with our little Royal Institution gang grows, it becomes clear that this intriguing bunch are quite at home with "gigantic ideas". Mostly we remember them as figures in history,

unrelated to each other. In fact they were a community that corresponded, attended each others lectures, dined together. This disparate group included: Charles Darwin (Erasmus' grandson), author Charles Dickens, David Brewster, optics including the kaleidoscope!, Michael Faraday of electric induction which meant motors and generators, and field theory crucial to Maxwell and Einstein, and his

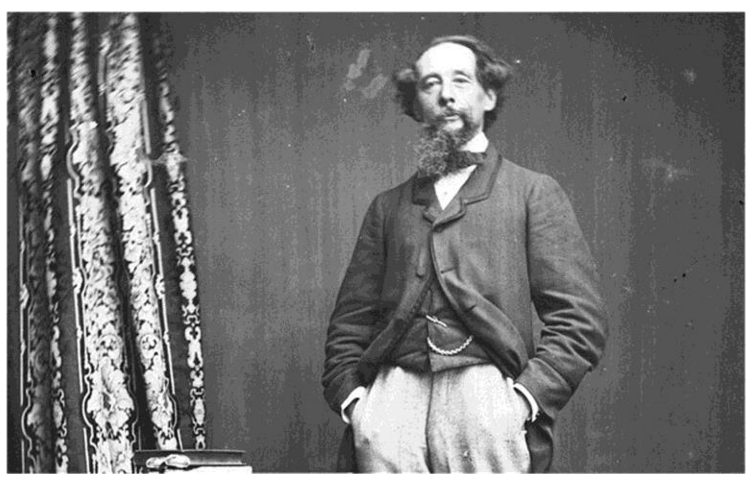


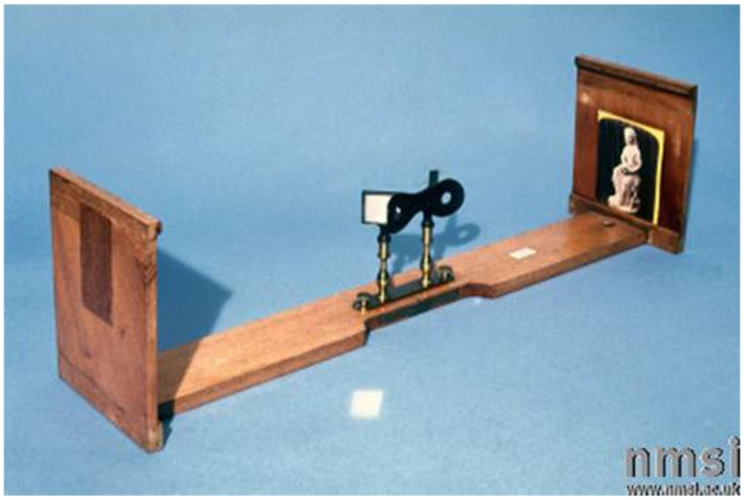
electromagnetism brought us telecommunications such as the Telegraph of Wheatstone, who, by the way, also did a lot of work with acoustics and human speech synthesizers, and invented the 'Enchanted Lyre,' or 'Aconcryptophone, which used a wire to carry vibrations from one musical instrument, which one played, to another, which then produced the sound. This became the tin can and string telephone that children play with to this day.



Aleck, the teenage son of his Scottish friend, Dr. Bell, an elocutionist, was so inspired by Wheatstone’s contraptions that he went on to produce a speech transmitting device of his own.Fox Talbot, photography, along with John Herschel (who was full of ideas, he even invented the ‘blueprint,” the speedometer, and the cowcatcher, besides spinning the famous shilling that became the “thaumatrope”!)

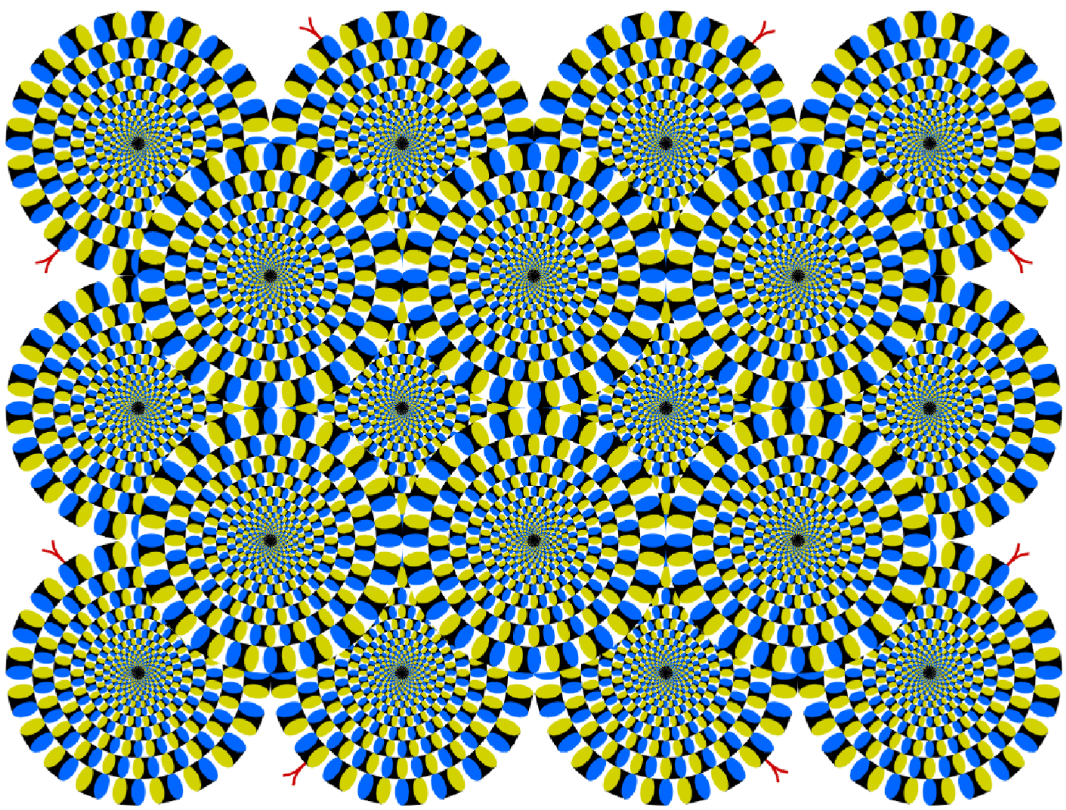
Oh, and if you want to know what the dickens Charles Dickens contribution to the cinema was, just try adding up the number of hours of cinema text he’s provided to us.





To this point, however, all of the investigations have attributed visual phenomena as a function of the retina of the eye, such as the so called “persistence of vision.” Charles Wheatstone now proceeds to deal with binocular vision and he introduces the “stereoscope” to illustrate it.

He’ll develop this investigation - amazingly, the first coherent discussion and explanation of binocular vision that we’re aware of since Al Hazan around 1000 A.D. - and makes a critical distinction. Wheatstone leads us into the mind as the place where visual processing takes place, rather than the retina.



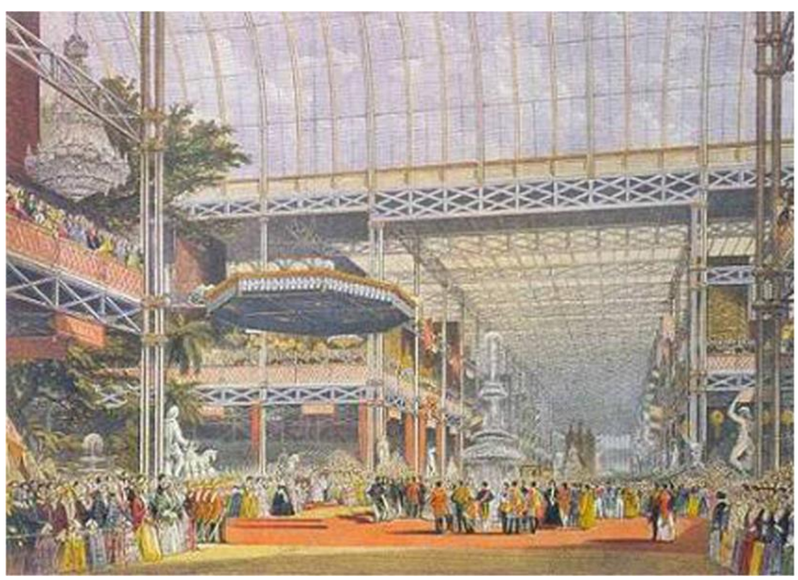
If you let your eyes dart about the screen you’ll see the pattern making subtle rotational moves. The pattern, I can promise you, is absolutely still. Your mind – brain if you prefer - is creating the impression of movement. There are now known to be several different areas of the brain that process visual data from the eyes ***about motion*** and in several different ways.

Actually, we're still only barely beginning to grasp how all this works in the human mind. Here we are, a multi-billion dollar industry based entirely on how the human visual system works, and we barely comprehend the basics. In recent years we've learned from people who have experienced, either through accident or illness, that they cannot see things unless they are moving, or vice versa. From these people, we now know that vision is processed in parts of the brain and in ways we never realized.

In illustrating binocular vision, Wheatstone also effectively created the science of photogrammetry (which translates approximately into "light drawn to measure"), by which we use images of objects as a means to measure them. He had to do this because photography did not yet quite exist when he began his work, and so he had to draw his stereo views by hand.

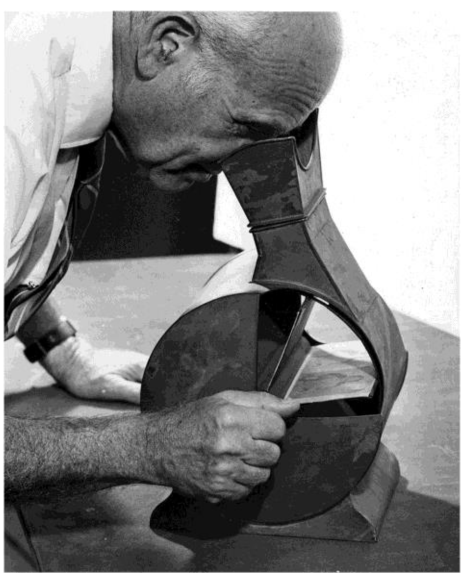
Wheatstone is all over anybody who will make him the stereo views he needs to demonstrate his binocular vision theories, and both Daguerre and Talbot are known to have done so.

Stereoscopes became an immediate rage and by 1851 the year of the Crystal Palace Exposition, 250,000 were sold in a three month period.



Queen Victoria herself was enthralled by them. As the story of the pursuit of moving pictures unfolds from the “50's through the 80's, much of the effort is directed at a stereo version , notably Max Skladanowsky’s “Bioscope”. Much of this detailed in H. Mark Gosser’s, *Selected Attempts at Stereoscopic Moving Pictures and their Relationship to the Development of Motion Picture Technology, 1852-1903* (1977)

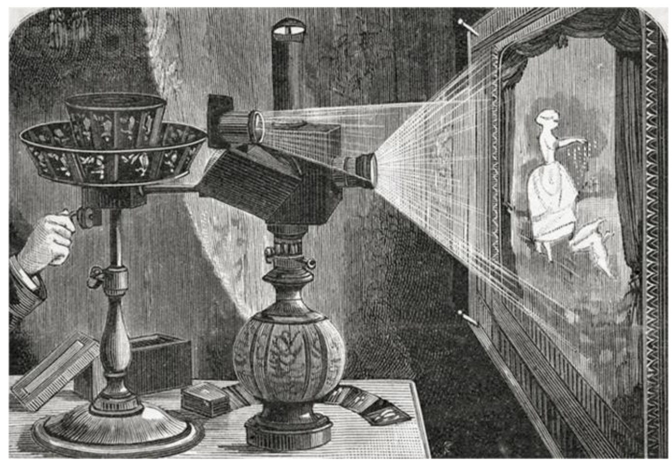
This approach by Wheatstone only provided for 8 Pairs of moving stereo images and was not very effective.



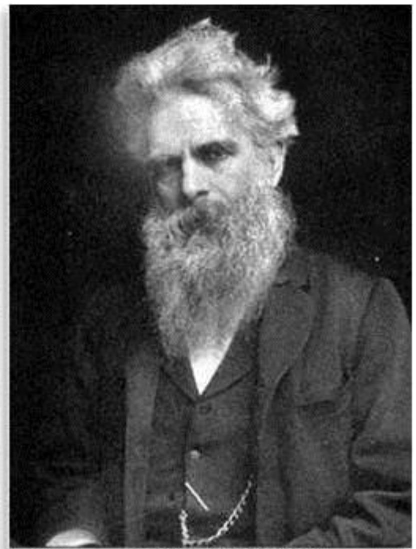
Coleman Sellers version of 1861 is getting better and anticipates the Mutoscope by some thirty years.

But the stereo approach to moving pictures was inhibited by the desire to project the images. Projectionists, a vital part of our art form today, of course, preceded the cinema. In earlier days they were often known as, “lanternists” and, as we’ve seen, have been with us since at least 1420. So, Marshall, (AMPAS projectionist) your profession is actually 592 years old!

This leads us to Reynaud and the projection praxinoscope.



The Theatre Optique was definitely a precursor to the motion picture theatre, showing complete screenplays to an audience.

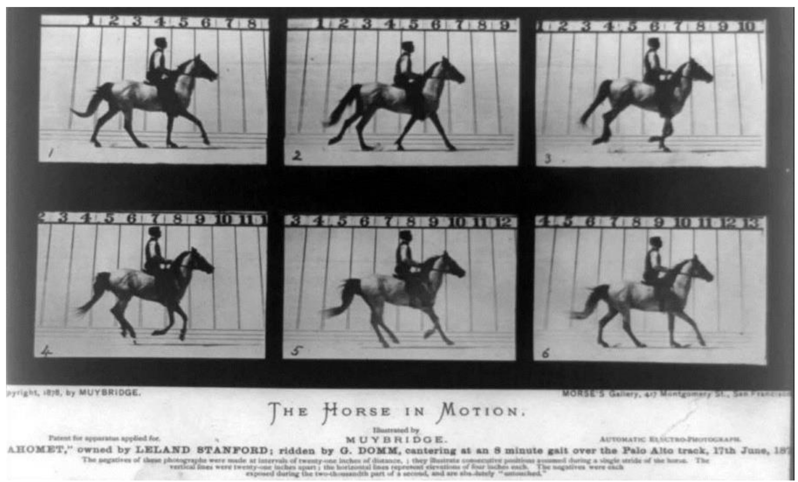


Eadweard Muybridge

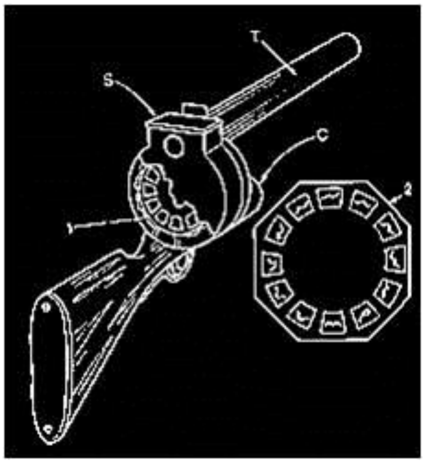
While Reynaud's projecting Praxinoscope was quite definitely Beguiling Optical Entertainment, the effort to produce photographic moving pictures was quite definitely driven by science.

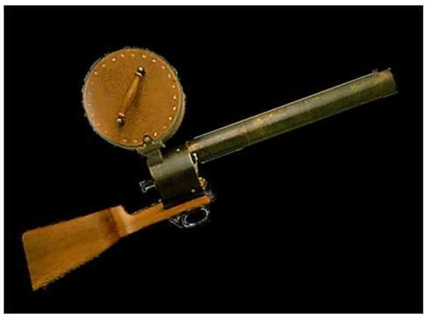
The photographer Edweard Muybridge, famous for his work with…

…the Stanford horse project in 1872 while an excellent pictorial photographer, was also a photogrammetrist. He used photography to study and measure, and for a time was employed by the U.S. Government Coastal Survey.

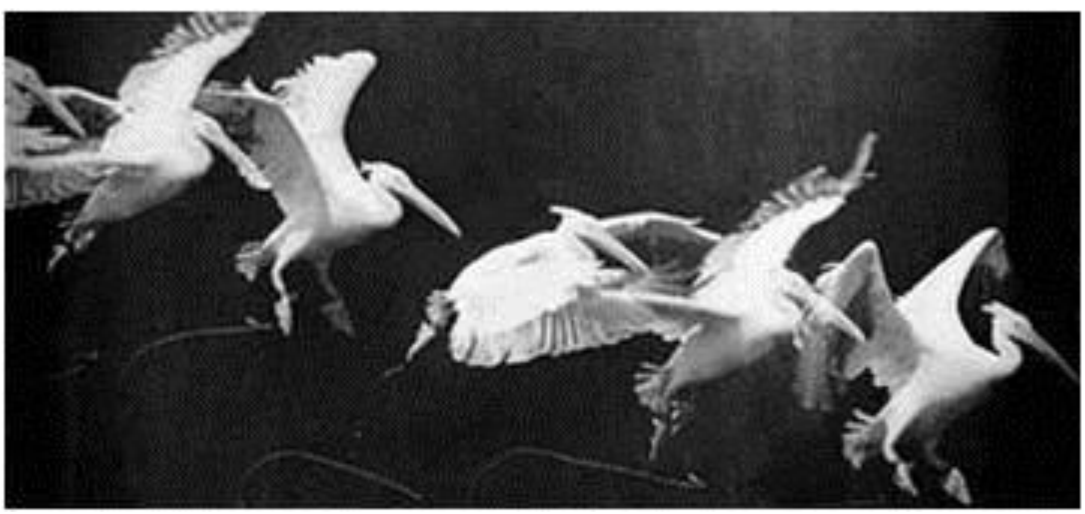


Closely allied in this science was Etienne Jules Marey who used images to study physiology…

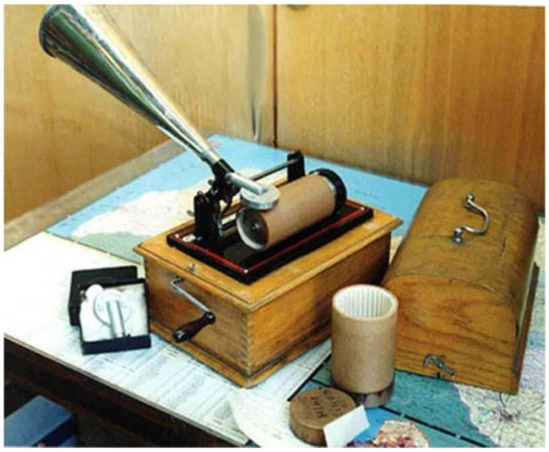




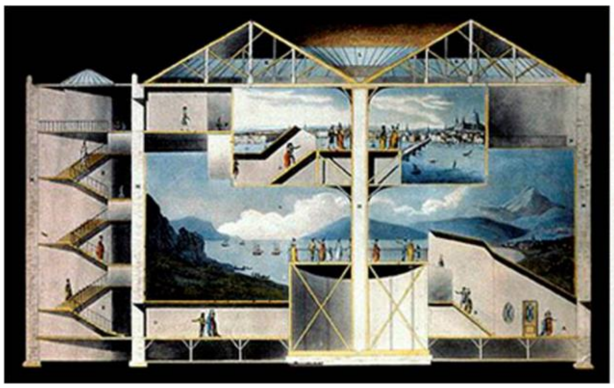
…and created a sort of “photo-tommy gun” capable of “shooting” images at a rate of 100 a second.

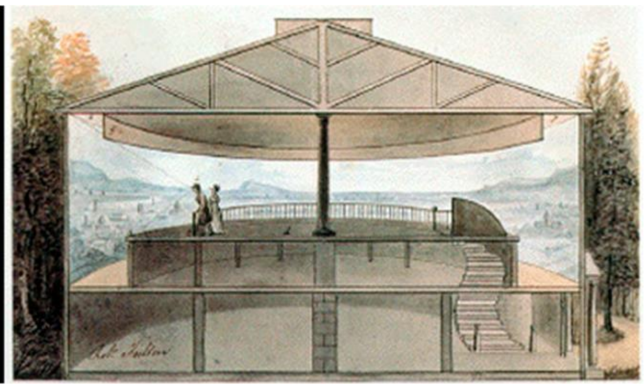


But while they had the potential for being rendered as “movies” the actual goal was to view them like this.



They were both aware of each others work - and aware of both of them, was a certain Thomas Edison. In ‘87 Edison instructed William Dickson to create a visual counterpart to his phonograph. As with his now familiar cylindrical sound recording device, the visual version would record minute images in a spiral around a cylinder so that both sound and image could be replayed together.





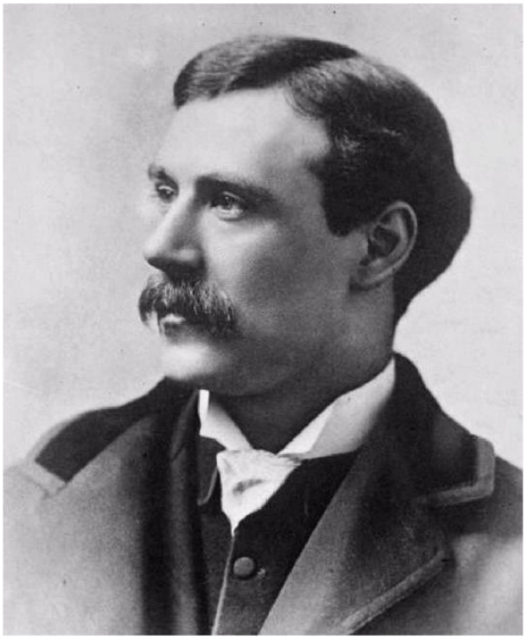
Meanwhile French born Louis Aimé Augustin LePrince, who’s the manager of Pollpot’s panorama company in New York, conceives the notion that the panorama effect would be greatly enhanced if it were possible to project numerous real life moving scenes within the grand scale of the panorama.

LePrince experiments with both single and multiple lens cameras, the sixteen lens camera, by the way, is clearly designed to shoot eight successive “stereo pairs” of images.

In 1888 Edison met with Muybridge who demonstrates the "Zoopraxiscope" and the following year, 1889, Edison traveled to France for the Exposition Internationale, saw Reynaud's work and met Marey and recognized the validity of Reynaud's and Marey's use of long continuous rolls, which fortunately, now became generally available from Eastman Kodak, though Eastman had not originated the concept.

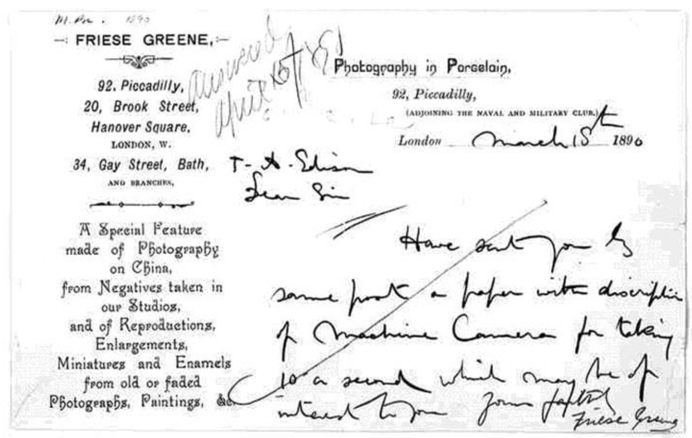
So, by the close of the decade, our now galvanized and growing community of inventors and scientists are right at the point of bringing motion pictures into being. The field now includes, besides those already mentioned: Leon Bouly, Wordsworth Donisthorpe, Max Skladanowsky, Herman Casler, Birt Acres, Kazimierz Prószynski (pronounce: Casimir Prooshinsky, Woodville Latham, with LePrince efforts showing every sign of imminent success. At which point he simply disappears.

He boards a train in Dijon and is never seen again. Were he actually known to be dead at the time, his family would have carried on his work, but, being merely "disappeared," the family, and the work, remained paralyzed, until he could be declared legally dead



seven years later. Conceivably a very convenient grace period for some. Years later, his son Adolph, who had spent years trying to establish his father's priority claims, died of a gunshot also under mysterious circumstances. LePrince' wife Lizzie believed both deaths were foul play. Clearly, there is a great deal of this period of the history that we do not yet know. There is a book, and a film, titled, "The Missing Reel" by Christopher Rawlence that discusses some of this mystery. Hard behind LePrince was William Friese-Greene who was unable to sustain the costs of a very promising technological effort and went bankrupt.

He had even written to Edison in hopes of selling out to him, though all he may have accomplished there was to spur Edison on. At the time, Edison denied ever receiving such a letter from Friese-Greene, but after Edison's death the curator of Edison's records found the letter. At any rate Friese-Greene died in 1921, broken and penniless.



FRIESE GREENE,

92, Piccadilly,
20, Brook Street,
Hanover Square,
LONDON, W.
34, Gay Street, Bath,
AND BRANCHES,

A Special Feature made of Photography on China, from Negatives taken in our Studios, and of Reproductions, Enlargements, Miniatures and Enamels from old or faded Photographs, Paintings, &c.

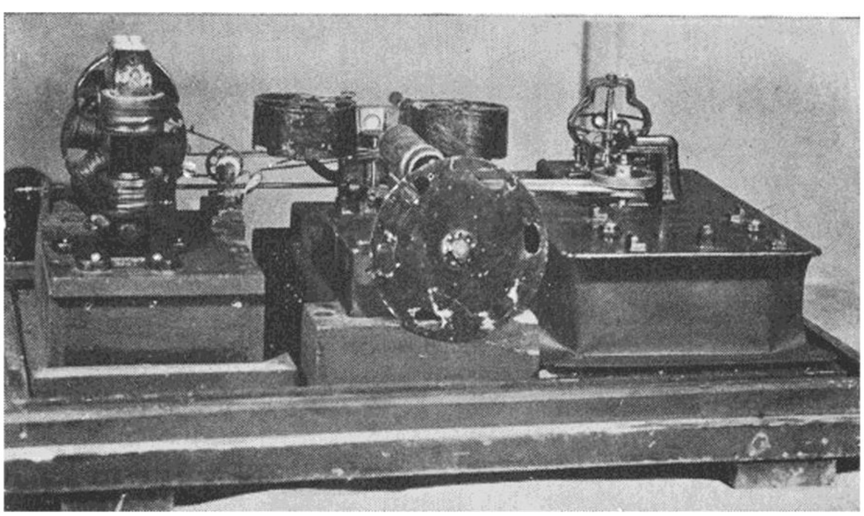
Photography in Porcelain,
92, Piccadilly,
(ADJOINING THE NAVAL AND MILITARY CLUB.)

London March 15th 1890

T. A. Edison
Dear Sir

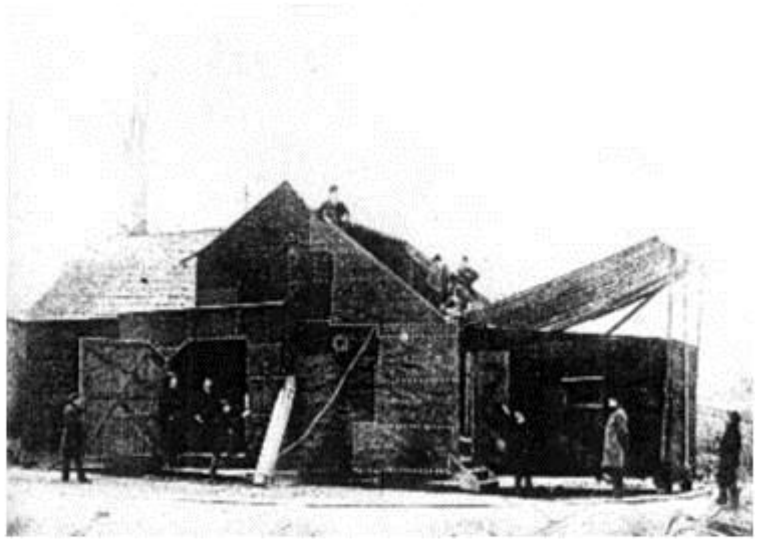
Have sent you by same post a paper with description of Machine Camera for taking 10 a second which may be of interest to you

Yours faithfully
Friese Greene



Devising a motion picture camera was now demonstrably achievable and William Dickson did just that for Edison in 1891 with the "Kinetograph."

In 1893, Dickson had a stage built called “The Black Maria.” It rotated so it could align with the sun. On this stage a great number of the earliest films were made.



Projecting motion pictures, however, was proving somewhat more difficult. So for the display system for the “Kinetograph” Dickson built the “Kinetoscope,” a personal viewer. Two vital developments were needed to make this really practical: The Maltese cross provides a way to obtain a rapid intermittent action from a constantly rotating drive, so that an image could be displayed long enough to be comprehended. And this very important stratagem, a loop of slack film formed before and after the “gate” so that the film could be swiftly advanced one frame, without having to pull the weight of the entire roll of film behind it. This was claimed by the Latham’s and is known as the “Latham Loop,” but may have preceded them.