"The Historical Development of Optical Toys" (1820-1900)

Nathalie Newman

THE NATIONAL COLLEGE OF ART AND DESIGN

"THE HISTORICAL DEVELOPMENT OF OPTICAL TOYS IN EUROPE FROM 1820 to 1900."

A THESIS SUBMITTED TO THE FACULTY OF HISTORY OF ART AND COMPLEMENTARY STUDIES IN CANDIDACY FOR THE DEGREE OF BACHELOR OF SCIENCE IN INDUSTRIAL DESIGN (ENGINEERING).

THE FACULTY OF DESIGN

DEPARTMENT OF INDUSTRIAL DESIGN

BY: Nathalie Newman (Nathalie Newman)

DATE: 20.4.82.

TABLE OF CONTENTS:

BIBLIOGRAPHY

1. "On Photography" by Susan Sontag
Published by Allen Lane Penguin Book Ltd. London 1973.

2. "To Catch a Sunbeam" by G.A. Household & L.M.H. Smith
Published by Michael Joseph (London)

3. "Customs & Faces 'Photography'" by Sir Benjamin Stone
Published by Bill Jay Academy Editions London 1972

4. "The Focal Encyclopaedia of Photography"
Published and written by The Focal Press 1961

5. "The Focal Encyclopaedia of Film & Television Techniques"
Published and written by the Focal Press 1961

6. "Photography Essays & Images" by Beaumont Newhall
Published by Martin Secker, Warborg Ltd 1981 (London)

7. "History of Photography" by E. Epstean
Published by Columbia University Press, New York, 1945

8. "The Real Thing An Anthology of British Photography, 1840 - 1950"
Published and written by The Great Britain Arts Council

9. "Early Photography" by Patrick Daniels
Published by Academy Editions London 1978

10. "The Victorian Home" by Jenni Calder
Published by Batsford London 1977

11. "Eminently Victorian Aspects of an Age"
Written and published by B.B.C. Radio
London 1964

PHOTOGRAPHIC BIBLIOGRAPHY

1. Mimosoidas Suchas, Acacia. A Photogenic Drawing, c 1839 (Time Life)

2. Calystegia Sepium. A Photogenic Drawing, c 1839 (Time Life)

3. Early Box Camera, c 1840 (Time Life)

4. Devil Lantern Slide (National Science Museum, London)

5. Illustration of a Magic Lantern by W. Hooper, c 1787 (National Science Museum, London)

6. "Unidentified Lady", Daguerreotype, c 1855 (Essays and Images, Newhall)

7. Fox Talbot Studio, c 1840's (Time Life)

8. Binocular Type Stereographic Viewer (Time Life)

9. Hand-Held Stereographic Viewer (Time Life)

10. Elaborate Stereographic Stand Viewer (Time Life)

11. Simple Folder Stereographic Viewer (Time Life)

12. Early Carte-de-Visite Camera (Time Life)

13. Three of Talbots Box Cameras (Time Life)

14. Muybridge's Zeotrope (Time Life)

15. Revolver Camera, c 1882 and Necktie Spy Camera (Time Life)

16. Photographic Gun (National Science Museum, London)

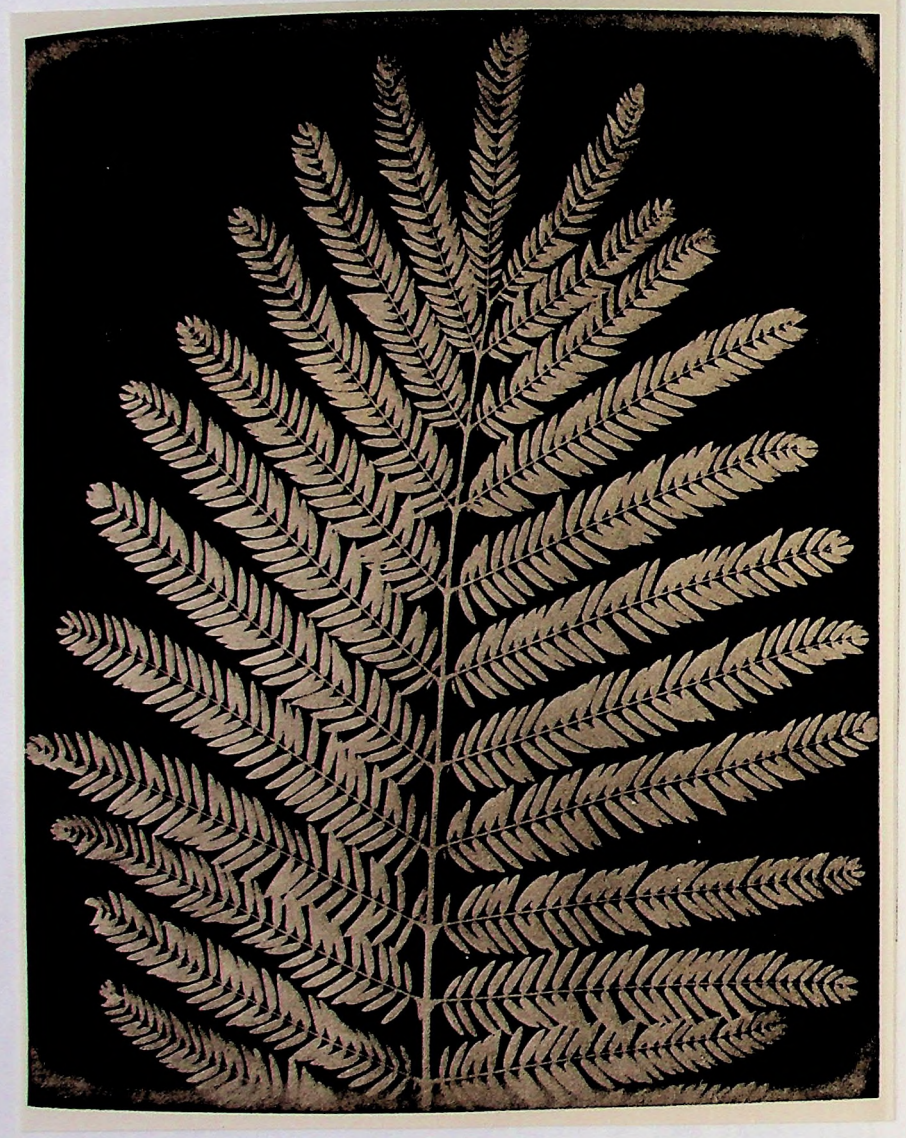
17. Photographic Gun (National Science Museum, London)

18. Eadweard Muybridge's "Attitudes of Animals in Motion", c 1881 (Essays and Images, Newhall)

19. Kodak 'Eastman' Camera (Time Life)

20. "The Hand Camera, A Portfolio of Catalog Illustrations" (Essays and Images, Newhall)

21. Eadweard Muybridge "Two Models Running" (Essays and Images, Newhall)



1. Mimosoidas Suchas, Acacia. A Photogenic Drawing, c 1839 (Time Life)

INTRODUCTION

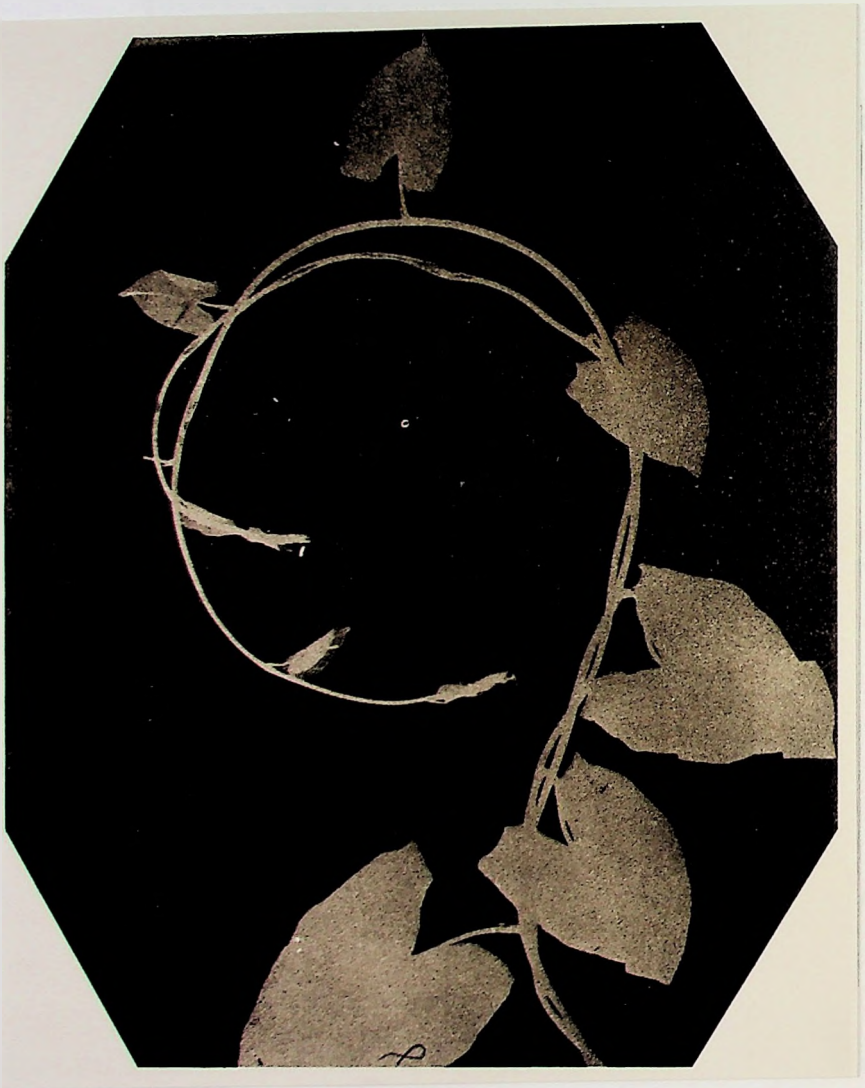
> "The age when taking photographs required a cumbersome and expensive contraption - the toy of the clever, the wealthy, the obsessed - seems remote indeed from the era of sleek pocket cameras that invite anyone to take pictures".

The words of Susan Sontag from her book "On Photography" are indeed true. In a mere sixty years between 1820 and 1880, man had discovered and perfected the ability to capture instantaneous images, in the form of the photograph. Not purely the achievement of the photochemists but of the camera too. Though today an integral tool of society, the camera was not always so, in the early 19th century (then the "camera obscura"), was one of many optical toys available to the Victorians. Where many of its comtemporary toys have since become obsolete, the camera exploited by the mass production techniques of the industrial revolution, has become big business.

Today, the camera is the means of verification of all human activities and for many has

become the mode of classifying what is beautiful or ugly. It has deluded us into believing that we are all equally discerning and creative artists. Interestingly, it has grown hand in hand with that other 20th century phenomenon the 'tourist'.

The aims of this paper are to trace the development of Victorian optical toys, and to observe both the factors that influenced them and their influences. The paper should illustrate not only the technical achievements but also the social awareness which kindled such development. It should also highlight the ever expanding horizons of the camera, from a source of amusement to the early Victorians, through the more sophisticated 'peep shows' of the 1890's, to the camera as we know it today.



2. Calystegia Sepium. A Photogenic Drawing, c 1839 (Time Life)

1.1 Optical Toys Prior to 1820

1.1.1 The Camera Obscura

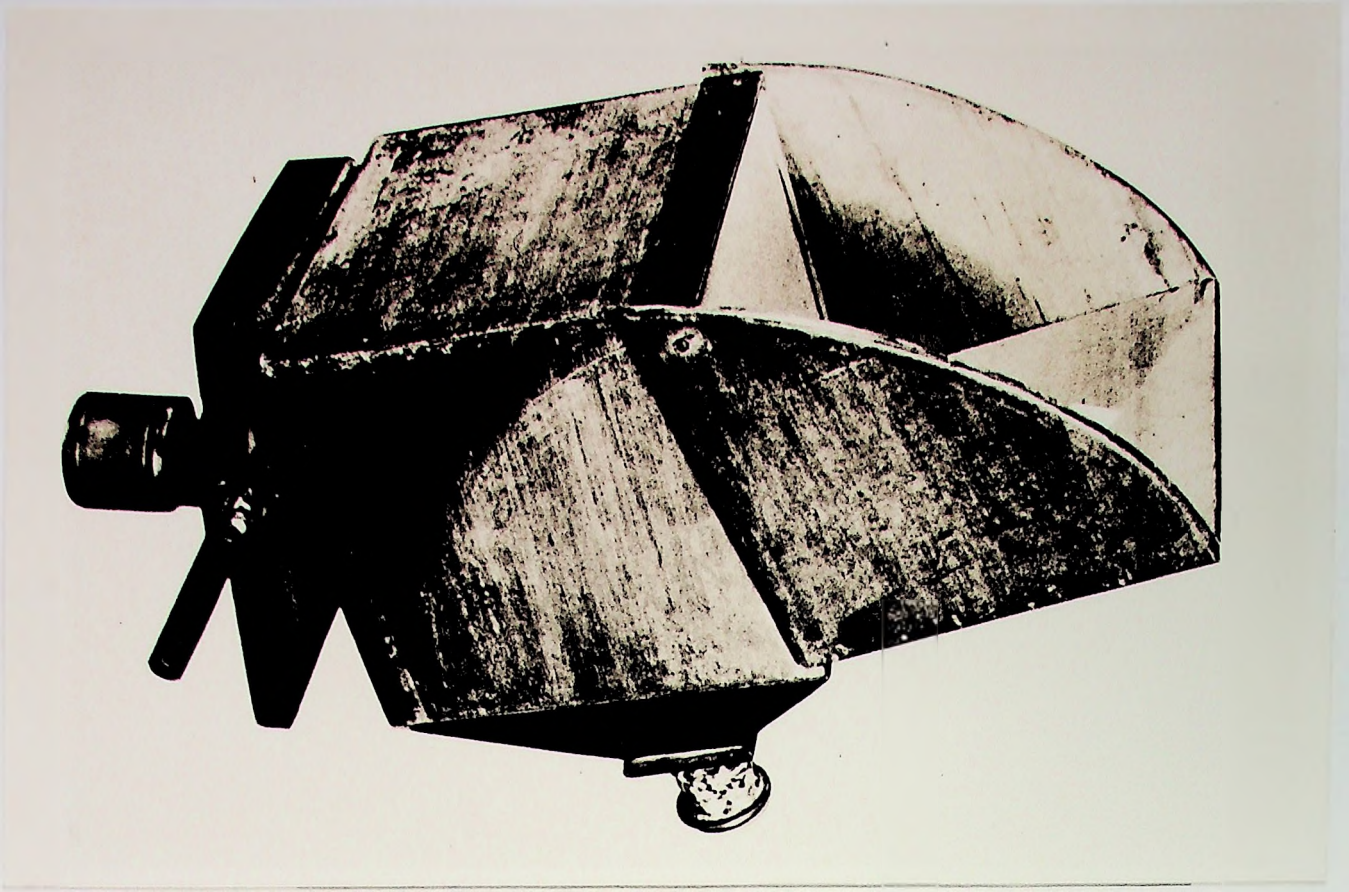
The word 'camera', derived from Latin, means 'room'. So the 'camera obscura' was in its essence a darkened room, with one small light source. It was observed that an inverted image of the exterior scene was projected onto the opposite wall.

The principles of the camera obscura can be traced as far back as the C4th B.C. by Chinese scholars. It is not heard of again until 1039 A.D., in accordance with the account given by the Arabian scholar, Atheran. the camera obscura was a common place phenomenan at that time.

Since the earliest times great civilisations have crumbled and buried some highly developed technology with the dust, e.g. the secret of the Pyramids, the Aztecs, the Easter Islands, etc. In this way the camera obscura disappeared yet again in the 11th century and, though mentioned by Leonardo De Vinci in the C15th, it was not fully resurrected until the C16th by Roger Bacon.

The latter half of the 16th century saw many changes to the camera, resulting in a clearer image and a portable model. Until 1558 the camera obscura was nothing more than a toy, a spectacle. In 1550 the camera was fitted with a bi-convex lens by Cardano, which improved the magnification properties. The addition of a diaphragm by Danial Barbaro in 1568, sharpened the image, but it was when Danti reflected the image on a concave mirror to eliminate invertion in 1573, that the camera obscura became a potentially useful instrument. It was Giovanni Battista Porta who in 1558 realised the usefulness of the camera obscura as an artist's aid, as the image projected portrayed perfect perspective. He encouraged the development of portable models, tents, cubicles and later a pocket version.

In 1676 Johann Sturm introduced the mirror at 45° to the lens, correcting the inverted image and deflecting it into a translucent surface from where it could be traced. The bi-convex lens was replaced with a combined lens and ground glass in a brass tube in 1685 by Johann Zahn. This improved focusing and was the forerunner of the C19th box and reflex



3. Early Box Camera, c 1840 (Time Life)

camera. But it is not until 1816 that the camera obscura was combined with photochemistry to obtain a permanent image in the form of a photograph.

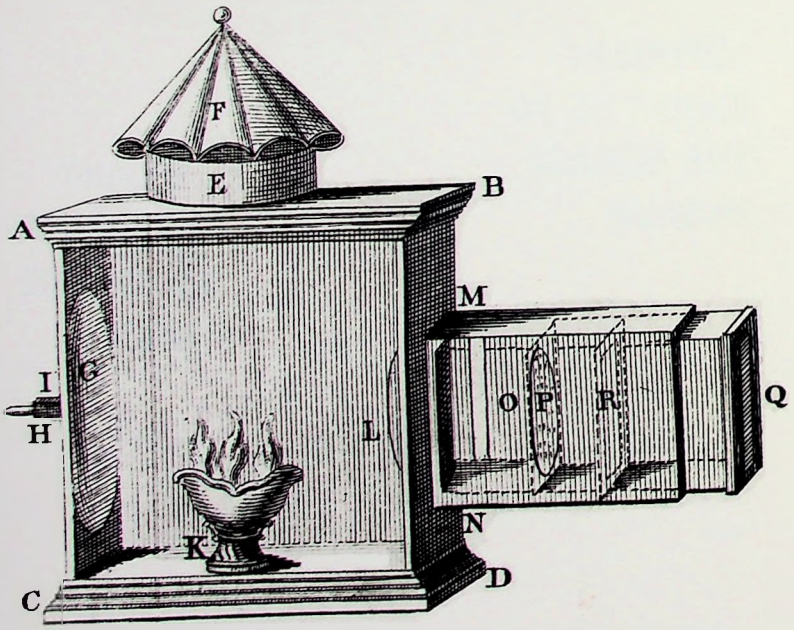
1.1.2 Early Photochemistry

The principles of blackening silver nitrates were discovered in 1565, but it was through the experiments of Johann Heinrich Schuke (1637 - 1744) that it was observed that the darkening was directly due to exposure to light radiation. Experiments at sensitising paper with silver salts were not undertaken until the C18th by Thomas Wedgewood (the son of the famous potter, Josiah Wedgewood). Exposed areas of the paper were seen to blacken, yielding a silhouette image of the object. As a fixing method was not developed until 1826, the images were not permanent, and were called 'shadowgraphs'.

1.1.3 The First Photographic Image

In 1816, Joseph Nicephore Niepce made photographic history when he combined the two essential principles, 1, a suitable optical device to produce an image (the camera obscura) and 2, a surface permanently altered by light to receive an image on exposure. Niepce's first "heliographs" (as

4. Devil Lantern Slide (National Science Museum, London)



5. Illustration of a Magic Lantern by W. Hooper, c 1787 (National Science Museum, London)

they were called), recorded faint images with the camera obscura on a sensitised plate, with an exposure of up to eight hours. Permanent images were to allude him until 1826, when photography escaped the realms of fantasy and became a reality.

1.1.4 The Magic Lantern

The origins of the "magic lantern" another pre-Victorian optical toy are obscure, it would appear that the principles of optical projection had been known since the early C17th but little or not progress was made until the invention of 'limelight' in about 1650. Using candles the image could not be projected any significant distance as the lumin* output was too low. When a mixture of hydrogen and oxygen played onto lime was ignited, it produced a brillant white light (limelight), capable of projecting a bright, clear image up to 70 feet away.

The optical principles of the "magic lantern" differ little from those of present day slide and overhead projectors. A concave mirror (now called a cold light reflector) situated behind the lamp (today, a low voltage, high

*lumin: unit of measurement of light output

power halogen lamp), gathers the light and reflects it through the slide. A tube at the front of the case, contains the lens, which focuses and magnifies the image to be projected on a screen.

As each slide had to be hand painted on glass, the "magic lantern" was reserved for the privileged rich, and so its popularity dwindled. It was not revived until the middle of the C19th, when photographic plates made slides more readily available and subject matter more diverse.

1.1.5 The Social Awareness of the Pre-Photograph Era

Portrait painting, miniatures and silhouettes had created a demand among the Victorians for the instantaneous image makers. Portrait paintings popularised during the Renaissance had continued to be fashionable among the wealthy of the C18th. The birth of the miniature broadened the market for portraits as they were infinitely cheaper, but it was not until the 1780's that portraits became available to the masses, in the form of the 'silhouette'. It was the invention of the amateur profile maker, the french Minister of Finance, Etienne de Silhouette. In 1786, duplication became possible. Using a lamp behind the subject, the image was transferred

onto a glass plate. When traced by the operator, the motion was transmitted to a scribe onto a copper plate by a system of levers, similar to a "pantograph". Details of features and costume could be added as desired. The plate was then inked and printed. The system was designed by Giles Louis Chretien and was called the 'physionotrace'. Silhouettes became highly fashionable among all classes, they were cheap and were the first readily available form of permanent mass imagery. The camera was not to compete successfully with silhouettes until forty years later.

Bibliography:

The Focal Encyclopaedia of Photography
The Focal Encyclopaedia of Film and Television
Photography, Essays and Images, Beaumont Newhall
History of Photography, E. Epstean

ALBERT SANDS SOUTHWORTH & JOSIAH JOHNSON HAWES. Unidentified lady. ca. 1855. Daguerreotype taken with a camera fitted with a movable plate holder, the invention of Southworth. The Metropolitan Museum of Art, New York.

6. "Unidentified Lady", Daguerreotype, c 1855

(Essays and Images, Newhall)

CHAPTER 2 (1980 to 1900)

2.1 The Victorian Attitude to Photography as a Hobby

Drawing room entertainment of the Victorian gentry was an inexhaustible industry, no expense was spared, and novelty was paramount. In a materialistic era, possessions had considerable social status and still do today. In this atmosphere of the idle rich of Europe and to a lesser extent America, boredom was an endemic disease, especially among the house-ridden ladies, and to work as a social stigma. So it is not surprising the number of inventors who dabbled in science and technology during the early C19th, as tinkering with mechanisms as a legitimate passtime for the gentlemen of society and a source of amusement for the ladies. It was not until the 1850's that photography became a commercially competitive business. The introduction of patents, as individuals tried to protect their designs, shall later be shown to be at the expense of technological development.

Optical toys developed in two major areas during the 1820's; 1, the camera and the search for a

permanent image or photograph and 2, the motion picture illusion. Over the next eighty years, both fields were to develop to unprecedented heights, each year producing new designs as photochemical techniques appeared. Photography became what almost amounted to an obsession among the rich Victorians.

As 'stills' photographic techniques were perfected they were combined with motion to form the moving picture. To avoid duplication from this point the two areas, still and motion photography, will be treated separately.

2.2 The 'Stills' Camera and the Photograph

2.2.1 The 1820's

Joseph Nicephore Niepce

In 1826 Joseph Nicephore Niepce succeeded in producing the first permanent photographic image. By exposing a pewter plate (made light sensitive with bitumen) for up to 8 hours in the camera obscura, he was able to achieve a faint image of some neighbouring farm buildings. The results were disappointing however, as during the long exposure period the movement of both the sun and and the wind effected the image. It is interesting

that some features of Niepce's first camera were prototypes of modern camera technology, such as (A) the accordion middle section (similar to a square bellows) and (B) the variable iris diaphragm (similar to a variable shutter). In order to observe the progress of the image during the long exposure period, Niepce introduced a spy-hole into the body of the camera, this feature was to be used again by Fox Talbot in the 1840's.

Louis Jacques Mande Daguerre

About the same time Louis Jacques Mande Daguerre (a scenic painter) was also preoccupied with producing a permanent image with the camera obscura. Daguerre had previously used the camera to achieve the spectacular effects of his 'Diorama'. The 'Diorama' introduced in 1822, was a special theatre set. Huge translucent paintings were given dramatic effect by changing the direction, intensity and colour of the lighting and by the relative movement of the paintings.

2.2.2 The 1830's

On the 4th January 1829, the famous partnership of Niepce and Daguerre was agreed. Due to the indiscretion of Chevalier the lens manufacturer

who supplied both men, Daguerre had heard of Niepce. The partnership had taken 3 years to establish (as both were suspicious of divulging their ideas) and was only to last 4 years, with the death of Niepce in 1833. The partnership was then carried on by Niepce's son Isidore but it was not until 1837 that a satisfactory photographic process was developed, called the 'Daguerreotype'.

Daguerre had discovered that a polished silver plate, when exposed to iodine vapour became light sensitive. On exposure to light radiation no visible image was apparent, until treated with fumes of heated mercury. The vapour formed an amalgam with minute specks of silver and the picture was made permanent by removing the undissolved silver iodine with a hot salt solution.

The process was submitted to the French Academy of Sciences to be assessed for a Government subsidy by a committee, whose members were Francois Arago (scientist and astronomer), Jean Baptiste Biot and Alexander von Homboldt. A report was to be published by the Academy on the 7th January 1839. it was leaked to the papers on the 6th.

'La Gazette de France' (Paris) ran the following article on the 6th January 1839.

"The fine arts - a new discovery."

We announce an important discovery by our famous Diorama painter, M. Daguerre. This discovery partakes of the prodigious. It upsets all scientific theories on light and optics, and it will revolutionise the art of drawing.

M. Daguerre has found the way to fix the images which paint themselves within a camera obscura, so that these images are no longer transient reflections of objects, but their fixed and ever casting impress which, like a printing or engraving, can be taken away from the presence of the objects.

Imagine the faithfulness of nature's image reproduced in the camera and add to it the work of the sun's rays which fix this image, with all its range of high lights, shadows and half-tones, and you will have an idea

of the beautiful drawings
which M. Daguerre, to our great
interest, displayed. M. Daguerre
does not work on paper at all;
he must have polished metal plates.
We have seen on copper several
views of boulevards, the Pont Marie
and its surroundings and a lot of
other places rewarded with a truth
which nature alone can give to her
works. M. Daguerre shows you the
piece of bare copper, he puts it
in his apparatus before your eyes
and at the end of 3 minutes - if
the summer sun is shining, a few
more if Autumn or Winter weakens
the strength of the suns rays -
he takes out the metal and shows
it to you covered with an enchant-
ing drawing of the object towards
which the apparatus was pointed.
It is only a matter of a short
washing operation, I believe, and
there is the view which has been
conquered in so few minutes, ever-
lastingly fixed, so that the strongest
sunlight can do nothing to destroy it.

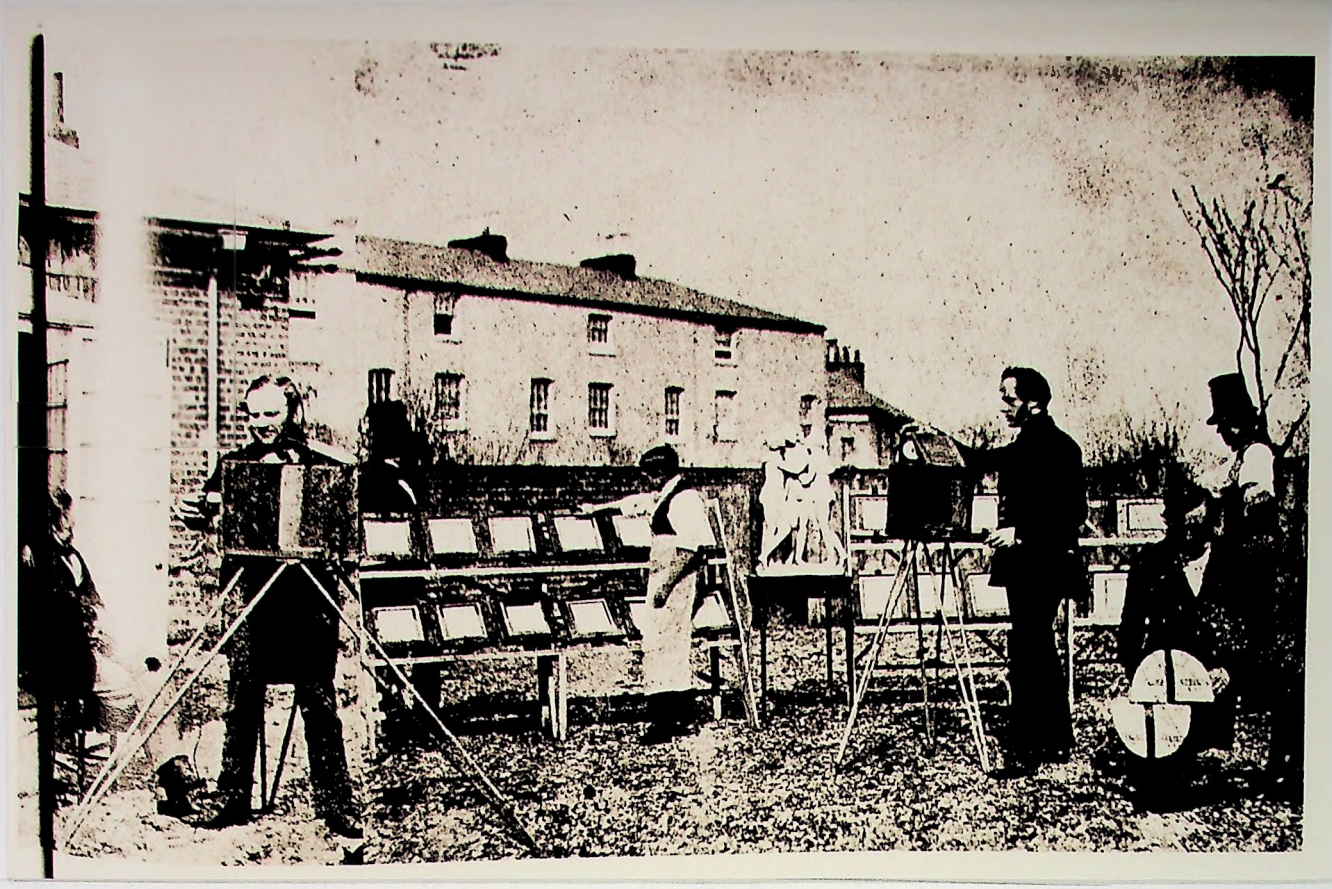
> M. Arago, Biot and Humboldt have verified the authenticity of this discovery, which excited their admiration and Arago will make known to the Academy of Sciences in a few days....."

The process was to receive considerable world wide press coverage for the remainder of that year.

> "From today, painting is dead "
>
> Paul Delaroche

2.2.3 The Daguerre Camera

The 1839 Daguerre camera consisted of 2 box sections, the rear box contained the plate and ground glass and the front section the lens. Focusing was achieved by the relative movement of one box within the other and though only 10½" long in the closed state, it could be extended to 20" during use. The camera with all its essential equipment weighed 110 lbs., this included a minimum of the plate box, the iodising box, the mercury developing box and a spirit lamp. The camera was manufactured under the name of Giroux and was fitted with a



7. Fox Talbot Studio, c 1840's (Time Life)

W.H. Wollaston achromatic meniscus prism for increased clarity of the image. The focal length was approx. 15" with an effective aperature of f14. As the 'Daguerreotype' was only patented in England competitors soon appeared in Europe, one of the more famous was Lerebours of Paris, who used a plano-convex lens with an aperature of f17.

The exposure time had been reduced to 20-30 minutes in strong sunlight, small cameras with short focal lengths and large aperatures needed the minimum exposure time, and, so became popular. Though the 'Daguerreotype' camera enjoyed considerable fame, it is not the true ancestor of the modern camera.

2.2.4 William Henry Fox Talbot

Between 1834 and 1839 William Henry Fox Talbot, an English scientist and linquist, had developed a process he called 'Photogenic Drawing', later renamed the 'Photograph' by Sir John Herschel. It was in January 1839 that Talbot first heard of the discoveries of Daguerre, which prompted him to submit a paper on his findings to the Royal Society of Great Britain on the 31st of that month, in an

effort to establish prior claim to the process. This paper was later privately published by R & J E Taylor (London) 1839, and was the first publication of any photographic process.

The same Sir John Herschel had in 1819 discovered that sodium thiosulphate was an ideal fixer for silver nitrates, and though he informed Talbot of these properties on 1st February 1839, Talbot did not adopt the process. The findings were later published in 'Comptes Rendus' the French Academy of Science's journal and were used by Daguerre. According to Talbot the process further reduced the density of the already faint image and was expensive. It should be noted that the rivalry which was to impede the evolution of photography in the 1840's had already begun.

In his own writings Talbot discribes how through successive experimentation, he had achieved a permanent image, which did not deteriorate even when exposed to direct sunlight for long periods. He discovered that the weaker the silver nitrate solution, the higher the sensitivity, and he therefore concluded quite correctly, that a treatment with a strong salt solution would effectively fix the images.

William Talbot also discovered the negative and the negative/positive process.

> "In the photogenic or sciagraphic process, if the paper is transparent, the first drawing may serve as an object to produce a second drawing in which the lights and shadows would be reversed."

By 1839 he had successfully used his process to achieve images on glass for the 'magic lantern'. He also captured the perfect silhouette and perhaps most ambitiously recorded microscopic images. The exposure time had been reduced to a couple of minutes in some applications. Talbot dispensed with the 2 part box camera by using a 2" fixed focus microscope lens in combination with a ground glass, yielding a 2½" by 1" picture.

1839 also saw the invention of the tripod with a universal ball and socket head, the inventor, Baron Seguir, also developed a less bulky collapsible bellows camera weighing a mere 35 lbs., and a darkroom tent for on-field developing.

2.2.5 The 1840's

New Camera Designs

In 1840 two new cameras were developed for use with the Daguerreotype process.

(1) Chevaliers 'photographe', a wooden folding camera (which on removing the lens and ground glass boards, allowed the two sides to hinge inwards), and

(2) the mirror camera by Alex S. Wolcott of New York. The mirror camera was totally novel, it comprised of a box with a large front, opening directly onto a mirror. The camera was light and the mirror corrected invertion. The images produced were slightly soft due to the limited 12" focal length. Wolcott was also the first photographer to open a public portrait studio in March 1840 in New York.

The new year 1841 brought the conical shaped camera by Prof. J. Petzval (Vienna), it was developed for Voigtlander and Co. Two models were manufactured in brass and wood. With exposure time down to 60 seconds, it produced circular pictures of 9" diameter. Though the double combination lens introduced in this camera remained popular until 1889, (as it allowed 16 times more light to be transmitted),

the camera itself was soon superseded.

2.2.6 The Talbot Calotype Process

The same year Talbot submitted yet another paper to the Royal Society of Great Britain, on 10th June. This paper gave details of the vastly improved photochemical process, which he dubbed the 'Calotype' but which was better known as the 'Talbotype'. The word 'Calotype' being derived from Greek and meaning 'beautiful picture'. Talbot patented his process in England from 1841 to 1852 and thus is accused of stunting photographic development in Britain during this period.

The 'Calotype' process sensitised paper by applying alternative washes of silver nitrate and potassium iodide, and finally to be treated with a wash of gallo-nitrate of silver, immediately before use. The image was not visible on exposure and was a true negative, which implied, that a considerable quantity of positives (copies) could be made from the original. Exposure length was now reduced to the incredible time of 1 second, the instantaneous picture had arrived.

In the 1840's the development of both the camera

and photochemistry seemed to stagnate. Europe's hands were tied by patents and law suits. Photography did reach America in the 40's when Francois Gourand (Daguerre's agent) arrived in New York (from France) on the 23rd November 1839. The Daguerreotype received patronage in the USA from Samuel Finley Morse. Morse was at that time involved in his own experiments with the electric telegraph.

To quote Matthew B. Brady (1823-96), an eminent American photographer,

> "improvements not very material were made from time to time, such as the Talbotype and the Ambrotype. I think it was not till 1855 that the treatment of glass with collodion brought the photograph to supersede the Daguerreotype".

2.2.7 The Development of the Glass Negative

Using paper for a negative gave a mottled effect on the positive and limited the resolution of fine detail. The idea of using glass was suggested, but as glass is not

absorbent, a suitable coat containing light sensitive salts was required. The cousin of Joseph Niepce, Abel Niepce de Saint Victor, was the first to capture an image on glass in 1847. The glass was first treated with egg white and albumen to gain sensitivity, it was then coated with potassium iodide and albumen, and finally sensitised with acidified silver nitrate. The glass was developed in gallic acid.

2.2.8 The 1850's

The first magazine camera appeared in 1850, it was designed by Marcus Sparling. Ten sheets of sensitised paper were stored in separate holders, each sheet being dropped after exposure into a receptacle underneath the camera body.

1850 also produced Louis Desire Blanquart-Evrard's improved sensitising by coating the paper with albumen containing ammonia chloride before treatment with silver nitrate. This process produced a better print, which was less prone to fading, and which proved ideal for glass collodion negatives. It remained in use until the 1890's.

The observation by Delacroix in 1850, illustrates

how on a geological timescale, photographic technology was developed in a mere milli-second.

> "Since the light of the star (Vega) which was daguerreotyped, took 20 years to transverse the space separating it from the earth, the ray which was fixed on the plate had consequently left the celestrial sphere a long time before Daguerre had discovered the process."

2.2.9 The Collodion Process

1851 is yet another significant date on the calendar of photographic history. It was the year in which the revolutionary 'Collodion' process was discovered. It greatly overshadows the discovery of Gustave Le Grey, who improved the sensitivity and storage capacity of paper without deterioration merely by waxing the photographic paper prior to sensitising. In the same year a novel camera was designed by R. Willatis of London. Willatis invented a very light collapsible conical camera, which had a cloth body capable of expansion. The camera only 4" deep when collapsed, took 8½" x 10½" pictures.

The birth of the 'collodion' process came at a time when both the daguerreotype and the calotype were restricted by patents in Great Britain. The patents gave the U.S.A. the opportunity to become world leaders in photography, they won most of the awards at the Great Exhibition in 1851.

A description of the 'collodion' process first appeared in "The Chemist" in March 1851, and was the discovery of Frederick Scott Archer, a British sculptor (1813-1857). The 'collodion' process which became universal for a quarter of a century successfully combined the perfect detail of the daguerreotype and the advantages of the cheap calotype negative, from which numerous unexpensive positives could be made. Using Abel Niepce de Saint Victor's experiments (with albumen on glass) as a starting point, Archer soon found that collodion was perfectly suited for photographic purposes. When poured over the glass, the collodion produced an even, transparent film. This film was to some degree tough and elastic and could withstand the essential handling required at all stages of the process.

Collodion consisted of gun-cotton in ether, into

which either potassium iodide or silver iodide was mixed. When poured onto the glass plate, the ether quickly evaporated, leaving a tacky coat of collodion on the glass. The plate was then plunged into a bath of silver nitrate and finally washed in water. The plate was now ready for exposure and could be developed in either gallic or pyrogallic acid. As the plate was wet during exposure the process was known as 'wet-collodion'. Though it both reduced exposure time and increased sensitivity, that each plate must be prepared immediately before use, was a considerable disadvantage over the calotype. Vast amounts of equipment were necessary, including a dark room (usually a tent). The dark room was eventually made redundant when a black cloth draped over the back of the camera was introduced.

When in 1852 Talbot dropped his patent on the calotype, it enjoyed new fame, which was unfortunately short lived as the wet-collodion process became generally known.

2.2.10 The Collodion Process Cameras

Newton developed a new camera in 1852, especially designed for use with the collodion

process. The camera had 4 chambers under the main body containing,

(1) the sensitising bath,

(2) the developing solution,

(3) the rinsing water and

(4) the fixing bath.

The collodion plates were attached to a rod, which lowered the plate through each compartment on a rack and pinion mechanism. This camera is perhaps the forerunner of modern polaroid cameras. The collodion type camera tended to be designed according to the size of picture required, and so the 1850's saw the development of both larger and smaller cameras.

2.2.11 The New Photographer

The birth of the amateur photographer is also a 50's phenomena, as the dageurreotype, calotype and collodion process were generally available and camera manufacturing became a commercial competitive business. In 1853 a group of amateurs and professionals set up 'The Photographic Society of London'. The opening paper given by Sir William John Newton (1785-1869) underlines the controversial position of photography within the arts:

> "I will now take this opportunity of adverting to another mode which an artist may fairly adopt, with respect to his negatives, in order to render them more like works of art, and I am particularly desirous of directing attention to this subject, because it has been recently stated in this room, that a photograph should always remain as represented in the camera, without any attempt to improve it by art".

Newtons main argument was that by taking photographs slightly out of focus, photographs "though less chemically, would be found more artistically beautiful". Many felt that the photograph did not enhance nature but highlighted its imperfections. The black and white could not do justice to the colours, tones and half-tones of reality.

The same feelings were shown towards photographic portraits, many could not bare the truth as revealed by the camera. The camera was too harsh, it had no heart, in the words of Lady Elizabeth Eastlake, (wife of Sir Charles Eastlake, Director of the National Gallery of Art in London, and

later the Photographic Society of Great Britain).

> ".... generally speaking, the inspection of a set of faces, subject to the usual conditions of humanity and the camera, leaves us with the impression that a photographic portrait, however valuable to relative or friend, has ceased to remind us of a work of art at all."

In a paper written by the above mentioned lady, she arrives at a surprisingly modern conclusion that photography is "a new medium of communication". She proposes that photography is not to compete with art and that its main function should be in the recording and verification of facts and events. At that time the majority of photographic establishment employed artists at high salaries to touch, colour and finish photographic portraits. So the photograph could not claim to be an art form or if so a rather incomplete one.

2.2.12 The New Cameras of the 1850's

While many philosophical arguments as to the position and future of photography within society

were being discussed, new technical developments continued to appear on the market. In May of 1854 A.J. Melhurish and J.B. Spencer produced the first roll-film. Sensitised waxed paper was rolled onto a holding spool to be transferred to a receiving spool within the camera body. These were available in various sizes. Another roll system appearing in the same year was the work of Capt. H.J. Barr of the Indian Service. His system consisted of several sheets of sensitised paper fixed to a band of black calico. Each sheet was spaced approx. 2" from any other and the system eased the developing process.

2.2.13 The Stereographic Technique

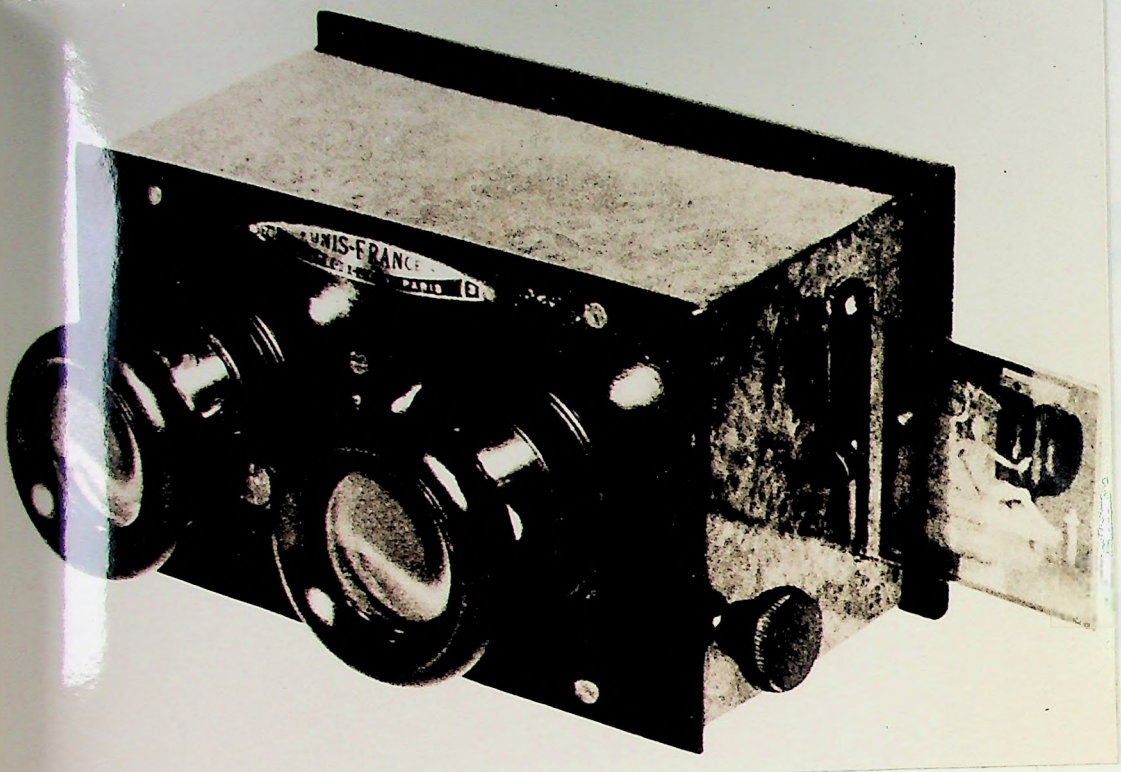
The principle of stereoscopic imagery had been established long before instantaneous photography made the stereograph a reality. Its invention is attributed to Charles Wheatstone in 1838, but it was Oliver Weddell Holmes (1809-1894), the famous Boston physican, who reduced Wheatstone's clumsy instrument into a handheld version. The twin photographs were held at a reading distance from a pair of magnifying lenses. The effect was to produce an apparently 3 dimensional image from a pair of 2 dimensional photographs, and relied on the existence of parallax, due to the separation

of one eye from the other by a 1" or more.

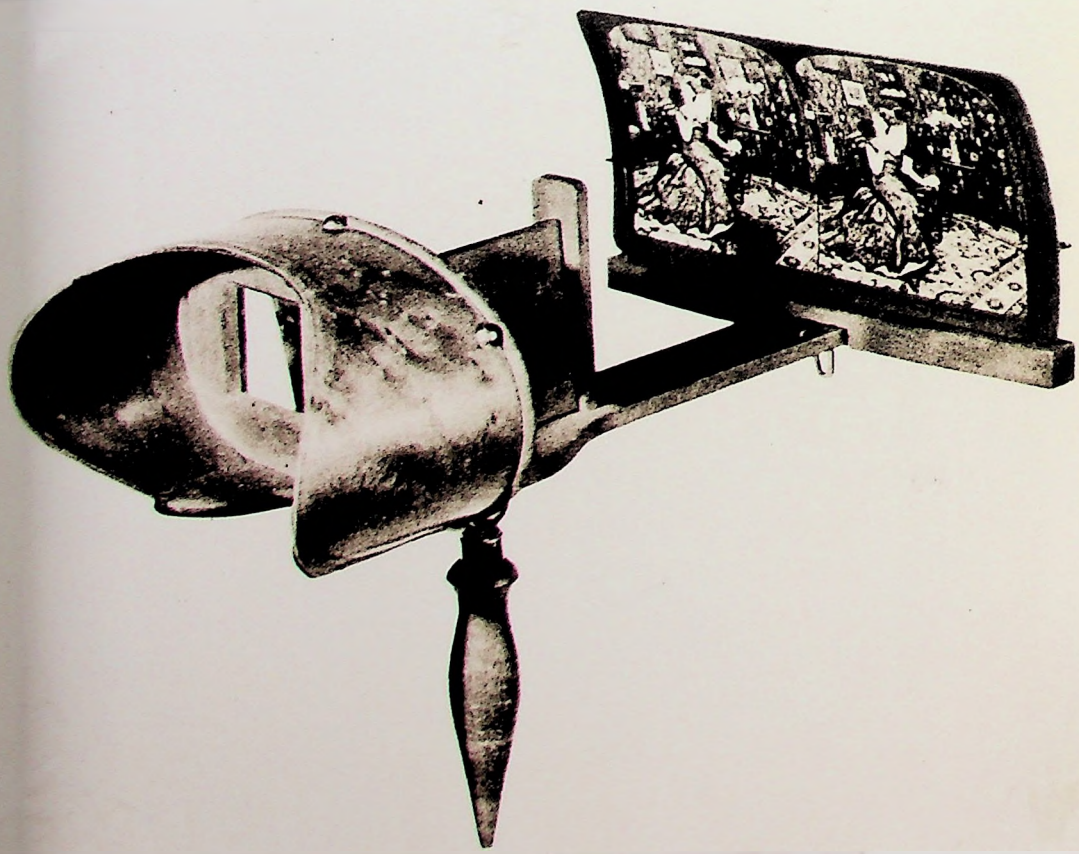
The subject matter of many of the Victorian "peep shows" was definitely often rather dubious. Some being on a power with modern day "blue movies". These were the forerunners of the more famous moving peep shows of the 1890's. Unfortunately, they have to be seen to be appreciated. Holmes' article in "The Atlantic Monthly" of June 1859 does hint at the possible content:

> "In choosing stereoscopic pictures, beware of investing largely in groups. The owner soon gets tired to death of them ... mostly they are detestable - vulgar, repetitious of vulgar models, shamming grace, gentility and emotion, by aid of costumes, attitudes, expression, ... in buying brides under veils and such figures..."

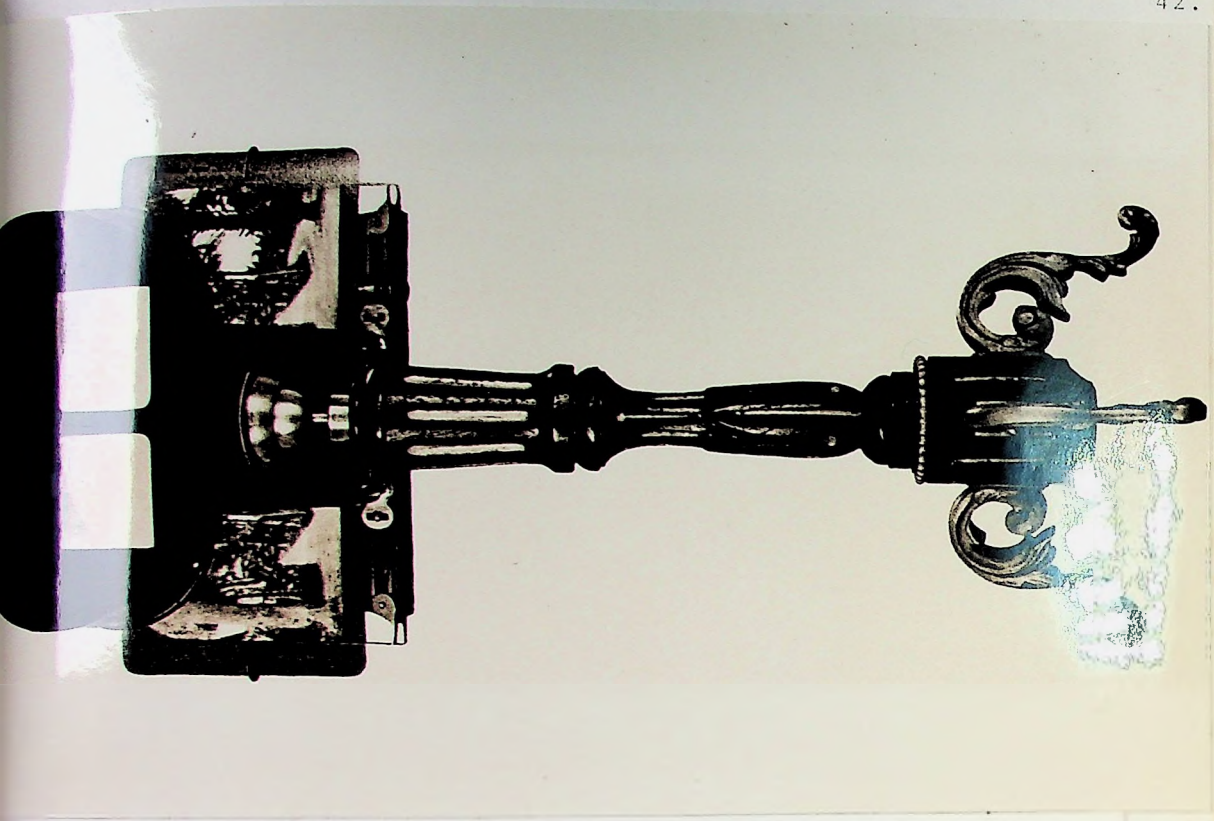
In 1856, a binocular stereoscopic camera was introduced, and was the first camera capable of taking truly instantaneous photographs of live subjects. This camera encouraged the development of smaller standard photographic cameras. One of these was Thomas Straife's



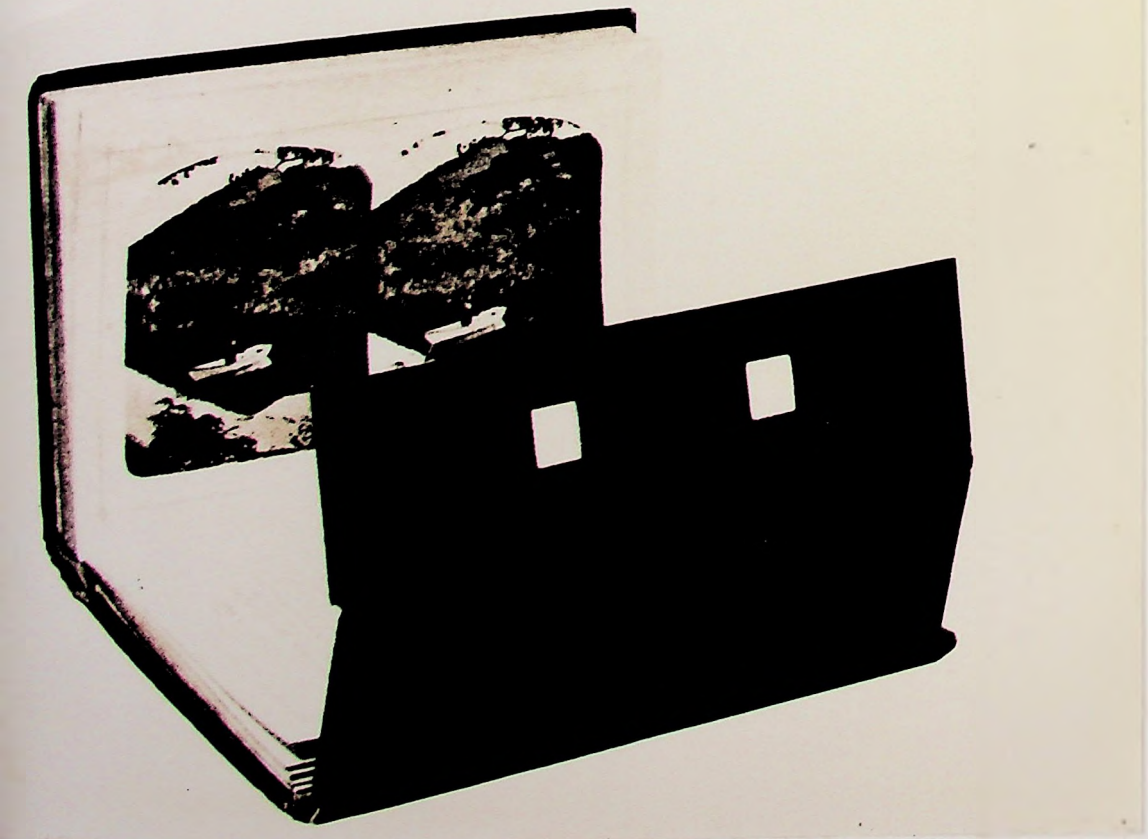
8. Binocular Type Stereographic Viewer (Time Life)



9. Hand-Held Stereographic Viewer (Time Life)



10. Elaborate Stereographic Stand Viewer (Time Life)



11. Simple Folder Stereographic Viewer (Time Life)

'pistol' camera. It appeared in June 1856 and gave 1½" diameter photographs. Another novel feature of the camera was its trigger released spring shutter, worked on a system of rubber bands.

Many attempts to keep the 'wet-collodion' moist for longer periods were made. Some of the more obscure were by using liquorice, sugar, beer, glycerine and even raspberry syrup, needless to say without any success. A more realistic method was found by J.N. Toupenot in 1855. He made a collodion-albumen plate which was coated with an emulsion of silver bromide. The process was slow, but gave good detail and kept for weeks. A reliable dry process was not to oust the wet-collodion method until fifteen years later.

2.2.14 Photographic War Coverage

A new role into which photography entered during the 1850's was that of war reportage. Today the photographs of the Crimean War, taken at that time, seem mild by comparison to the horrific, emotive pictures of the Nazi holocaust of World War Two a century later.

"In these last decades, "concerned"

photography has done at least as much to deaden conscience as to arouse it."

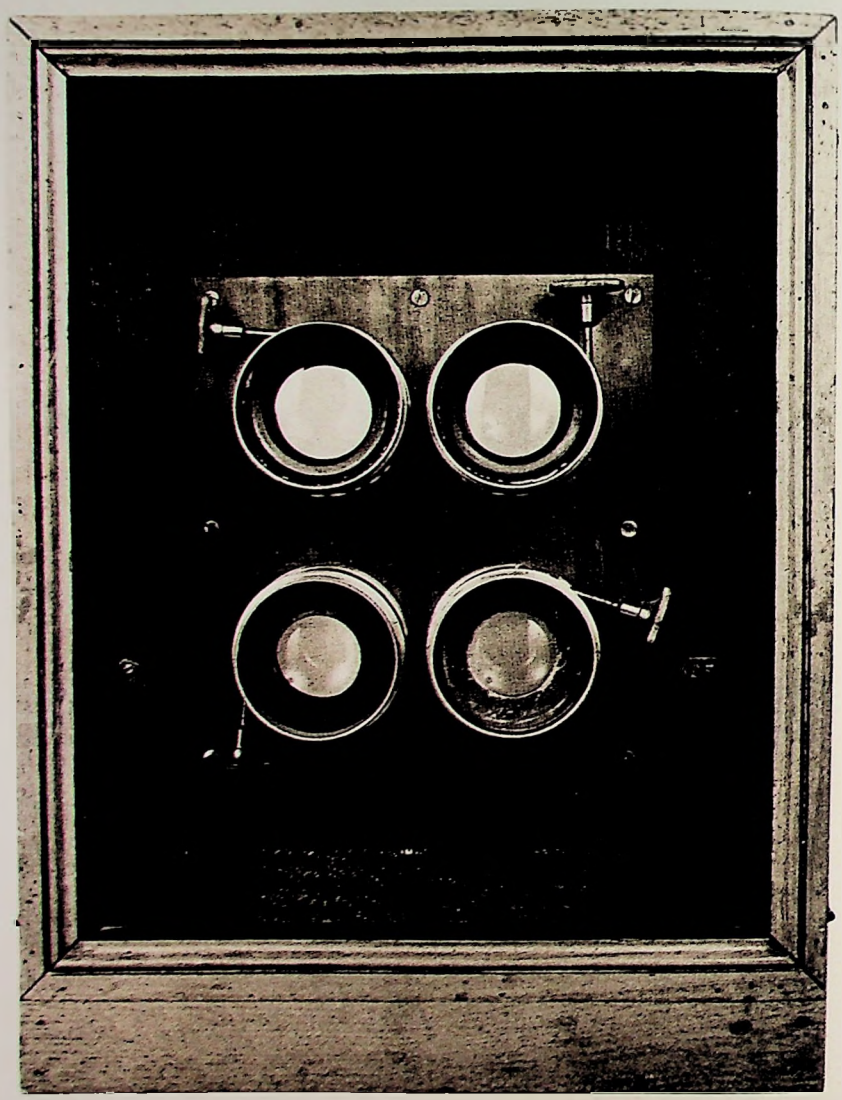
Susan Sontag.

Today we are over saturated with instantaneous visual images, to the point of indifference. Yet in 1850 the newspaper photographer was indirectly responsible for embarrassing society into recognising the terrible differences between the classes, i.e. Thomas Annans views of the Glasgow slums and inhabitants, brought about the Glasgow City Improvements Trust, active between 1868 and 1877.

2.2.15 The 1860's

The Photo-Album

As the photographic processes were perfected, the subject matter became the new preoccupation. The 1860's are remembered in photographic history for the 'carte de visite' craze. Andre Adolphe Disderi popularised this 2 x 4 inch photograph. Pictures of everything and anything were taken and collected, a popular subject was The Royal Family. The 4 x 5½ inch 'cabinet' photograph was equally popular in the 60's and the feverish collection of these images was to remain a major hobby until the turn of the century.



An early carte-de-visite camera had a focusing knob on each lens. Some cameras had lenses of different focal lengths so that views of different sizes, ranging from full-length to close-up, could be taken simultaneously.

12. Early Carte-de-Visite Camera (Time Life)

This phase produced the photograph album to hold both "cabinet" and "carte de visite's". In keeping with the Victorian obsession with possessions, the albums were often highly elaborate, contained in music boxes, etc.

> "The question does, indeed, arise whether photographs, at present manufactured, will be permanent. We have no extended experience about this and cannot have. The oldest sun-picture is younger than the reign, and it is a doubtful matter whether a Victorian 'cabinet' or 'carte-de-visite' will turn up in the year of grace 3897 ... they will at lease endure as long as any oil or watercolour paintings ..."

2.2.16 The Cameras of the 1860's

It seems indicative that each decade of the late 19th century produced another string of cameras. The 60's were no exception. In 1860 Birtsch introduced the miniature camera known as "chambre noire automatique". The camera was suited to both wet and dry collodion processes and produced a $2\frac{1}{4}$" sq. photograph. It also incorporated an illuminated ground glass view finder and

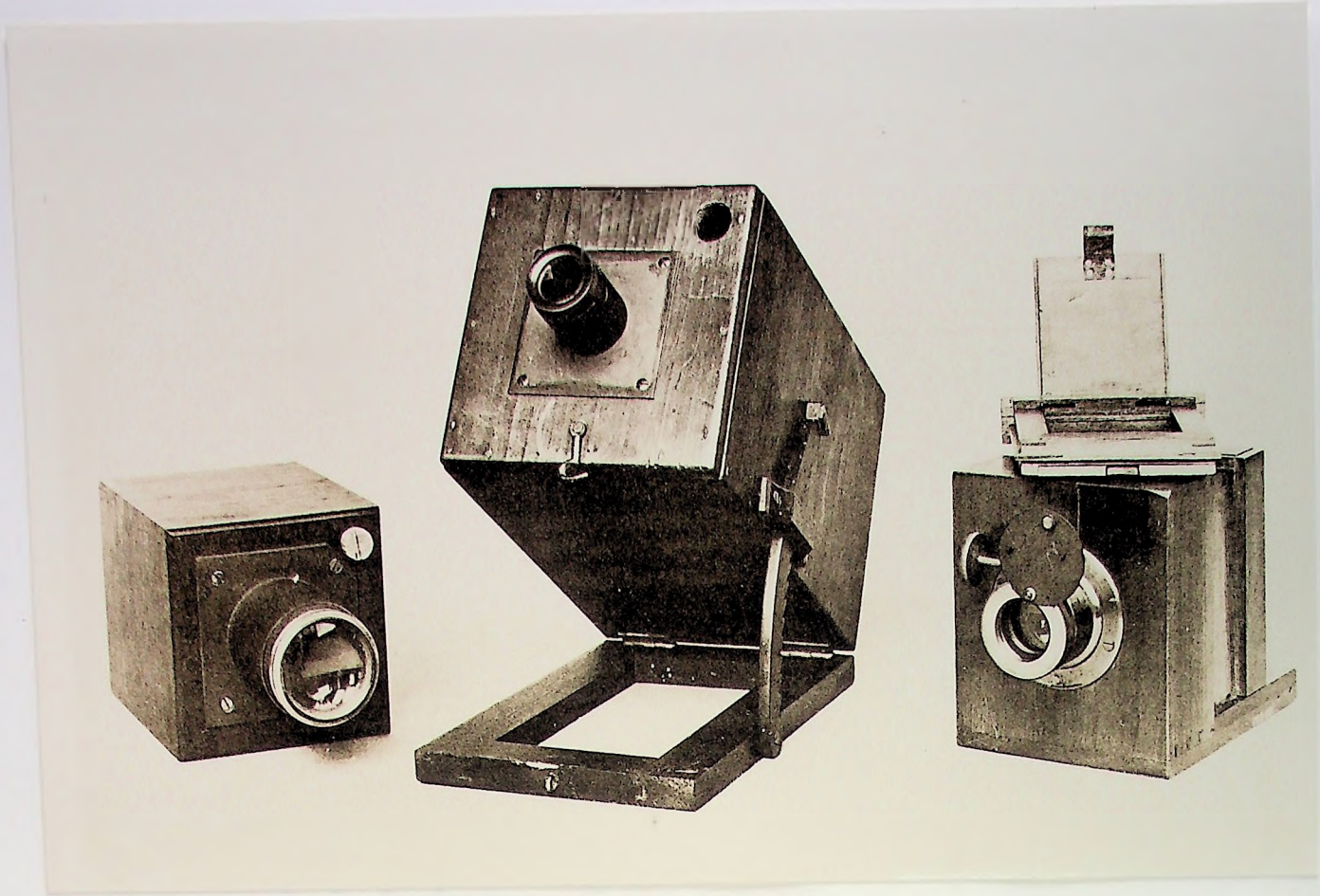
a spirit level. 1860 is also famous in that it produced the largest camera of the century, the work of a Glasgow amateur, John Kibble. The camera weighed 44 lbs., was horse drawn and produced images 36" x 44" on glass plates, it had a lens diameter of 13" and a focal length of 6', and cost £170.

The Dubroni camera (1864) was a small hand camera with internal development. The body contained a ruby glass globe, with aperture for the lens and plate. The developing solutions were introduced into the camera via a pipette, the camera was then gently rocked, and the surplus solution removed in the same manner.

Another novel camera was made by C. Piazzi Smyth in 1865. He designed an ebonite silver nitrate sensitising bath into which a 1" x 3" plate was introduced and exposed through a 1" diameter hole in the side of the bath.

2.2.17 The 1870's

The enterprising Edward L. Wilson (1839-1903), founder, editor and publisher of "The Philadelphia Photographer", wrote a best selling pamphlet in 1876 called "To My Patrons". The leaflet gave



13. Three of Talbots Box Cameras (Time Life)

advice to prospective portrait sitters, as to how they should dress and act.

> "Dress is a matter which should have your careful attention. The photographer is very much tried by his patrons sometimes, who place upon their persons, when about to sit for a picture, all sorts of gew-gaws and haberdasheries, which they never wear when at home .... never come in a hurry or a flurry. Red takes black, and red faces takes black."

2.2.18 The First Dry Plate Process

The first satisfactory dry plate process did not appear until 1871 and was the work of Dr. R.L. Maddox (London). Dr. Maddox developed a gelatin emulsion, which consisted of a mixture of cadmuim bromide and silver nitrate in warmed gelatin. In 1873 H.W. Vogel (Berlin) increased the colour sensitivity of the emulsion by adding dyes. The sensitivity was farther improved by Richard Kennett in 1874, when he marketed "pelicle" a preparation that was to be mixed with water as required by the user.

Four years later Charles Bennett published the

details of a new dry gelatin process in "The British Journal of Photography". The new emulsion was a major breakthrough, it was easily manufactured, highly sensitive, it could be stored for long periods and reduced the exposure time to $^{1}/_{10}$ of that of the wet-collodion process. Within months it was being commercially produced. The wet-collodion process virtually disappeared except in the printing industry, now the dark room could be left at home.

As the new process standardised films, as plates of known and constant sensitivity were produced, the need to calculate exact exposure lengths became a problem. Ferdinand Hunter and Vero Driffield were the pioneers of the science of 'sensitometry'. The first light meter was the 'actinograph' and was more like a table whereby assessing the prevailing light conditions, a simple calculation yielded the necessary aperture and exposure time. This was superseded by the 'actinometers' which looked like a pocket watch and contained a light sensitive print out paper. The time taken for the paper to darken to a specific tint, was recorded and used to compute the exposure lengths.

The 1880's were to witness the combined knowledge of stills photography and motion, as the dry plate process made possible the photography of moving subjects.

To trace the origins and development of the motion picture illusion it is necessary to return to the 1820's.

Bibliography:

The Real Thing An Anthology of British Photography 1840-1950 by Arts Council of Great Britain

Early Photography - Patrick Daniels

The Focal Encyclopaedia of Photography

The Focal Encyclopaedia of Film & Television

Photography, Essays & Images - Beaumont Newhall

On Photography - Susan Sontag

The Victorian Home - Jenni Calder

Eminently Victorian Aspects of an Age - BBC Radio

14. Muybridge's Zeotrope (Time Life)

CHAPTER 3

3.1 The Motion Picture Illusion

3.1.1 The 1820's

The First Moving Pictures

The first attempt at moving images appeared in 1826 with J.A. Paris'es 'Thaumatrope'. The 'Thaumatrope' consisted of a single card, attached across its centre to a string. An image was drawn on both sides of the card i.e., the trunk and branches of a tree on one face and foliage on the other. By rapid rotation (of the card) the eye automatically superimposed the images from both faces. This is possible because of persistance of vision, (the delayed reaction of the retina). The 'Thaumatrope' became a very popular toy with victorian children, as it took a minimum of skill and money to make.

In 1829 J.A. Plateau developed and prolonged the illusion of motion with the 'Phenakistiscope'. A series of sequelled images were drawn onto a circular card. The card had equally spaced apertures around its circumference. When rotated on its axis, the images visible through the apertures were reflected onto a mirror, when viewed the images appeared to move.

3.1.2 The "Zeotrope"

Four years later W.G. Horner improved the 'Phenakistiscope' and called it the 'Daedateum'. The name was later changed to 'Zeotrope'. Horner created a light sheet metal cylinder, about 1" in diameter. The drum was mounted on a central pivot and was hand spun. The top half of the drum was pierced by uniformly spaced slits. A paper band containing the animated cartoon was fastened inside the lower half of the cylinder. The illusion of movement was achieved in the same manner as the 'Phenakistiscope'. The image card could be easily removed and substituted with any number of others, as long as the number of pictures corresponded to the number of apertures. A similar machine called the 'Stroboscope', designed by S.R. Von Stampfer, also appeared in the same year (1833).

No great improvements or novel designs in the motion picture illusion apparatus appeared between 1833 and 1850. Europe seemed to be pre-occupied with the stills photograph. When in 1851, Archer discovered the wet-collodion process, the 'magic lantern', which had practically disappeared was resurrected. Now cheap photographic glass slides were possible. But it was to take 20 years for the manufacturers to avail of collodion in a commercial respect.

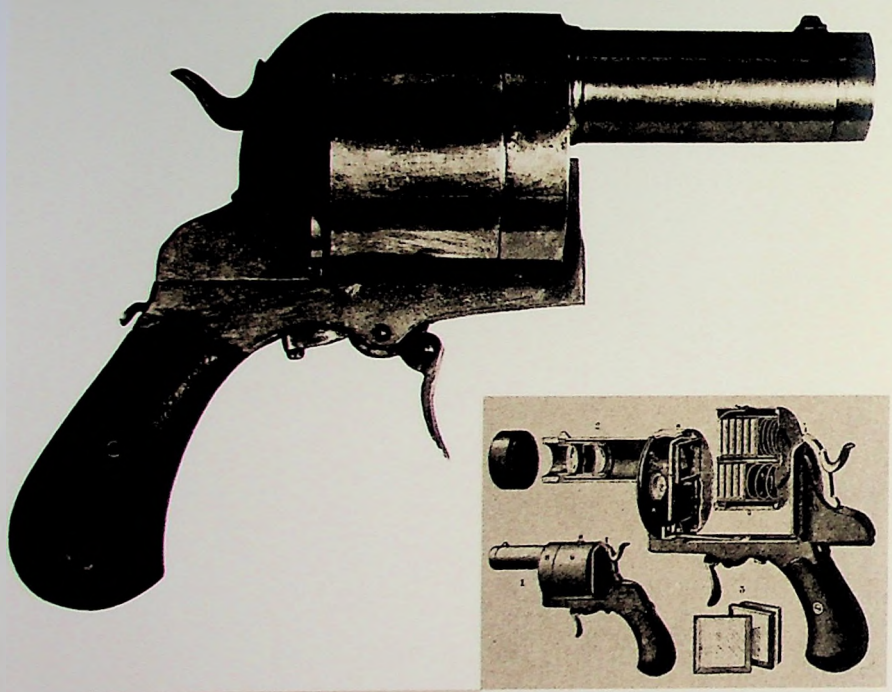
3.1.3. The Resurrection of the Magic Lantern

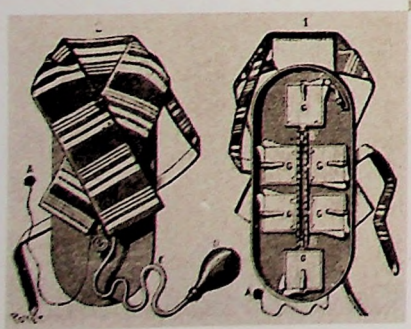
The 70's saw the mass of production of 'magic lantern' slides, on a variety of subjects as stated by G.A. Household in 1870.

> "The stories highlight the social problems of the day, drunkeness, poverty and unemployment".
>
> G.A. Household and L.M.H. Smith

A century later the above quote still rings true. In the 1870's and 1880's the Temperance Movement (started in Maine, U.S.A. in 1851) had spread to Europe. It was the topic of many lantern slide stories, a section from the script of "Jessies Last Request", illustrates this:

> "A lady kind who came to see us,
> A pledge book in her hand?
> She pressed us all to sign, father,
> And join a Temperance band,
> She said that none were safe who took
> The drink in little drops,
> It led to drinking more and more,
> At home and liquor shops;"
>
> From "Jessies Last Request" by J.J. Lane.





The works of the revolver camera at top are revealed in this 1882 engraving. It held 10 tiny plates and a lens in its barrel. After squeezing the trigger to make the exposure, the user rotated part of the chamber, moving the exposed plate into a lower compartment and bringing a fresh plate into position.

A necktie camera was hidden beneath the folds of a cravat; the only visible parts were the lens, disguised as a stickpin, and a winding knob that looked like a button at the bottom of the tie. By turning the knob the user moved a chain to bring each plate into position (cutaway view, left); by pressing a bulb concealed in his pocket he snapped the picture.

15. Revolver Camera, c 1882 and Necktie Spy Camera (Time Life)

James Bamforth of Holmfirm, Yorkshire, was the largest slide manufacturer. His organisation included film studies, actors, scriptwriters (a text accompaning each group of slides) and artists. The production of slides was done on a seasonal basis, shooting taking place during the summer with slide manufacturing, painting and script writing done during the winter. The colours still had to be hand painted onto each slide and as they had to be transparent, variety was originally very limited. But as manufacturers became more skilled at mixing transparent colours with prussian blues, indigo's etc. (to produce remarkably colourful images), the black and white slide soon became obsolete.

Reference to the amazing skills of the slide artists is made by G.A. Household in "To Catch a Sunbeam".

> "The artists, probably all women trained and employed specially for the purpose, developed considerable skill in working in detail on glass plates only 3¼" square. Their paintings had to stand up to very

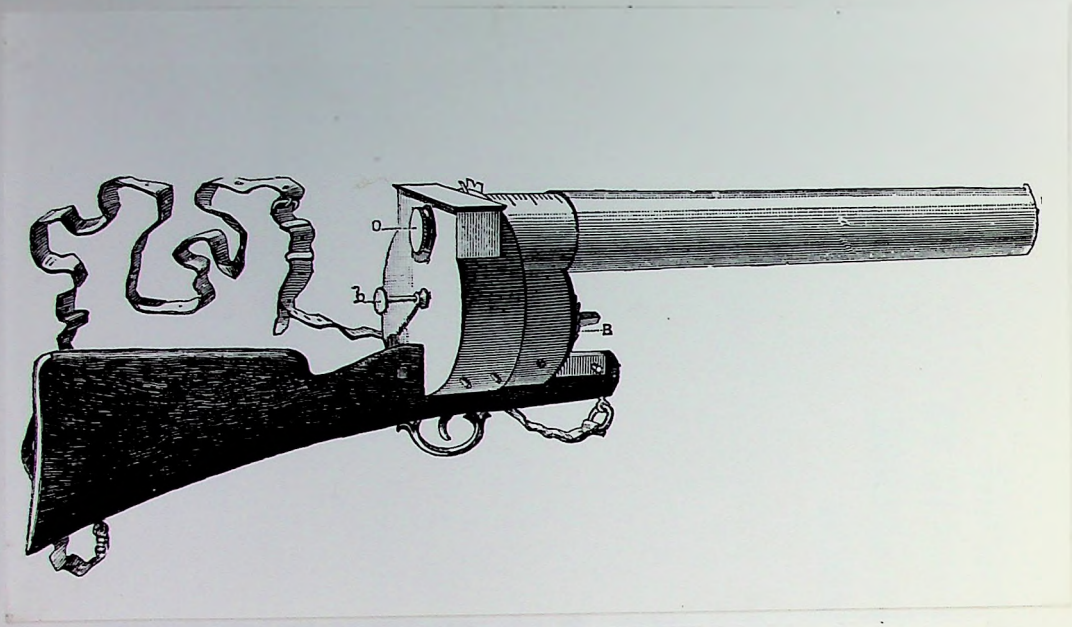
large magnification and it was due to their skills that black and white lantern slides quickly became unacceptable to the public".

"To Catch a Sunbeam" G.A. Household and L.M.H. Smith.

The 'magic lantern' was capable of producing astonishing effects on the screen, such as dissolving one image into another (fading-out) and superimposing slides. Continous movement for short periods was also possible. Blanking was used, two or more lanterns side by side, or top on top, through which a long back-ground slide was slowly cranked, e.g. a train pulling into a station. It was to take many years for the motion picture to acheive the same flow and unflickering movement.

3.1.4 New Motion Picture Developments

In 1874 Janssen recorded the transit of Venus across the sun, using his 'astronomical revolver'. Two years later W. Donisthorpe exposed plates in rapid succession for viewing in a zeotrope. Molteni adapted the zeotrope to be used within the magic lantern. Using a glass image bearing disco with rotating shutters on the same axis. For each rotation of the picture disc, the



16. Photographic Gun (National Science Museum, London)

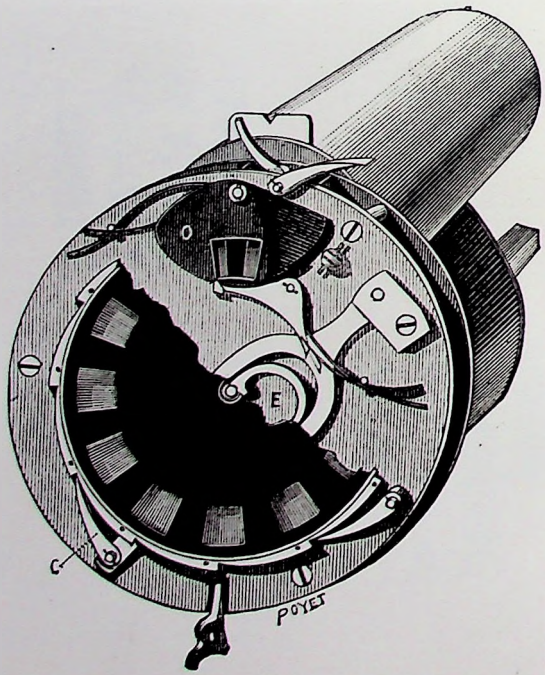


Fig. 76.—Details of the interior of the photographic gun.

17. Photographic Gun (National Science Museum, London)

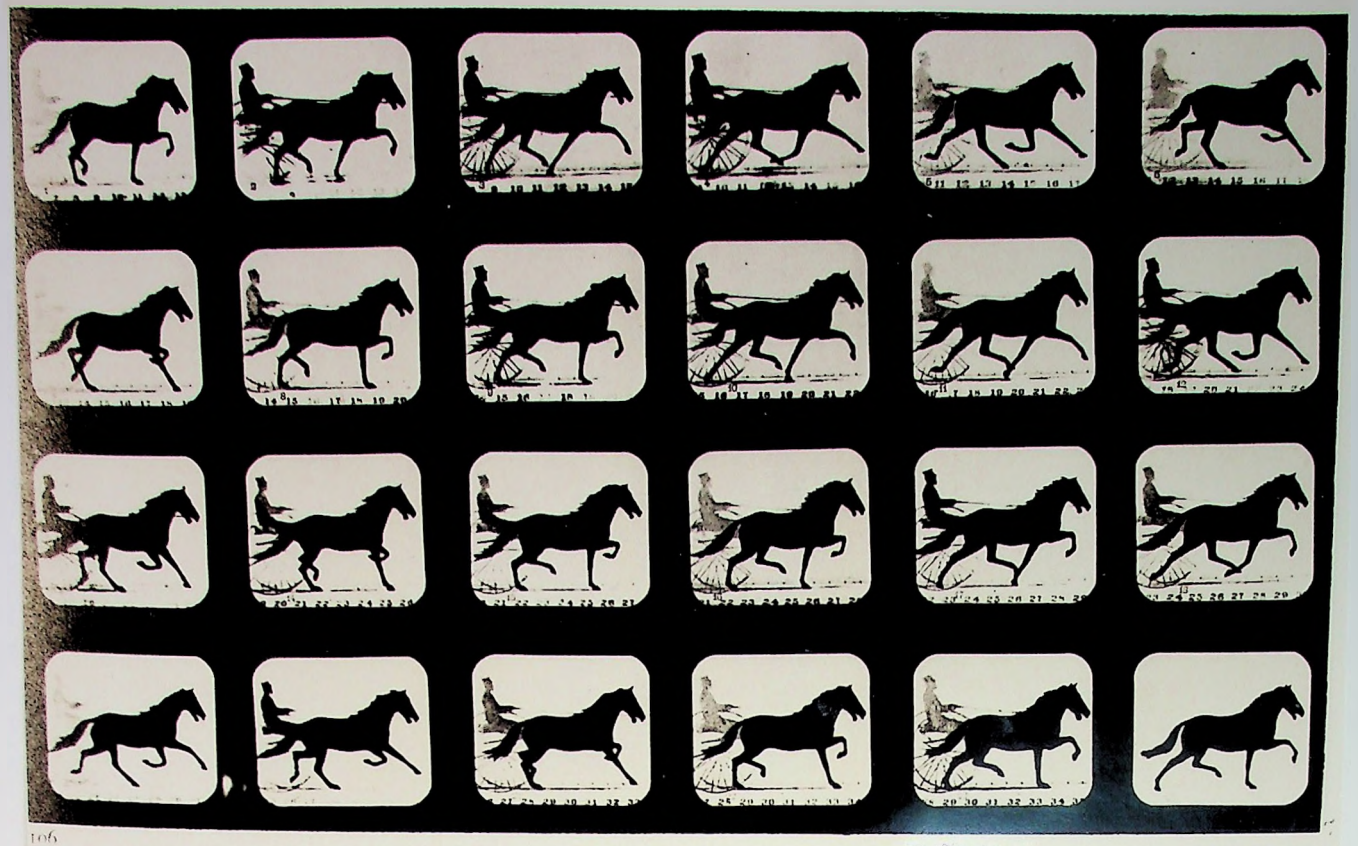
shutters rotated 10 times. This gave a very fluid movement of the images and was rather improved by Beale's 'Choreutoscope'. His image disc moved intermittently by a form of maltese cross mechanism. For each revolution of the shutter one picture was visible. The invention of the 'choreutoscope' is also claimed by W.L. Hughes in 1884.

In 1877, the same year as Edward Muybridge was to commence his experiments with sequel pictures of moving horses, Emile Reynaud developed the 'praxinoscope' (a form of zeotrope). In the 'mirror drum' (as it was later called) a band of drawings were not directly viewed, but were seen as a virtual image reflected onto a 12 sided mirror drum, situated in the centre of the cylinder.

3.2. Motion Pictures 1880's

3.2.1 Eadwaerd J. Muybridge

Eadwaerd J. Muybridge (1830 - 1904) was an English born photographer, who worked in California. Muybridge was under the patronage of Governor Levand Stanford, an enthusiastic horse owner. On Stanfords request Muybridge made many attempts to photograph Stanford's horses in motion. He first set up a battery



18. Eadweard Muybridge's "Attitudes of Animals in Motion", c 1881 (Essays and Images, Newhall)

of cameras, to be activated with a trip-wire over which the horse would run. This, however, was unsuccessful as the wires frightened the horse and consequently the movement was unnatural. Muybridge then fitted electric starters to the cameras. The results were successful and were to be viewed in either a zeotrope or a 'zoopraxiscope'. The 'zoopraxiscope' was Muybridge's own invention in 1880, and was a combination of the zeotrope, and a magic lantern. It consisted of a circular glass, on which miniature images of the required animal were represented at regular intervals. Equi-distant from the image small slabs admitted the light source projecting the image onto the screen. Muybridge exhibited his films at an exhibition at the San Francisco Art Association on May 5th 1880, it was met with considerable excitment. A contemporary account reads as follows:

> "Nothing was wanting but the clatter of the hoofs upon the turf and an occasional breath of steam from the nostrils, to make the spectator believe that he had before him genuine flesh and blood steeds".
>
> "San Francisco Call"
>
> (May 5th, 1880)

Two years later (1882) E.J. Marey (France) produced the 'photo gun'. A circular plate allowed the twelve exposures by using a rotating shutter. The plate was moved intermittently (by a clock mechanism) between exposures.

3.2.2 The Mass Production of Cameras

The 1880's market was swamped with cameras. The fast bromide paper developed by Maddox, had not only made pre-prepared paper possible but also enlarging. The new cameras were light weight, compact and easy to use. There were four main varieties, the change-box, the magazine, the roll-film and the reflex cameras.

3.2.3 The Change-Box Camera

This camera usually contained 12 exposures of either glass plates or cut paper film, held in a separate (change) box attached to the main camera body. This permitted a change of film in full daylight, it also incorporated a counter system, so the photographer could record the number of exposures taken. Each plate was held in a separate sheath and manipulated into place for exposure. The change-box camera had been prototyped as early

as May 1867 by H. Cook.

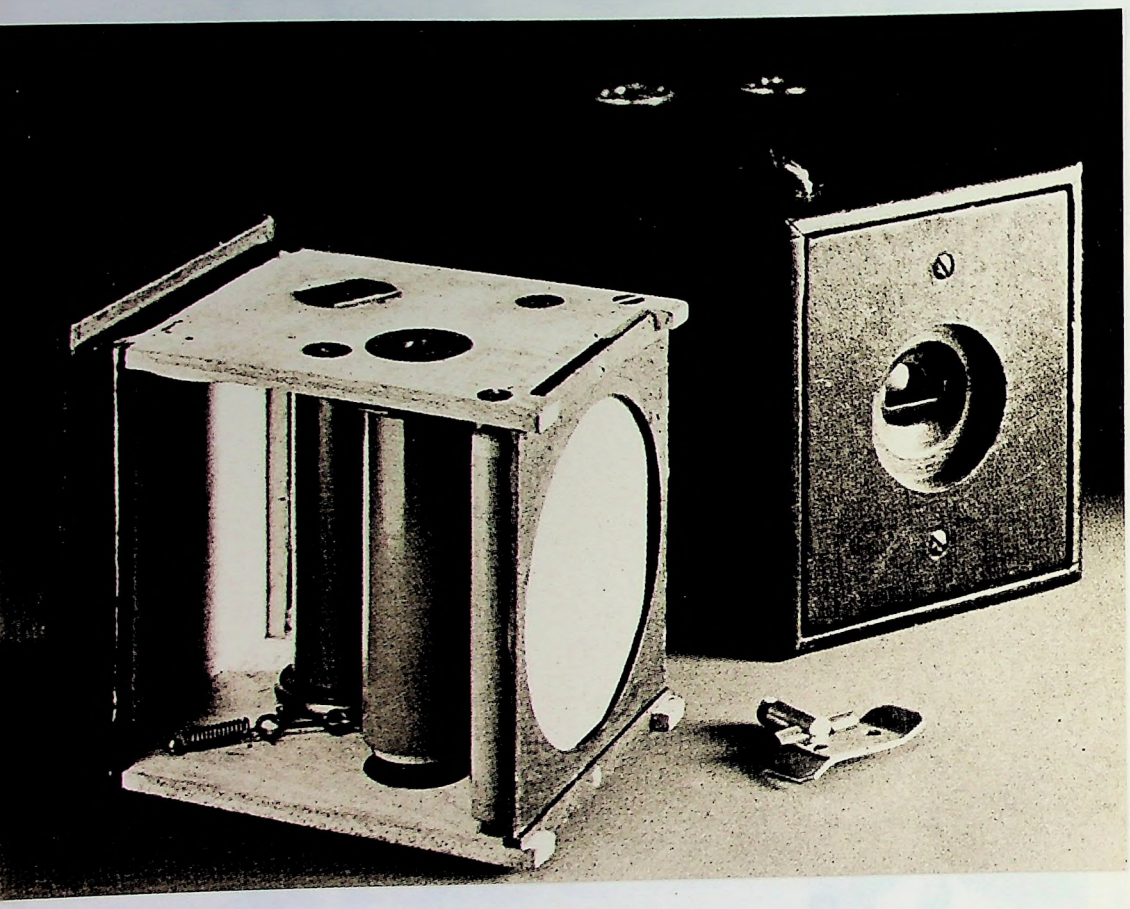
3.2.4 The Magazine Camera

The magazine camera (mentioned previously in the 1850's) usually held 12 - 40 plates or cut film in the 80's. The magazine camera differs from the change box camera as the film is contained within the camera body. The manipulation mechanism was unique to each make of camera. The first hand held magazine to expose a packet of celluloid film was called 'Frena'. Developed in England in 1893 in held 40 sheets like a packet of cards, measuring 3¼ x 4¼ inches.

3.2.5 The Roll-Film Camera

The roll-film camera superseded both the change box and magazine cameras. The flexible film held on 2 spools and was originally kept in a separate box called a roller slide. It was produced in many sizes to suit a variety of cameras. In 1888, the first nitro-cellulose film appeared, though it did not become popular until 1890, when its cost was reduced by mass production.

Kodak first appeared in the 1880's and revolutionised cameras when they marketed the

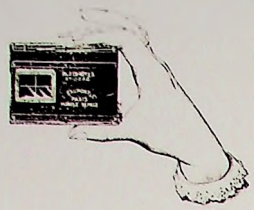


19. Kodak 'Eastman' Camera (Time Life)

The Hand Camera, A Portfolio of Catalog Illustrations

1880-1900

The invention of the gelatin dry plate and film brought about a new type of camera design for the ever-increasing amateur market. The camera could be handheld, and exposures could be made not only at snapshot speeds, but also in rapid succession. This led to a new kind of photography and, within a few years, to motion pictures. For the cinematographic camera is, basically, a still camera capable of taking sixteen or more photographs per second. A bewildering variety of cameras was offered to the photographer in the advertising pages of magazines. We reproduce illustrations of a few of them.

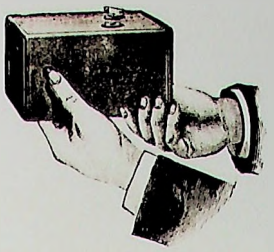


The "Block Notes" camera, for single exposures on 4.5 by 6 cm (1¾ by 2⅜ inch) plates. Manufactured by L. Gaumont et Cie, Paris. Introduced in 1902.

Double Camera. The upper camera served to view the image while the lower camera made the exposure. Manufactured by Marion, Paris, 1889.

The Kinegraphe, for single exposure on 8 by 9 cm plates. Manufactured by E. Français, Paris. Introduced in 1887.

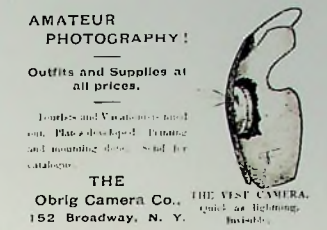
The Twin-Lens "Artist" Camera, for twelve exposures on 3¼ by 4¼-inch plates. Manufactured by the London Stereoscopic and Photographic Company, Ltd., London. Introduced in 1899.



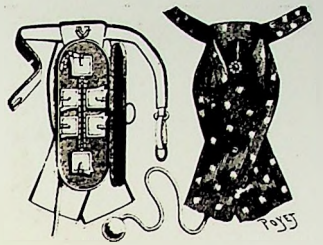
The Kodak, for 100 exposures on roll film masked to a 2½-inch circle. Manufactured by the Eastman Dry Plate and Film Company, Rochester, N.Y. Introduced in 1888.

The Photo Jumelle, or Binocular Camera. One lens took the picture while the other lens cast an image for viewing on a ground glass. It held twelve plates 4.5 by 6 cm. Manufactured by Jules Carpentier, Paris. Introduced in 1892.

The Parcel Detective Camera, for 3¼ by 4¼-inch plates. Manufactured by Marion & Company, London. Introduced about 1887.



The Concealed Vest Camera, for six exposures, each 1⅝ inches in diameter, on a single glass plate 5½ inches in diameter. To be worn under the coat, as a vest. Manufactured by Stirn & Lyon, New York. Introduced in 1896.



The Photo Cravatte, worn as a necktie, with the lens disguised as a stick pin. For six exposures on separate 2.5 by 2.5 cm. plates. Invented by Edmond Bloch, Paris.

'Easteman' designed in 1888. It was the first cheap, hand held, roll-film camera. It weighed a mere 2lbs 3oz and measured only 6½ x 3½ sq. inches. The roll was paper coated with a strip of emulsion. it held 100 exposures and took 2½" diameter photographs. A rectilinear fixed focus lens gave sharp definition of everything beyond 8 feet, with one speed and a fixed stop. The camera was ideal for the amateur as Kodak advertised that the complete camera be returned to the factory, where it would be unloaded, developed, printed and reloaded for a fee of 10 dollars, the camera itself costing 25 dollars or 5 guineas.

3.2.6 The Single and Twin Reflex Cameras

A mirror at 45° to the lens had already been used in the camera obscura in 1676 by Johann Sturm but it was not patented until 1861 by Thomas Sutton. In 1888 S.D. McKellen designed the first reflex camera. The mirror within the camera was automatically displaced during exposure, as it was connected to the roller shutter blind. The mirror was displaced by a push button mechanism by W. Wilson in 1898 in the 'Cambier Bolton'. This camera also contained a Thornton Pickard focal plane

shutter, with variable shutter speeds from $^{1}/_{20}$ to $^{1}/_{1000}$ of a second.

A twin reflex camera was developed by Rand O. Beck in 1890, with both lenses simultaneously focused (this camera is identical to modern twin reflex cameras).

Many miniature and freak cameras appeared before the turn of the century, to disappear as rapidly as they had come. Some of the more famous are Bolas' spy camera and Kodak's pocket camera. The spy camera invented by Thomas Bolas in 1881 (for Scotland yard) started an absolute craze in spy cameras. Though the fashion was short lived, it did pave the way for scientific miniature precision cameras that would appear in 1924. A famous miniature camera is Kodak's 'pocket', a prototype of the 'Brownie Class', it was designed by Frank A. Brownell and weighed only 7½ ozs. It was made of aluminium, with a set shutter and push button release. The newest feature being a daylight loading roll-film, with 12 exposures of 1½" x 2".

3.2.7 The Standardisation of Photographic Equipment

The 1880's and 90's saw the adoption of Edison's 35mm film widths, each frame being perforated with 4 pairs of rectangular holes, to be moved by a claw mechanism (only when the shutter was closed). The maltese cross mechanism operating intermittently a sprocket wheel, was universal accepted in projector design. An alternative method was that of T.H. Blances regristration pins (in 1896). This gave a much steadier picture.

The first public films were shown in 1893, in the form of the celebrated moving peepshows. As the article written by E. Ebsteem shows, the peepshow may have been the forerunner of todays sex education programme.

> "An expenditure of half a dollar will enable anyone to convince himself of the truth of the delination, further ignorance of the subject is not to be endured".

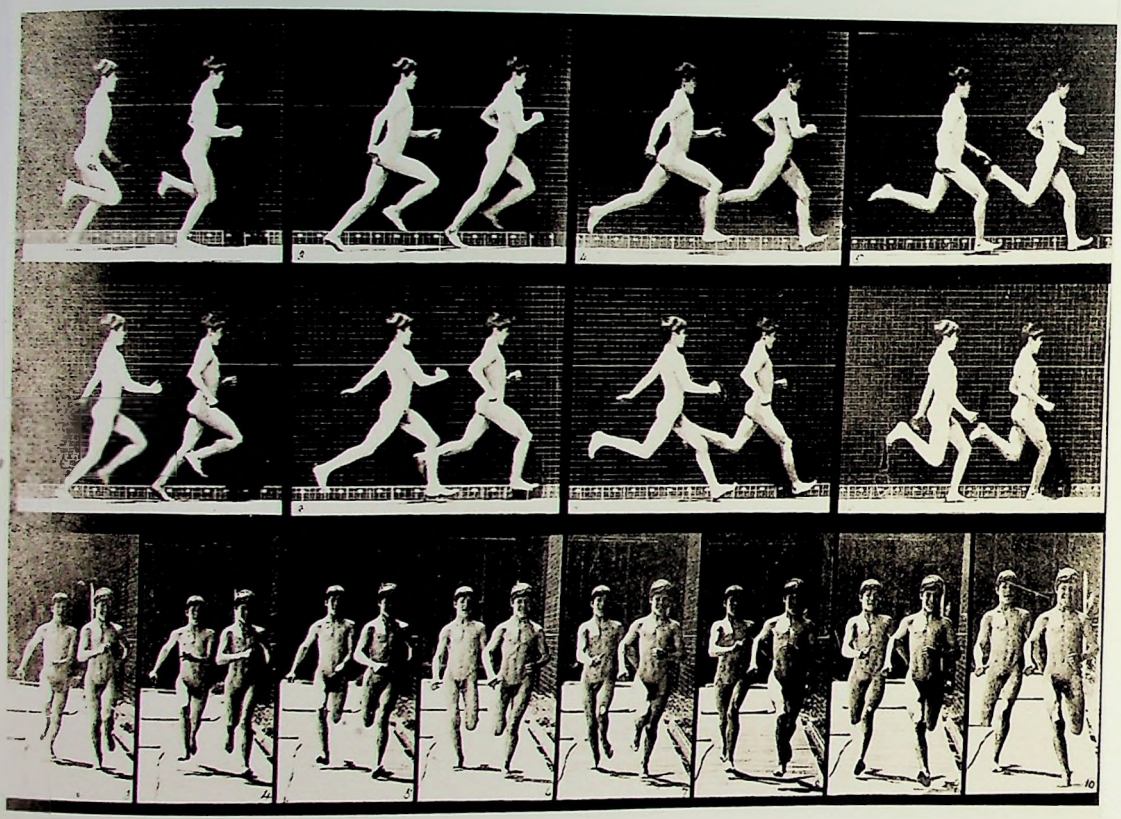
Bibliography:

To Catch a Sunbeam - G.A. Household and
L.M.H. Smith,
Published by Joseph London

Photography, Essays and Images - Beaumont Newhall

Customs and Faces, Photographs - Sir Benjamin Stone

History of Photography - E. Ebsteem, Columbia
University Press, New York 1945.



21. Eadweard Muybridge "Two Models Running"

(Essays and Images, Newhall)

CONCLUSION

The cameras of today have not altered in any considerable way from those available at the turn of the century. New manufacturing techniques and highly developed photochemistry have allowed for a more standard, compact, reliable product. Technicolour and "talkies" are the only two significant 20th century additions to the film industry.

It is interesting to note that the two major pre-Victorian optical toys, are also the two remaining post-Victorian products, the"magic lantern"which evolved into the slide and movie projector, and the 'camera obscura' todays camera. In 1870, the future of the camera and photography was a debatable subject, an article appearing in a newspaper of that year argues

> "The question does, indeed, arise whether photos, at present manufactured, will be permanent. We have no extended experience about it....."

A hundred years later the camera had gone to the moon. Today with the introduction of video, the micro film industry booms and has won back some

of the prestige lost to television, the 60's phenomenon. The camera, in conjunction with fibre optics etc. has a priviliged position in science and medicine. It has been the sole spectator to such miraculous events as the development of a foetus and in the observation of nature, such as plant growth.

It is difficult to imagine what further developments are possible to the camera but of their generation we can be sure, technical progress shows no signs of decelerating. Who knows, the video, the optical toy of the 1980's maybe the subject of an historical development paper in 2082.