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1. Daguerrotype animated self-portrait, Claudet, 1853

THE CHRONOPHOTOGRAPHERS

Bill Barnes

MANY PRE-CINEMA OPTICAL TOYS and devices used drawn figures or designs as subjects for animation but there were some that used what Brian Coe termed 'pose movement', by which he meant posed still photographs substituted for drawn ones.

It was not possible to photograph moving objects until photographic emulsions had become fast enough to do so. When this had been accomplished then it was at last possible to capture objects in motion and such attempts to secure photographed sequences of movement become known as chronophotography.

In Henry Hopwood's classic book *Living Pictures*, he examines 25 'moving pictures' devices with their patent numbers and dates, using both 'posed' and 'chronophotographed' movement.

For an exhibition at the Museum of Moving Image (MOMI) on the South Bank, London, in 1992 called 'Muybridge & the Chronophotographers', Brian Coe produced an excellent booklet containing the 25 examples of Hopwood in a more lucid, modern and attractive format with illustrations and, like Hopwood, in chronological order.

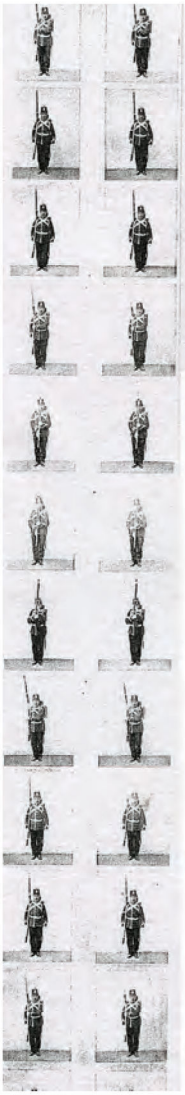
I do not propose to re-examine these in any detail; most of the important ones have been dealt with in well-researched works by film-historians who have a special interest in pre-cinema.

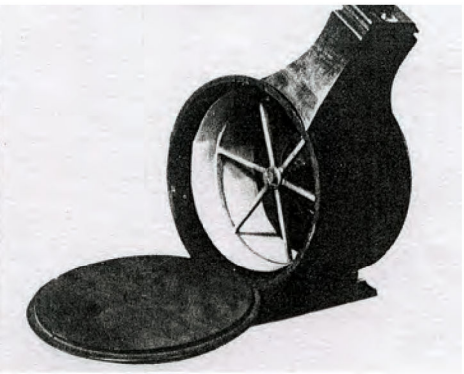
The first to suggest using photographs in sequence of movement seems to have been Jules Duboscq, well known for his electric carbon-arc magic lantern. He produced what he called 'The Stereofantascope' or 'Bioscope' and filed a patent for it on 12 November 1852, but is rather obscure how the pictures were to be produced for it.

Another Frenchman, based in England, Antoine Claudet of photographic fame, devised a double daguerreotype portrait of himself in two positions in the act of smoking, based upon a system not unlike a magic lantern slipping slide, whereby one image is visible while another is not. By rapidly alternating one picture for the other a simple form of animation was achieved (fig. 1). The patent was applied for on 23 March 1853.

In 1859 Henry du Mont in Belgium produced his 'Omniscopes', using a combination of the phenakistiscope with the stereoscope, made impracticable at the time as there was no film fast enough to capture the images for it. Similar to this was an idea patented on 1 March 1864 by Louis Ducos du Hauron, the inventor of 'Anaglyphs'. Peter Henry Desvignes' patent of 27 February 1860 was for a stereoscopic Zoetrope and W.T. Shaw's patent of 22 May of the same year was for something similar.

The American Coleman Sellers' 'Kinematoscope' of 1861 was rather an ingenious device, a stereo-viewer using a system whereby posed photographs of a short phase of movement in sequence were placed on six paddlers around a rotating shaft. It is amazing that it did not prove more popular.





2. Wheatstone's stereoviewer, c. 1870

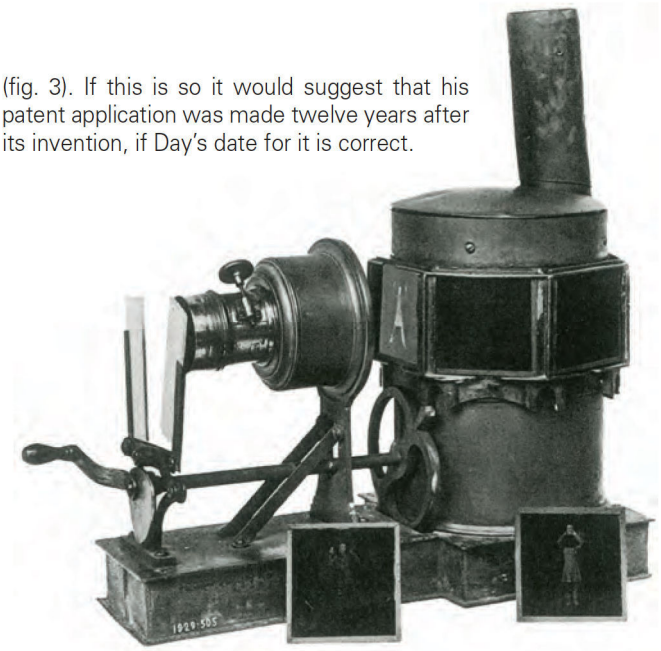
Gaetano Bonelli and Henry Cook proposed a variation of the stereoscope phenakistiscope in August 1863 using microphotographs. Sir Charles Wheatstone, inventor of the stereoscope, produced a viewer in c.1870 using a band of stereoscopic pictures fitted round the inside of a drum (fig. 2).

Next to consider are those devices using posed photographs for use in the magic lantern.

An exponent of this type was the American Henry R. Heyl, who achieved some sort of success with his 'Phasmatrope' of 1870. This used six posed photographs of a couple waltzing, which he fitted on a disc revolved by a ratchet and pawl intermittent movement that could be fitted into the slide stage of a magic lantern. This was a great step forward.

According to Will Day in his sale catalogue N.D. c. 1935, John Arthur Roebuck Rudge had experimented with devices for the projection of movements by means of the magic lantern as early as the 1860s. His sole application for a patent was dated 12 November 1884, for his 'Phantascope Lantern'. There seems to be some confusion over the names given to what he called his Biophantic lanterns. His patent application seems to refer to his 'Life in the Lantern' of 1872

(fig. 3). If this is so it would suggest that his patent application was made twelve years after its invention, if Day's date for it is correct.



3, Rudge's original Life in the Lantern, instrument and slides, 1872

It was this machine, using slides of the head of William Friese-Greene and which Friese-Greene demonstrated at several photographic societies and often gave the impression that it was of his own devising, that Rudge had to express his objections to in the press.

His Biophantic Lantern or Bio-Phantascope of c. 1868 and its later developments 'Life in the Lantern' of 1872 (Day) have both been dealt with in the *New Magic Lantern Journal*, vol. 8, no. 2, October 1997, by Raymond Newport and David Robinson.

So much for those devices which used posed photographs, some practical and others not, and most but not all, forgotten and non-existent. However, it would be good to think that their creators did not labour in vain and that their attempts inspired others, acting as catalysts for that band of hopefuls who came after, set upon finding a way of reproducing long phases of movements photographically.

One of them was Wordsworth Donisthorpe whose 'Kinesigraph' was patented on 9 November 1876. His work has been examined thoroughly by Stephen Herbert in his highly recommended monograph published by his Projection Box in 1998, with additional information, he tells me, forthcoming, so need not detain us here.

Next on the scene, the giant figure of Eadweard Muybridge from Kingston-on-Thames, where there is a permanent exhibition in the local museum of his achievements, including his original 'Zoopraxiscope' lantern (fig. 4). His life and work have been covered extensively both here and in America and need no further introduction. However, a little-known book in the Barnes Archive acquired over 30 years ago is pertinent to this chronophotographic survey and should be mentioned here as it is relevant to the work of Muybridge. *The Gallop* by Edward L. Anderson, published in

4. Zoopraxiscope of Eadweard Muybridge (Kingston Museum)

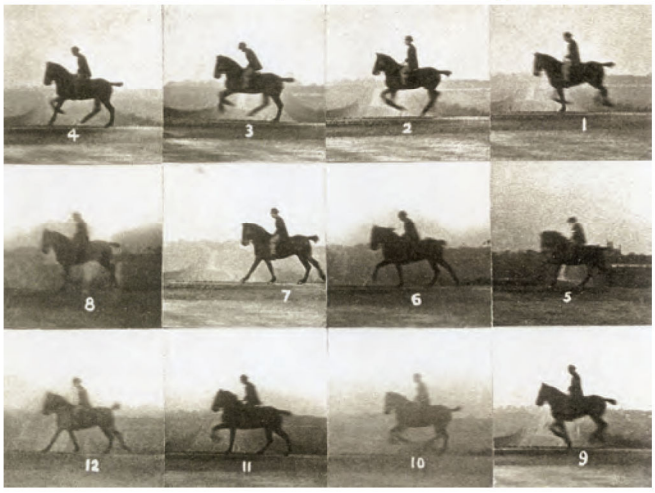
Edinburgh by David Douglas, 15 Castle Street, 1883, contains a plate of chronophotographs taken by John Annan especially for the book and published here for the first time since (fig 5). The quality of the photos comes as quite a revelation. One could easily be led to believe they were taken with a ciné-camera. The work of John Annan seems to be unknown today. He does not even get a mention in Gernsheim. Here is a chronophotographer who needs to be researched and his achievements assessed and made known.

In a paragraph on page 22 of *The Gallop* its author writes: 'I also offer some photographs taken by John Annan of Edinburgh (see plate 111). These true representations of the galloping horse have not been corrected or tampered with in any way and are given exactly as they were taken upon negatives with all their imperfection.'

We know they are chronophotographs because on the title page is printed 'Illustrated by Instantaneous photographs by John Annan'. The book was exhibited at MOMI in the exhibition 'Muybridge & the Chronophotographers' and went unnoticed and completely disregarded.

Etienne-Jules Marey's life and work has been so intensely covered in numerous books, monographs, exhibitions and even films, though mainly in French, to mention his name here is enough. His 'photographic gun' of 1882 was suggested by the astronomer Pierre Jules César Janssen who had devised his 'astronomical revolver' to secure photographs of the Transit of Venus on

5. A sequence of photographs of a horse in motion by John Annan of Edinburgh, specially taken for the book The Gallop *by Edward L. Andersons, published in 1883*

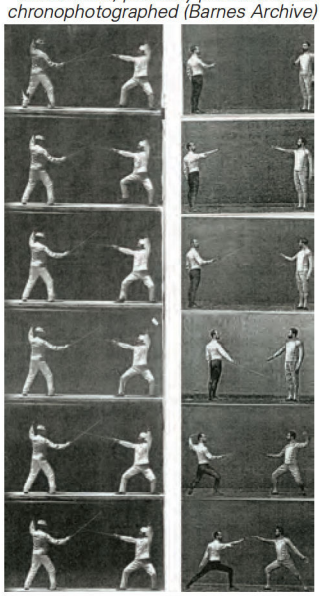


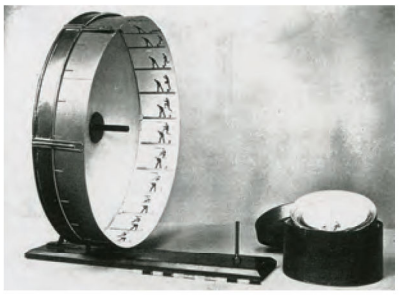
8 December 1874. It consisted of a circular daguerreotype plate rotated by clockwork through a modified form of Maltese-cross mechanism. A rotating shutter with twelve apertures exposed the plate each time it was at rest.

Here I pause to mention an interesting series of photographs in the Barnes Archive, unidentified and unpublished since taken: a set of sixteen separate photographs of two gentlemen fencing, much in the style of a series produced by Marey (fig. 6). Each photograph is printed on card and captioned in English naming the position taken by the two contestants. It is not even certain if they are chronophotographs. I rather think not.

Another outstanding chronophotographer was the

6. A strip of photographs taken by John Marey with his chrono camera (1892) and six of a set of sixteen separate photographs unidentified, probably posed and not chronophotographed (Barnes Archive)





7. Dr Anschütz's Tachyscope, 1887 (Will Day Collection). Anschütz also produced a horizontal model, an example of which is in the Kinematheke, Berlin, complete with chronophoto strips and in original box (Barnes Collection)

8. The electrical Tachyscope or Schnellseher of 1889, invented by Ottomar Anschütz, using sequence photography trans - parencies fixed around the circumference of a large steel disc illuminated intensively by a Geissler Tube

German Ottomar Anschütz, who has been extensively researched in great detail both in English and German by Deac Rossell. Highly recommended is his monograph published by The Projection Box in 1997: *Ottomar Anschütz and his Electrical Wonders*. For those who read German his definitive study of Anschütz's life and work is outstanding and is available as Kintop Schriften 6, *Faszination der Bewegung Ottomar Anschütz zwischen Photographie und Kino*, published by Stroemfeld/Roter Stern, Frankfurt am Main, 2001. The chronophotographs of Anschütz are perhaps the first ever produced.

Neither Marey nor Anschütz seemed to have resorted to projecting their chronos, but Anschütz did produce some viewing devices to illustrate sequence photography (figs 7 and 8).

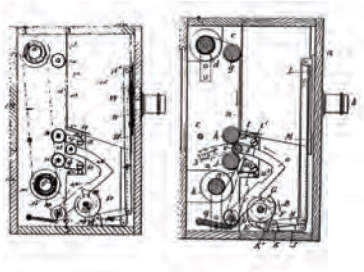
Another experimenter was Albert Londe, who made a multiple-lens camera with the aim of aiding him in his medical studies. It was a very complicated mechanism which had no possible future other than for his own use. Another Frenchman, General Sébert, in conjunction with Londe developed a chronophotographic device to assist in the study of ballistics.

For a strange mystery story, the disappearance of the French pioneer Louis Aimé Augustin Le Prince, one should read the excellent *The Missing Reel* by Christopher Rawlance (Collins, 1990 and Fontana Paperback 1991), who researched his subject in amazing detail. Le Prince, if anyone, came close to devising a cinematograph camera.

Almost last on this list in the quest of a practical movie camera were Frederick H. Varley and William Friese Greene. Varley patented a camera on 26 March 1890 and in 1893 Friese-Greene patented a camera suspiciously like Varley's (see fig. 9 and compare!).

A Frenchman Léon Bouly patented a device derived from that of Marey's chronophotograph camera on 12 February 1892.

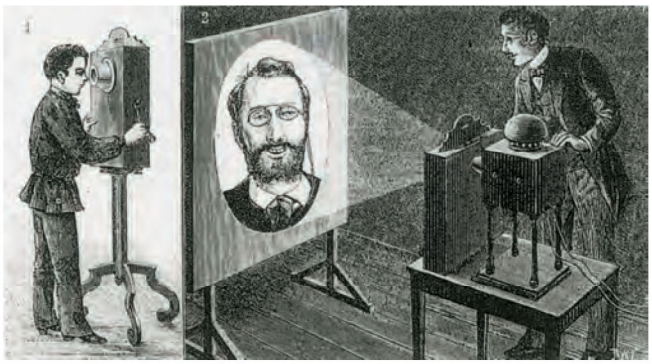
9. The two cameras patented by Varley in 1890 and Friese-Greene in 1893 showing the close similarity. A reflection on the poor judgement of the Patent Office. The second should never have been allowed.



Something must be said about George Demenÿ who joined Marey in 1881 and was his principal collaborator throughout his chronophotographic work. It was Demenÿ who produced a 'speaking photograph' analysis of speech. He made a sequence in close-up photographs of himself, using Marey's film camera, pronouncing the short phrase 'Je vous aime'. Another sequence of him saying 'Vive la France' appeared in *Paris-Photographie* on 25 October 1891 and in *La Nature*, 18 April 1892 (fig. 10). This machine he called the 'Phonoscope' and it was patented on 3 March 1892 (fig.11). Demenÿ went on of course to produce a 60mm-wide movie camera, the Demenÿ-Gaumont chronophotographe of 1896, which in 35mm-version was marketed world wide as the Gaumont-Chrono, a very popular cinematograph in the early years of cinema.

10. Demenÿ says 'Vive la France' (Barnes Collection). A sequence photograph of the inventor George Demenÿ taken for the Phonoscope of 1892, as printed in La Nature, *1892.*

11. Demenÿ's Phonoscope viewer and projection model, 1891



The aim of some, if not all, was to achieve a practical way of recording photographically long sequences of objects in motion. The journey of these chronophotographers had been a long and difficult one – years of frustration, false hopes and heart-ache. A few came close, but in truth all were doomed to failure. Not one of them had the faintest chance of realising his dreams, simply because the one element necessary was not available to him, namely a suitable photographic base on which to record long series of movement in sequence. This only became available with the invention by George Eastman of his first 'Kodak' camera using a roll of celluloid in 1888. From then on the doors were open for a practical way of cinematography. And the irony of it is, not one of the four men who did succeed had been a chronophotographer!

To achieve the required results there had to be three important components: a camera for recording the images, a printer to supply a positive, and a means for exhibiting them, a projector.

The first to succeed was William Laurie Dickson. He had a camera, a printer but no projector. His system used a peepshow device, 'The Kinetoscope'.

Max Skladanowski was next with his 'Bioscope'. He had a camera, a printer and a projector, but his means were so complicated, cumbersome and mechanically unsound, it had no possible future.

The Lumière Brothers with their 'Cinematographe' had a camera, a printer and a projector, but the three elements were rolled into one, so to speak. The camera acted as both printer and projector.

It was left to Robert W. Paul to come forward with the correct solution: a separate camera, a separate printer and a separate projector, thus supplying what was necessary for the world's first modern system of cinematography.

REFERENCES

This article would not have been possible without:

Henry V. Hopwood's 'Living Pictures: Their History, Photo-production and practical working'. *The Optican & Photographic Traders Review*, London, 1899.

and the poorer without:

Brian Coe: Muybridge & the Chronophotographers, published in conjuntion with the exhibition *'Muybridge and the Chronophotographers'*, held at the Museum of Moving Image, 1992.