

Birt Acres

“the first Englishman successfully to produce and publicly show animated pictures.”

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Introduction:

Birt Acres was the first Englishman successfully to produce and publicly show animated pictures. (1)

On first reading this sentence my curiosity was aroused. Who was Birt Acres? What were the circumstances which led to his first film? I scoured film history publications for any tit-bits of information which they might offer, but it became abundantly clear that the few meager facts about Acres were common to all textbooks, if they bothered to mention him at all. (2) This seemed strange in the light of the importance of the opening quotation. I could only deduce that 1) the claim was wildly exaggerated and that Birt Acres did not deserve deeper study, or 2) Birt Acres was an important early film maker but that no one had collated the available information from contemporaneous records and reports.

Working on the latter assumption, which proved largely correct, I offer the following results of my preliminary research into the life and career of Birt Acres.

Early life and photography:

Birt Acres was born in Virginia, USA, although both his parents were English. The year of his birth was 1854.

Many historians have made the mistake of assuming that the whole period of 1830 to 1860 was merely an extended prologue to the Civil War. In fact these years were much occupied with the broadening of democracy, the rapid growth of the population and wealth of the country and the constant drive to develop and exploit natural resources. Thirty thousand miles of railroad were constructed, nearly 5 million immigrants poured in from the Old World and thousands of new corporations were chartered (3). Virginia played its part in this expansion and prosperity, particularly in the growth of its tobacco crop, which was exported internationally. It would be interesting to assume that Birt Acres' parents were engaged in this trade, since a meeting in a tobacconist's shop in London was to play a large part in his career many years later. Pure supposition notwithstanding, it is interesting that a writer of a "projected portrait" of Birt Acres was later to comment:

On the wrappings of one of Messrs. W.D. and H.O. Will's packet tobaccos, the late Mr. W.M. Thackeray is quoted as saying that 'there is no better tobacco comes from Old Virginia than the Three Castles'. Mr. Birt Acres comes, I have been told, from Virginia, and has a unique personality *sui generis*. (4)

It is unlikely that Birt's parents, being English, would have remained in Virginia after the outbreak of Civil War. So sometime before 1861, the family moved to Paris, France, where Birt Acres was educated.

When or why Birt Acres arrived in England is not clear - but by 1892 he was manager of Elliott and Son's Works at Barnet, London, and a prominent figure in artistic photography. In that year Birt Acres had exhibited a carbon enlargement of a sea-scene at the Edinburgh Convention which "attracted much attention".

Elliott and Son was a splinter company from the firm of Elliott and Fry, which had been producing quality portraits since 1 January 1864, when Joseph Elliott and Clarence Edmund Fry agreed to become co-partners in the business of Photographic Artists (5) at 55 Baker Street. Elliott and Fry was one of the first photographic businesses to adopt the dry-plate process (6). So successful was the company that it established in Barnet, a suburb of London, a separate department in order to produce prints and enlargements for the Baker Street portrait studio. In 1892 this production off-shot became a self-contained company, completely disassociated from its parent, and its sphere of activities was considerably expanded. Chief among its new operations was the manufacture of "Barnet" dry plates. But Elliott and Sons was also well-known for its manufacture of carbon tissue and its quality carbon and platinum printing and enlarging (for which the wet-plate process was retained).

It was at the company of Elliott and Sons that Birt Acres became interested in photography - and where he mastered the carbon process. One critic wrote of his work:

He possesses very great skill in certain branches of photography that have an almost poetic flavour, thus affording a clue to the real nature of Mr. Acres' character, which, for lack of such evidence, most of us would regard as eminently practical and unsentimental. His favourite occupation is, or was, to photograph the melancholy ocean in its turbulent moods. It is impossible to describe the emotional effect which vast carbon enlargements of his marine studies, with appropriate poetry by way of title, produce in one's soul. *Poeta nascitur, non fit*. Then, Mr. Acres is of a soaring tendency, and frequently points his camera to the clouds, in which he discovers and photographs a world of new beauty. He is of opinion that amateur photographers could not do better than turn their (photographic) attention heavenwards. The splendid example he has set them should distinctly raise the status of amateur photography in more ways than one. (7)

The carbon process, in which Birt Acres was so proficient, had been perfected by (Sir) Joseph Wilson Swan in 1864 and it became practical for amateur photographers when he introduced the necessary carbon tissue two years later. After a period of enormous success its popularity waned in the 1880s, due to the introduction of other, cheaper methods of mass-producing permanent prints. There was a revival of interest in carbon printing in the early 1890s due, perhaps, to the growing interest in Fine Art photography, and the need for the 'serious' worker to produce pictures which differed as widely as possible from Kodak snapshots and the work of the new horde of unsophisticated, untrained camera owners. Birt Acres was said to have played a large part in the revivification of the carbon process. Seemingly a strange mixture of poet and entrepreneur, he also claimed to have been the founder of the short-lived Photographic Dealers and Manufacturers Association.

During 1893 Birt Acres was also becoming increasingly interested in the recording and reproduction of movement. On 8 December 1893 he received Patent No. 23,670 for "Apparatus for exposing successive photographic plates, magic lantern, and other slides", which he called the chrono photograph, and which was amended in January 1894 by Patent No. 420 by an "Improved form of photographic plateholder and camera for same."

His experiments in the recording of movement were delayed by a serious accident in August 1893: He was experimenting with sodium for the production of hydrogen for a particular purpose, and was making use of about sixty grains of it wrapped in fine gauze to prevent the gas from becoming ignited. But as soon as the sodium touched the water a terrific explosion

ensued which tore a large hole in a thin sheet iron drum he had in his hands; he was also holding the sodium with a pair of ordinary pliers... From Tuesday (last week) until Saturday he was totally blind, but on the latter day he recovered the use of one eye, and the doctor holds out the hope of similar recovery of that of the other one shortly. (8)

This experience obviously made Acres more sensitive to a catastrophe which occurred in Bradford a few months later - a gas cylinder burst and killed several bystanders. Although the Bradford incident was particularly severe, the explosion of a gas cylinder was not an uncommon occurrence. Rarely a week went by without the photographic press reporting similar accidents. The oxygen gas cylinders were used in the production of a lighting source for lantern projectors. Birt Acres wrote to the Photographer's Record (9) advocating the charging of the cylinder with gas at a lower pressure. As Acres pointed out: "At present it is the rule to charge cylinders under a pressure of 120 atmospheres... which equals fifteen pounds per square inch multiplied by 120, which gives the enormous pressure of 1800 pounds per square inch, which is about twelve or fifteen times greater than the pressure of steam in an ordinary locomotive boiler." Acres recommended that the pressure be reduced, or that the same amount of gas be inserted into larger cylinders.

Moving pictures:

During this time Birt Acres was working on an idea for mass printing photographs. His scheme was to print still photographs from a roll of paper fed past the negative. The paper would be interrupted and clamped into contact for each successive print. Birt Acres' idea was submitted to his employer, Elliott and Son, and had no direct relation to the motion picture process at this stage. Although he did not know it at the time, this mass printing idea was to change his life within a year.

The chain of circumstances, which eventually led to Birt Acres, began in New York, when two Greeks, George Georgiades and George Trajedis, bought a few Kinetoscopes from Thomas Edison's company and transported them to England, setting up an exhibition in a store in Old Broad Street in the east end of London. The business was a great success; so much so that the two Georges decided to add more machines. At this point they became very shrewd if not downright crafty. Why, they reasoned, import more of the expensive Edison machines, at \$300 each plus freight, if duplicates could be produced in England?

The next link in the chain of circumstances was a cigarette establishment, in which the Greeks confided their problem to the proprietor. He, in turn, remembered that a regular customer had gossiped over the counter of his old friend Robert W. Paul, a skilled instrument maker. Through these contacts Georgiades and Trajedis contracted Paul, and asked him to duplicate the kinetoscope. Apparently, Paul was reluctant, pointing out quite rightly that if the machine was patented (and that seemed a reasonable assumption) his building of duplications would be illegal. The Greeks were insistent, so Paul investigated the British patent records and was amazed to find that Edison had not patented the kinetoscope in England (or in the rest of Europe).

Feeling legally free to steal the idea, Paul not only produced machines for the Greeks but turned out machines for his own personal use. He opened a Kinetoscope showroom in Earl's Court, London, which produced a quick and large profit. Paul's fame spread across the Continent, and his Hatton Garden workshop was besieged by customers, clamoring for Kinetoscopes. Understandably, the Edison managers were furious. Not only were they losing a lot of business to Paul but also the owners of the purloined machines were unabashedly ordering films to show in them from the Edison studio, the only motion picture production plant in the world at that time.

Since the Edison company could not prosecute Paul and the owners of his machines, its only recourse was to cut off their supply of film. Only owners of Kinetoscopes made by Edison would be allowed to buy the new films. This plan was put into effect in October 1894.

Paul saw the danger to his own, now very flourishing, enterprise if he failed to supply his customers

with films. With typical directness and energy he began designing and building a camera so that he could produce motion pictures for his customer's "Kinetoscope". By 29 March 1894 his camera was ready - and the necessary intermittent motion of the film, with a pause for each exposure, was adopted from Birt Acres' printing machine idea.

Paul's camera differed markedly from the Edison Kinetograph - in size if not in principle. Edison's camera was so big and heavy, with its ponderous housing and battery driven motor that 'on location' shots were exceedingly difficult since the camera could only be moved by a horse and wagon. Paul's hand-operated camera was small and portable, enabling films to be made in the street or country. It is interesting to speculate that this difference in portability between the Edison and Paul cameras began the parallel but separate traditions of cinema in the U.S.A. and Britain. The former was rooted in the theatrical tradition from the outset while in Europe the growth grew out of a documentary or concern for 'reality'.

The second difference between the two cameras was Paul's observation that satisfactory impressions of motion could be created at a shooting rate of only 20 frames per second compared to the Edison rate of approximately 48 frames per second. Paul's films, therefore, had a temporal length of over double the Edison productions for the same footage.

Now Robert W. Paul was ready to make films for his, and his customer's peepshow machines. He later wrote: "I find that on March 29, 1895, I made an arrangement with Birt Acres for him to take films for the kinetoscope with a camera made by me." (10)

Paul must have made Birt Acres an irresistible offer and/or Acres had kept an eye on the development of the kinetoscope machines and their films, seen their rapid growth and potentialities for improvement, and felt that this was a new field in which his talent could best be exploited. Whatever the motive - cash or satisfaction - Birt Acres resigned the management of Elliott and Sons (11) and began making films for Paul's kinetoscopes.

Probably the first film he produced was "Sea Waves at Dover". It was described by one viewer: "The waves roll up in the most realistic manner, breaking against the Admiralty Pier, each wave as it breaks throwing up a great cloud of spray" (12). This would have been a natural subject for Birt Acres' first film since he had made so much use of the same subject in his exhibition photographs. It is possible that this was the first motion picture film made in Britain for a public audience.

If Birt Acres' name is mentioned at all in film histories it is usually in connection with his collaboration with Robert W. Paul. But this is unfair to Acres. The collaboration lasted only a few months at the longest, and it was Acres, before Paul, who saw the next step in the development of motion pictures - their projection on a screen, like a lantern slide, for the simultaneous viewing by a large number of people. I make this claim for two reasons. First, Birt Acres' background in photography would have given him the link between lantern slide projection and moving pictures. Second, he was already working on the idea of *projected* films, and only two months after his agreement with Paul, he had obtained a patent for "Improved apparatus for enabling photographic images to be taken, *projected*, or viewed in rapid succession." (13). [My emphasis]. Paul had not solved the projection problems until October of the same year. One source book on film history (14) states that their collaboration was terminated due to conflicting personalities; it is much more likely to have been due to conflicting business interests.

So Birt Acres commenced business on his own account as a manufacturer of photographic films at Salisbury Road, Barnet. His assets were his patents and machines and about 100 pounds cash capital.

During 1895 Birt Acres was not only improving his Kineopicon (as he later called his film production and projection machine) but was adding to his stock of films. In that year he

successfully filmed the Derby horse race, including "the course being cleared, the actual race, with the group of horses rushing to the front of the picture and out of it, and the subsequent thronging of the crowd across the course" (15). This was followed by movies of the Oxford and Cambridge Boat Race, and the opening of the Kiel Canal. The latter is claimed to be the first newsreel of an event of historic and international importance.

The construction of the Kiel Canal, linking the North Sea with the Baltic, was begun in 1887 and completed in 1895, significantly increasing German potential strength in the North Sea. New large docks were under construction and it quickly became apparent that the Germans had decided to construct a formidable fighting fleet, and the British could not for long avoid the conclusion that it was directed primarily against them. For this reason, Acres' film received a good deal of attention for several years, long after it had ceased to be of news interest.

Prior claims:

Birt Acres, having made films with Paul's camera for his Kinetoscopes, designed and built his own camera with which he took further films, and having successfully mastered the problems of projecting these films onto a screen, was now ready for a public demonstration. And, it is at this point that I would like to disagree, with respect, with many film historians, and confirm the opening quotation.

F.A. Talbot asserts that Robert Paul's machine was the first motion picture projector to be given a public demonstration in Great Britain (16). Ramsaye, too, implies the same, by omitting to mention any conflicting evidence (17). On 20 February 1896 Paul's projector was demonstrated before an audience at Finsbury Technical College, and the following week, on 28 February, it was demonstrated in the library of the Royal Institution.

Joseph H. North is unequivocal: "In England the first public exhibition of motion pictures was given at a polytechnic institution, the Marlborough Hall" (18) by Messrs. A. and L. Lumiere. He uses an impressive array of facts over eight pages to dispute Paul's priority over Lumiere, and I would not argue with a word of it. I would dispute the conclusion: that if Paul was not the first to demonstrate the projection of motion pictures, then Lumiere's performance must be given the credit. North, like most film historians, has ignored Birt Acres. The earliest claim made for the public projection of magic pictures by Lumiere (in England) is February 1896. Yet it is on record that Birt Acres "gave a demonstration of his new Kineoscopic Lantern" on 15 January 1896 at the Photographic Club, London (19). A full report of the demonstration, including a description of the six films which were projected that evening, appeared in The British Journal of Photography in the issue of 24 January. The report concluded: "The Photographic Clubbers present testified to their admiration by round after round of hearty and spontaneous applause."

The evening before this performance, Birt Acres was demonstrating his film projector to the members of the Royal Photographic Society (20). Therefore, according to two confirmed reports, Birt Acres' demonstrations of film projection preceded both Lumiere's and Paul's.

Of course, the arguments centering on 'who was first' are merely games that historians enjoy playing with themselves. What are the differences in timing of a couple of weeks in the overall development of the cinema? Suffice to say that in the early months of 1896 the movies had arrived in Britain. The Times recorded these early developments in several news items (21, 22, 23, 24).

It is not on record when Birt Acres first began his public performances on a regular basis. However, The British Journal of Photography of 27 March 1896 carried this item: "Mr. Birt Acres, who, as our readers are aware, has recently demonstrated his Kinetic lantern before several of the photographic societies, and may claim to have been the first in the field with a public exhibition of animated photography on the screen, has given his system the happily chosen title of Kineopticon, and is exhibiting it at a pleasant little hall in Picadilly Circus, where we had an opportunity on Saturday last of witnessing the display".

Even assuming such a short deadline of one week before this entry was published, this means that Acres was giving regular performances of his movies by 20 March. Also there is no suggestion that the Journal's writer attended an opening night; the implication is that Birt Acres' performances had been running for some time. Even if Birt Acres' show did not predate the Lumiere opening of 9 March, he certainly was not lagging behind by more than a week or two. And while we are playing the historical game of 'firsts' we could say that Birt Acres opened the first movie theater in Britain exclusively devoted to the projection of films. All the other contemporaneous performances were small items in a larger program of entertainments. The following list of events in order of appearance at the Empire (25) reveals the motion picture's position in the entertainment program:

Egger - Reiser. Tyrolean Singers and Dancers
'La Danse', New Ballet
Schwarz Bros.
The Lusinskis, Russian Dancers
The Schaffers, Acrobats
Fred Mills, Ventriloquist
Lumiere Cinematographe
Paul Cinquevalli, Juggler
'Faust Ballet'
Griffin and Dubois, Eccentrics

It is possible that Birt Acres opened his own movie house precisely because the film would otherwise be seen as one act in a frivolous list of music-hall entertainments, with the film being considered the most frivolous of all. Acres believed in the new medium as a device for serious historical record-making and he would have objected to its frivolous commercial exploitation. Birt Acres was not a showman, rushing to exploit a new seven-day wonder before the novelty wore off. He was committed to films as a serious, important tool for broadening knowledge, right from the first days of his experiments. In this respect, too, Birt Acres was 'first'.

He was reported to have said: "Without wishing to run down what is known as 'ordinary' photography, Mr. Acres advanced his opinion that the destiny of animated photography was to outstrip the former and older branch of work - an opinion in which had the most implicit faith... The future of animated photography he maintained lay with the photographer and not with the showman. He believed there was something more in it than a music-hall attraction..." (26). And: "As regards the position of animated photography, he said that hitherto it had been made the instrument of the showman, and as such had, in many cases, been used objectionably; but he believed that it would in time return to its proper place, that of a branch of photography."

It seems certain that Acres was not motivated by fortune; least of all by fame. In May 1896 a journalist, visiting Acres' Kineopticon hall was moved to write: "Mr. Birt Acres, with a modesty very rare in these days of advertising, does not anywhere on his prospectus put his name, nor did he announce himself personally as the inventor, on the day I saw his exhibition, but contents himself with the following note at the end of the program: "our apparatus is an English invention, and was the very first shown in England, an exhibition having been given, with great success, at the Royal Photographic Society, early in January last. An entirely new series of pictures is now being prepared, and we shall frequently vary our program." (27)

It soon became obvious that in spite of Acres' idealism he was in competition commercially, as well as artistically, with professional showmen. By the end of the year his Queen's Hall program was more promotional in its attack. It announced: "The Kineopticon, invented and patented by Birt Acres, Esq., F.R. Met.S., F.R.P.S...(then followed an annotated list of the 10 films on the program)... The above subjects are the identical pictures exhibited before H.R.H. The Prince of Wales and the Royal Wedding Guests, at Marlborough House, on Tuesday, July 21st, 1896. At the

close of the Entertainment, H.R.H. complimented Mr. Acres on the successful exhibit, and honoured him by a special permission to photograph the Royal Wedding on the following day." (28)

All subjects on the program were filmed by Birt Acres himself, and projected with the same machine. Even at this stage, Acres was using a dual camera/projector. The film was exposed at an average rate of 30 to 40 frames per second (slightly faster than Paul's; slightly slower than Edison's) on lengths of film from 40 to 60 feet. It was possible to expose the film up to 100 frames per second, merely by cranking the handle at a faster speed. The size of each frame was approximately 1 x 3/4 inches - already so close to the 35 mm. frame size which was to become the standard.

Many writers have remarked on the astonishment of the audience at moving images; how viewers ducked as a train seemed to hurtle out of the screen, and so on. Perhaps the stories have gained an exaggerated importance in the emphasis of such reactions. To counterbalance this impression it is as well to mention that there *were* visually sophisticated critics of the moving pictures, who could see their early technical shortcomings and offer sensible suggestions. A good example was this critic's reaction to Birt Acres' performance:

It seems to me, in this class of apparatus, the ultimate success will depend on the cooperation of the filmmakers and the perfection of material forming the base, whether it be celluloid or something yet to be manufactured. The great light necessary for the projection of the present size of Kinetoscopes designs, to make them visible life size on the screen, or of sufficient size to be seen by a large audience, is such that it makes apparent the slightest blemish in either film or support, and consequently pinholes, scratches, and marks, obtrude themselves, and are particularly noticeable in the quick changes that have to take place to keep up the appearance of motion, or living photographs... and the ultimate success of the invention will depend on the taking and projecting of photographs, for it is too much to expect to get perfection in detail in such a limited space... It is, of course, easy to criticise, and I only allude to these little matters in the hope that some of the workers on machines for this class of work will see their way, not only to arrange for larger films being used, but induce some film-maker to produce them with the utmost care. (29)

It is possible that Birt Acres, like Robert Paul, was first obtaining his film from the Blair Company of Foots Cray, Kent. Blair was coating photographic emulsion onto celluloid sheets imported from America. But Acres experienced great trouble with 'frilling' in development with these films (where the image surface tended to detach from the support) so he began to make and coat his own films.

In 1897 Birt Acres sold his business to a private company, which was shortly afterwards wound up voluntarily. So he reclaimed some machinery and started business again at Athenaeum Road, Whetstone. He was obviously quite successful at this stage since he was able to buy a parcel of land at Wickford, Essex, and erect works upon it at a cost of 500 pounds. (30)

It was here that he developed the machine for which he is best known, and which might be called the first home movie camera and projector. "He hoped to see the day when, instead of sending along a *carte* or cabinet of one's self, one would be able to forward a film to one's friends which, placed in a standard projecting machine, would reproduce him in a more lifelike manner than the still, dull representation of present times." (31)

For this reason, he designed the Birtac, a combination film camera/projector for home use. The Birtac (32) was about the size of a quarter-plate camera for still photography and was capable of exposing 20 feet of film at one loading. The lens was a Ross of 1 1/2 in. focal length, working at an aperture of f2., and was fitted to the outside of the apparatus for exposing the film and attached to the interior when projecting. Added to the end of the film was a length of black paper which was

wound over the exposed film in order to protect the emulsion from light during the changing of the film. The exposed film was developed by winding it around a 10 x 12 inch frame and dunking it into an upright developing dish (minimizing the oxidation of the developer). When processed the negative film was contact printed against another length of film, this time coated with a slow transparency emulsion (as used for making lantern slides). This positive film was processed in the same manner, but in a very dilute, slow-acting pyro developer. It was then dunked in a glycerine solution in order to prevent the film from becoming so dry that it peeled from the celluloid. A final step was to coat the film with varnish as a protection against scratches and abrasions.

The complete apparatus of the camera/projector, Ross lens, spools and gas lantern - "all that is necessary for taking and showing the pictures" - cost 10 pounds 10 shillings. The printing machine cost another 2 pounds 2 shillings; and the films, in 20 feet lengths, cost 2 shillings 6 pence each.

The Birtac was demonstrated to a large gathering at the Photographic Club on the 26 October 1898 and to the Hackney Photographic Society on 13 December 1898. The size of the projected image was designed to be 2 or 3 feet diameter for drawing room display, although this picture could be increased to 6 feet with a more intense light source. The intensity of the light source, and hence the size of the projected image, was restricted by two factors. One restriction was the pressure of the house gas available for the Welsback incandescent mantle; as the supply pressure varied so did the intensity of illumination. In fact, low gas pressure ruined Acres' demonstration at the Photographic Club. "However", he said, "as good generally comes out of evil, I have invented a machine which automatically provides this pressure, and affords a light superior to limelight. With this I am able to throw a brilliant image on the screen, of six-foot dimensions, with my little machine, and so obviate any difficulty which might have arisen, owing to future purchasers having as faulty gas arrangements as at the hotel above mentioned." (33)

The other restriction on the intensity of illumination was the very real risk of fire, since increasing the intensity of the gas light intensity produced an inevitable increase in heat. The celluloid base for early motion pictures was extremely flammable. Birt Acres claimed that his machine was absolutely free from danger and "could hardly be the cause of an accident even in the hands of the most inexperienced." He also claimed to have made "considerable progress in the production of an absolutely unflammable film." (34)

This was an important point for Acres to make. Since 1895 there had been numerous fires caused by the ignition of the celluloid and which naturally created a great deal of public apprehension. The most serious and sensational of these tragedies took place a year before Acres made the above remarks. In Paris on 4 May 1897 nearly 150 persons lost their lives in the Charity Bazaar fire. The need for fire regulations at motion picture shows was evident - and on 8 November 1898 (less than two weeks after Acres had discussed this "serious question" at the Photographic Club) the London County Council approved a code of stringent regulations governing the projection of motion pictures (35). No doubt Birt Acres was pleased with the new regulations; many film operators were outraged. Showmen found the new, eminently sensible rules both irksome and expensive to comply with. One critic was outraged: "The regulations are to my mind most absurd, more worthy of China than England" (36) and "It is very lucky that the London County Council has no power in Yorkshire, otherwise football would be prohibited, as it causes a lot of broken bones." (37)

Birt Acres continued his Whetstone and Wickford enterprises until December 1907, when he sold the latter business and rented out the former. Although he was still called "Managing Director of a photographic films company", he was living in semiretirement at St. Vincent's House, St. Vincent Road, Westcliffe-on-Sea.

On the 19 April 1909, Birt Acres was adjudicated bankrupt (38). He died in 1918, at the age of 64.

It is demonstrable that Birt Acres was not only the first person to make a movie in Britain, but also

the first film maker to project motion pictures to a public audience. Even if these facts were not true, Birt Acres would still occupy an important place in cinema history.

Footnotes and References:

1. Archaeology of the Cinema, C.W. Ceram, Harcourt, Brace and World Inc., N.Y., n.d. Caption to illustration 202.
2. Arthur Knight does not mention his name in his influential and authoritative book, The Liveliest Art, MacMillan Company, 1957.
3. Facts from The New Cambridge Modern History, Vol. X, p. 618.
4. The British Journal of Photography, Supplement, 6 April, p. 29.
5. The firm of Elliott and Fry continued in Baker Street until 1963, when it was incorporated with Bassano and Vandyk, a portrait photography business which is still flourishing.
6. The company began using Kennett gelatino-bromide plates in 1878, two years after their introduction by the Liverpool Dry Plate Company.
7. The British Journal of Photography, Supplement, 6 April 1894, p. 29.
8. The British Journal of Photography, 25 August 1893, p. 549.
9. Quoted in The Lantern Record, 5 January 1894, p. 1.
10. Letter from Robert W. Paul to Terry Ramsaye, dated 23 July 1924. Quoted in Ramsaye's book, A Million and One Nights, Simon and Schuster, N.Y. 1926. p. 149.
11. Announced in The British Journal of Photography, 26 April 1895.
12. From a program of Birt Acres' films. Not dated.
13. British patent No. 10,474 of 27 May 1895.
14. Focal Encyclopedia of Film and Television Technique, Hastings House, New York, 1969, p. 10.
15. From a program of an exhibition of the Kineopticon. Not dated - probably in the latter half of 1896.
16. Moving Pictures: how they are made and worked, Frederick A. Talbot, Philadelphia 1912, p. 29.
17. A Million and One Nights, Terry Ramsaye, Simon and Schuster, New York, 1926. p. 161.
18. The Early Development of the Motion Picture, Joseph H. North, September 1949, submitted as dissertation for Ph.D. at Cornell University, p. 39.
19. Page 61.
20. One of the few film historians who does credit Acres with the first public showing of animated pictures is C.W. Ceram in his book Archaeology of the Cinema, Harcourt, Brace and World Inc. New York, n.d. Caption to illustration no. 202.
21. The Times, London, 7 March 1896, p. 10D. (Advertisement)
22. The Times, London, 19 March 1896, p. 1 E.
23. The Times, London, 24 March 1896, p. 1 E.
24. The Times, London, 25 March 1896, p. 8 E. (Advertisement)
25. The Times, London, 16 April 1896, p. 8 (Advertisement)
26. The British Journal of Photography, Supplement, 4 November 1898, p. 86 and 23 December 1898, p. 831.
27. The Lantern Record, 1 May 1896, p. 1.
28. Birt Acres' Queen's Hall program is reproduced in Archaeology of the Cinema, C.W. Ceram, Harcourt, Brace and World Inc., New York, n.d.
29. The Lantern Record, 1 May 1896, p. 1.
30. These figures must be multiplied by at least ten in order to give a rough equivalent of the amounts at contemporary values.
31. The British Journal of Photography, Supplement, 4 November 1898, p. 86.
32. A Birtac camera is now in the collection of the International Museum of Photography, Rochester.
33. The Photographic Club met at Anderson's Hotel, London.
34. The British Journal of Photography, Supplement, 4 November 1898, p. 86.

35. "New Cinematographic Regulations," The Optical Magic Lantern and Photographic Enlarger, ix (December 1898) p. 175.
36. The British Journal of Photography, 9 December 1898, p. 799.
37. The British Journal of Photography, 16 December 1898, p. 15.
38. Report of the bankruptcy proceedings; see The British Journal of Photography, 23 April 1909, p. 331.

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