Tim van der Heijden; Mirco Santi

Thinkering with the Pathé Baby: Materiality, histories and (re)use of 9.5mm film[

2022

https://doi.org/10.25969/mediarep/19196

Veröffentlichungsversion / published version
Zeitschriftenartikel / journal article

Empfohlene Zitierung / Suggested Citation:
van der Heijden, Tim; Santi, Mirco: Thinkering with the Pathé Baby: Materiality, histories and (re)use of 9.5mm film[. In: *NECSUS_European Journal of Media Studies*. #Materiality, Jg. 11 (2022), Nr. 2, S. 94–125. DOI: https://doi.org/10.25969/mediarep/19196.

Erstmalig hier erschienen / Initial publication here:
https://necsus-ejms.org/thinkering-with-the-pathe-baby-materiality-historiesand- reuse-of-9-5mm-film/

EUROPEAN JOURNAL OF MEDIA STUDIES
www.necsus-ejms.org

Thinkering with the Pathé Baby: Materiality, histories and (re)use of 9.5mm film[1]

Tim van der Heijden & Mirco Santi

NECSUS 11 (2), Autumn 2022

https://necsus-ejms.org/thinkering-with-the-pathe-baby-materiality-histories-and-reuse-of-9-5mm-film/

Abstract

This contribution explores the materiality and histories of use of 9.5mm film and the Pathé Baby projector and camera. In December 1922, the French film production company Pathé Frères released the 9.5mm film format, which together with Kodak's 16mm small-gauge, released the following year, would 'bring cinema into the home' and effectively popularise the screening, distribution, and production of home cinema and amateur films. This article aims to highlight the significance of 9.5mm film within the history of amateur film and to demonstrate the heuristic value of performing historical re-enactments with obsolete media technologies, such as 9.5mm film and the Pathé Baby, so as to better understand how they worked, how they were used at the time, and how their historical, material, and performative dimensions can be preserved for the future. It draws on a series of media archaeological experiments with the Pathé Baby projector and camera, as well as on the hands-on reconstruction of a 9.5mm film from 1929, made by the Italian artist, composer, and amateur filmmaker Pippo Barzizza (1902-1994). Utilising experimental media archaeology as a practice-based and sensorial approach to media historiography, the article investigates the materiality, functionality, and practices of (re)use of 9.5mm film as a remarkable early twentieth-century home cinema technology.

Keywords: 9.5mm film, Pathé Baby, experimental media archaeology, materiality, histories of use

Introduction

> This invention relates to a small cinematographic projection apparatus or toy apparatus which is simple to handle and capable of being easily used by amateurs; in particular the charging of the apparatus, the re-rolling of the film and the automatic stoppage of the film for the fixed projection of any picture, being effected in an extremely simple manner.[2]

With these words, the French film production company Pathé Frères described their latest invention, the Pathé Baby, referred to as the 'Improved Motion Picture Projection Apparatus' in a patent specification from 1921. A year later, in December 1922, the company released the film projector, initially developed as a system for the screening of reduction prints at home. Compared to earlier home cinema projectors, the Pathé Baby offered a high quality, affordable, safe, and relatively easy to use system. It would 'bring cinema into the home' (*le cinéma chez soi*), as the Pathé company advertised at the time. The Pathé Baby projector was released together with the 9.5mm film format, a new gauge specifically aimed for domestic use. Soon after the Pathé Baby projector, the company released the Pathé 9.5mm film camera, enabling amateurs to record and screen their own moving images. Together with Kodak's 16mm small-gauge, released the same year, the Pathé 9.5mm film system would effectively change the screening, distribution, and production of home cinema and amateur films.[3]

This article aims to reconstruct, through hands-on inquiry, the histories of use of this remarkable amateur medium. Methodologically, it draws on a series of 'media archaeological experiments' with an original Pathé Baby projector and camera, conducted by media historian Tim van der Heijden within the framework of the project Doing Experimental Media Archaeology: Practice and Theory (DEMA) at the University of Luxembourg,[4] as well as the hands-on reconstruction of the historical, material, and performative aspects of a 9.5mm film from 1929, made by the Italian artist, composer, and amateur filmmaker Pippo Barzizza (1902-1994), conducted by film archivist Mirco Santi at the La Camera Ottica Film and Video Restoration Lab of the University of Udine in Gorizia, Italy. Characteristic for some of Barzizza's 9.5mm films is that they combine original film recordings, shot with the Pathé Baby camera, with edition reels from the Pathé Baby catalogues. The Barzizza collection therefore provides a unique view on home cinema practices from the 1920s and 1930s.

By combining a scholarly and archival approach in exploring the Pathé Baby and 9.5mm film, we aim to bring forward new perspectives on the materiality and

practices of (re)use of 9.5mm film as a historical medium. The article's objectives are twofold. First, it aims to highlight the significance of 9.5mm film within the history of amateur film. Second, it aims to demonstrate the heuristic value of performing historical re-enactments with obsolete media technologies, such as 9.5mm film and the Pathé Baby, so as to better understand how they worked, how they were used at the time, and how their historical, material, and performative dimensions can be preserved for the future.

Despite their pioneering role and important contribution to the standardisation and popularisation of amateur film and home cinema,[5] and their significant role within film history at large, the Pathé Baby and 9.5mm film have often been overlooked by film historians and media scholars.[6] Partly, this can be explained by the dominance of Kodak's 16mm and 8mm gauges, especially in the postwar decades, which led to a decrease of popularity of 9.5mm film and eventually the liquidation of the Pathé Frères company in 1960.[7] Nevertheless, many ciné-clubs and film enthusiasts continued to use 9.5mm film for several decades after. Even today, 9.5mm film screenings are still being organised and content about the history of 9.5mm film continues to be shared online.[8] To mark the significance of 9.5mm film as a medium, various international events have been organised celebrating the medium's centenary in 2022, including conferences,[9] (virtual) exhibitions,[10] and the 9.5mm film centenary programme organised by the INEDITS Association - Amateur Films / Memory of Europe.[11]

The article starts with a brief history of Pathé's 9.5mm film and a technical description of the Pathé Baby system and its distinguishing features. An elaboration follows on 'experimental media archaeology' as methodological approach for exploring the materiality of obsolete media technologies and their practices of use. Subsequently, two case studies will be presented in which the distinguishing technological features of the Pathé Baby system have been investigated through hands-on inquiry. The first case study reflects on the media archaeological experiments conducted with the original Pathé Baby projector and camera, which aimed to reconstruct how these historical media technologies worked and might have been used in early twentieth-century home cinema and home moviemaking. The second case study reflects on the hands-on reconstruction of Pippo Barzizza's

9.5mm film from 1929, which aimed to re-enact and hence preserve the performative qualities of this historical home cinema screening program. In the conclusion, we reflect on the lessons learned from our media archaeological experiments and complementary approaches in re-animating and re-using the Pathé Baby and 9.5mm film technologies in its centenary year.

A brief history of 9.5mm film

Soon after their introduction in 1922 and 1923, the Pathé 9.5mm and Kodak 16mm 'small-gauges' would develop into the standard formats for the amateur filmmaker, followed by Kodak's 8mm film format in 1932. The releases of the amateur film formats and their accompanying recording and screening technologies can be placed within a longer historical context and technological development, in which manufacturers aimed to overcome three obstacles that characterised amateur filmmaking in the early period: (1) film was too expensive, (2) film equipment was too bulky and difficult to use, and (3) the highly inflammable nitrate-celluloid base was unsafe for home use.[12] The Pathé Baby and 9.5mm film were designed to address these three issues, first of all by reducing the width of the film itself. At the time of release, Pathé's 9.5mm film was the smallest substandard film format on the market. Three strips of 9.5mm film could be produced out of one 35mm film strip, the standard format used in professional cinema production.[13] Likewise, the Pathé Baby film projector was 'remarkably compact', as Harold A. Abbott wrote in the second edition of his handbook *Motion Pictures with the Baby Ciné* published in 1930.[14] With the invention of direct reversal film, a new film processing method developed by Pathé Frères' chief engineer Louis Didiée,[15] the film price could be further reduced. Contrary to the former negative-positive development process, in which first a negative film was developed in order to make a positive print, direct reversal film allowed for making a positive print directly.[16] Reversal film saved costs for the amateur filmmaker as it 'enables the film which is used in the camera to be itself projected upon the screen without the necessity for any intermediate, or negative, film'.[17]

The safety issue was addressed by replacing the inflammable nitrate film stock with acetate-based film, also called 'safety film'.[18] Safety film was already implemented in two earlier home cinema systems: the 28mm Pathé KOK projector, also called Pathéscope, and the 22mm Edison Home Kinetoscope – both released in 1912.[19] However, the size of these projectors was too large and the film too expensive to 'trigger a home movie "revolution"', media historian Stephen Herbert wrote.[20] With the affordable 9.5mm film and more compact and easier to use Pathé Baby, the Pathé Frères company aimed to make another, more successful attempt to bring cinema into the home. Pathé's promotional materials advertised their new home cinema system in terms of a 'new era', in which the production and projection of motion pictures at home finally became 'within the reach of everyone'.[21] Besides the affordability and safety, also the simplicity of the technology was highlighted in such discourses, often by emphasising that even children could use it.[22]

Fig. 1: Advertisements from the 1920s, depicting home cinema screenings with the Pathé Baby projector.

The Pathé 9.5mm film system was initially advertised for the screening of reduction prints of professionally produced films at home. In 1923, the Pathéscope library offered more than 100 films in its catalogue, a number which would quickly expand in the following years.[23] Various genres were included: 'from scientific to juvenile farce, and from dramas to cartoons'.[24] In particular, comedies and cartoons were popular. Within the British context, film historian Clare Watson found that non-fiction categories were dominant in the 1920s, whereas the Pathéscope catalogue in the 1950s included mostly fiction films. The limited length of the 9.5mm reels meant that the prints were often heavily edited in order to shorten the films' duration.[25] Besides home cinema, 9.5mm film became popular as a system for home movie making and screening. The great portability and durability of the Pathé Baby projector made it an effective medium not only within a domestic context, but also within an educational context. Educational films contributed largely to the popularity of 9.5mm film and film circulation at the time. In 1924, the Pathé 9.5mm film system was launched in Britain, where it was even 'the most popular gauge in the country' in 1936.[26] During the 1920s and 1930s, 9.5mm film and the Pathé Baby technologies spread worldwide and gained popularity in the United States, Italy,[27] India, Norway, Germany, Austria, Brazil, Java, Singapore, Siam, Indo-China, Spain, and Portugal.[28]

The Pathé Baby system

Pathé's 9.5mm film technologies – including the 9.5mm film, the projector and camera – are characterised by several distinguishing material and technological features. It is important to discuss these distinguishing features in detail here as they will be highlighted in our media archaeological experiments, which we will discuss in the next part.

Pathé 9.5mm film

A unique material characteristic of 9.5mm film is its central perforation. Unlike standard 35mm film or 16mm film, for instance, the perforations are not positioned at the edges of the film, but right in the middle and in between the frames. As a result, its effective image size (6.5mm x 8.5mm) approaches Kodak's more expensive 16mm film (7.5mm x 10.5mm).[29] Despite the

economical use of film, a disadvantage of the central perforation is that the film is less stable in terms of transport, risking the occurrence of torn film. For recording, 9.5mm film came in a cassette or 'charger', so users only had to insert the cassette into the camera to start recording. Besides ease of use, another advantage of the cassette was that it could be charged in daylight. A standard reel of 25 feet of film corresponds to approximately 1000 frames, 'which suffices for, roughly, one minute of "action"'.[30] For screening, the 9.5mm film came in the shape of a metal cassette or spool, called *bobines* in French, originally holding 30 feet of film. After 1925, 60 feet and 300 feet reels were released in order to extend the film's running time.

Fig. 2: Still from 9.5mm showing the central perforation. Giuseppe Vecchi Film Collection. Courtesy of Home Movies - Archivio Nazionale del Film di Famiglia.

Pathé Baby projector

Various material features of the Pathé Baby projector can be distinguished. The projector was made of aluminium casting, the lamp house and wrap-around mechanism were made from steel, and the finish was in smooth black enamel, with

nickel-plated metal parts.[31] The lamp house was designed to 'swing back' so the film could be threaded and passed through the gate. The base of the projector incorporated the resistance, whose function is to regulate the current, so the incoming 110-120 volts would be reduced to the 12 volts needed for the projection lamp. No separate take-up spool was used for the hand-cranked Pathé Baby. The threaded film was simply taken up by the take-up chamber, a flat plate which guides the film into a coil. The lens of the projector was built into the removable top, positioned in front of the shutter, which featured two or in later models three small 'non-flick' blades.[32] Cast in zinc metal, the shutter acted as a flywheel which 'assisted the regular movement of the mechanism, thereby helping to reduce the flicker caused by the unequal shutterblade arrangement'.[33]

For more than ten years, the design and functionality of the Pathé Baby would largely remain constant: from the release of the first model (A) in 1922 to the last Pathé Baby model (G2) in 1932. The first models in particular – A-C – were almost identical. The first Pathé Baby with a motor drive was released ca. 1926 with model F, which provided the possibility to take up cassettes containing 60 feet of film in addition to those containing 30 feet. Model G, released in ca. 1927, featured the addition of the modular Super Attachment, which could be added or removed from the projector's housing. The accessory allowed for the projection of 300 feet of 9.5mm film, also called 'Super Reels'. The Pathé Baby projector could be used in combination with several other accessories, for instance a magnifier, which magnified the picture by up to 40%, and coloured gels to tint the images during projection. The Pathé Baby screen came in various sizes, ranging from 24 x 18 inches to 5 feet x 4 feet 3 inches.[34]

A unique feature of the Pathé Baby projector is the notch, whose function is to hold the film frame still. Cut on one side of the film strip, it stopped the film from running through its rotation for a short period. As Abbott explains:

> As the film passes down the film guide, its edge is in contact with a small spring catch: as soon as a notch appears in the edge of the film this catch slips into the notch and, by a special mechanism, throws the claw out of action for eight turns of the handle. The film thus remains stationary until the eight turn, after which the claw resumes its work and the film proceeds.[35]

The notch implementation was another attempt from Pathé to reduce film cost: only one frame was needed for the projection of a title or 'the image of an inanimate object'.[36] Sometimes series of two or more notches were made, in case a longer duration of the title or still was required.[37]

Pathé Baby camera

Similar to the Pathé Baby projector, the Pathé Baby camera initially came as a hand-cranked model, simply operated by turning the handle on the side.[38] The hand-cranked camera, first released in April 1923, was very compact, measuring about 4 inches x 3.5 inches x 1.5 inches.[39] The camera was manually operated with a rotation speed of 14 frames per second, corresponding to the rate of two cranks or turns per second.[40] After 1926, clockwork motor-driven cameras were released, which provided a more stable speed of recording.[41] Motor-driven cameras include the 'Camo' and 'Pathex' cameras as well as the popular 'Motocamera', released in 1928.[42] A standard Pathé Baby camera features an anastigmatic lens, providing an aperture ranging from f/3.5-f/14. While the hand-cranked camera required a tripod, the spring-motor camera could be used standalone as well. The handbooks generally recommended to use a tripod, as it would create more stable footage.[43]

Fig. 3: Pathé Baby camera and projector.[44]

Doing experimental media archaeology

Our experiments with 9.5mm film technologies were inspired by a methodological approach developed by media historian Andreas Fickers and film scholar Annie van den Oever called 'experimental media archaeology'.[45] It offers a practice-based and sensorial approach to media historiography, which enables the exploration of the materiality of past media technologies and their practices by means of conducting hands-on experiments and performing historical re-enactments. Drawing on the notion of 'historical re-enactment', originally introduced by philosopher R. G. Collingwood in his seminal book *The Idea of History*,[46] Fickers and Van den Oever argue that '[d]oing re-enactments with old media technologies in an experimental media-archaeology lab will produce new historical, ethnographic and empirical knowledge about past user practices and media experiences'.[47] The heuristic value of performing media archaeological experiments is that they engage historical imagination by 'sensing the past' and allow the tacit, embodied, and experiential knowledge of past media practices to be acquired in a participatory manner.

To explore the heuristic value of experimental media archaeology as a methodological approach for better understanding the materiality and histories of use of the Pathé 9.5mm film technologies, we will now discuss two case studies. The first case study reflects on the 'thinkering'[48] experiments with the Pathé Baby projector and camera conducted within the DEMA-research project at the University of Luxembourg. The second case reflects on the hands-on reconstruction of a 9.5mm film from 1929, made by the Italian artist, composer, and amateur filmmaker Pippo Barzizza (1902-1994) and preserved by Home Movies - Archivio Nazionale del Film di Famiglia in Bologna. The two case studies complement each other: while the first focuses on exploring the materiality and practices of use of 9.5mm film recording and screening technologies, the second focuses on the materiality of the 9.5mm film itself and ways to re-enact hence preserve its performative qualities.

Thinkering with the Pathé Baby projector and camera

The aim of the media archaeological experiments with the Pathé Baby projector and camera technologies was to reconstruct the ways in which these historical technologies worked and how they were – or could have been – used at the time, in order to better understand the practices of early twentieth-century home cinema and home moviemaking. Experiments were performed with various 9.5mm film technologies, including a hand-cranked Pathé Baby film projector, model D, from ca. 1924; a motor-driven version of the G2 model, from ca. 1932; a clockwork motor-driven Pathé 9.5mm film camera, from ca. 1928; and various 9.5mm film reels.

After purchasing the two Pathé Baby projectors on eBay, they were inspected and tested at the Engineering Lab of the University of Luxembourg in Belval. A transformer was used to convert the 230 voltage of the mains into the 110 voltage required for both projectors. The inspection of the current's path indicated that the current contact points at the base of the projector were connected to the lamp via wiring and to the resistance at the base of the projector, which regulates the amount of voltage going to the lamp. To make the projector safe for use in the

hands-on experiments and historical re-enactments, the film collector and technical expert Emiel de Jong installed a low current adapter to directly transmit a maximum of 12 volts to the projector's lamp, instead of using the transformer. The original cables were detached but not removed completely, so they could be reverse-engineered if needed. When the projector's housing was opened to clean and oil the mechanism's internal parts, including the axles and gears, it was discovered that the flywheel was made of plastic instead of the original metal, suggesting that a previous owner had replaced it. The modification raised the question of why plastic material had been used for the flywheel (possibly for reasons of economy or availability), how severely this would impact the longevity and performance of the projector, and whether a metal flywheel should be used instead to bring the projector closer to its original state.[49]

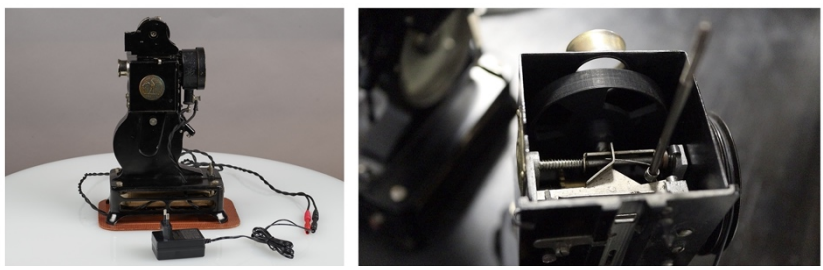

Fig. 4: Modernised Pathé Baby projector and close-up of plastic flywheel replacement.

After repairing, maintaining, and modernising the projectors, they were ready to be used in the hands-on experimentation and historical re-enactments. First of all, this enabled the re-enactment of certain protocols. After placing the reel at the reel axle, located at the top of the projector right above the lamp house, the first frames of the film need to be drawn so they can be guided to the projector's take-up chamber.[50] More so than other small-gauge formats like 16mm or 8mm, the 9.5mm film material curls heavily, probably enhanced by ageing, so it regularly happened in the experiments that the curliness of the film hindered its journey. Due to the lack of a take-up spool, the film has to be rewound after screening and placed back inside the reel by a small rewind crank, located above the projection crank.

The Pathé Baby projectors were subsequently used to explore some of the distinguishing features described in the previous part, in particular the notch function, speed of rotation, and the projector's flywheel-shutter combination; and to practise some of the more general technological processes, including manually setting the focus, positioning the image within the frame, and determining the brightness and size of the image on the projection screen. The 'thinkering' experiments also enabled the comparison between the hand-cranked and motor-driven version in use, identifying both their affordances and constraints. The hand-cranked Pathé Baby, for instance, not only provided a greater control over the speed of rotation, but also differed from the motor-driven version in the sense that it allowed for rotating the reel backwards, making the images run in reverse. The experiments furthermore made explicit the functionality of the aforementioned notch: pausing the film from running through the gate during the projection of the title frames. In the case of the hand-cranked projector, turning the crank felt much lighter compared to the regular cranking movement. This made the experimenter not only experience the notch function itself, for instance by hearing the very noticeable clicking sound of the bar release after every turn, but also sense how the notch is connected to the projector's internal mechanism.

Fig. 5: Screening a film with the Pathé Baby projector.

In addition to the media archaeological experiments with the Pathé Baby projectors, an attempt was made to re-enact the practice of making an amateur film with the Pathé Baby 9.5mm film camera as well. The possibilities for this experiment were limited due to the fact that 9.5mm film stock is no longer produced today – unlike 16mm, regular 8mm, and Super 8 film, for instance. A way to overcome this obstacle is to use (expired) unexposed film. After purchasing some from a Swedish seller on eBay, the sealed package was opened and the film cassette was loaded in a Motocamera. The camera was compatible with this type of 9.5mm film cassette, unlike the hand-cranked 9.5mm film camera, which required the significantly smaller original film cassette. As we have seen in the previous part, the film cassette could be loaded in daylight. When placing the 9.5mm film cassette in the camera, the small part of the film that came out at the front of the cassette had to be placed between the film guide and the presser, so the film would be exposed when the camera was running and the film would intermittently pass through the gate.[51]

Before starting the recording process, the camera was inspected. The motor was running well, made the appropriate sounds, and the film gate appeared to be clear. After studying the exposure guidelines from the manual, an aperture of f.3/5 was chosen, the widest opening of the camera's lens, to test whether any light would be captured on the expired film. Recordings were made outdoors, shot manually without tripod, in bright light conditions. The experiment was conducted together with film expert and post-production specialist Onno Petersen in his film lab in Amsterdam, so the exposed film could be developed immediately after the test recordings. To develop the film, a small Lomo tank developer was used. At the time, amateurs could either outsource the film development process to the Pathé factory, or chose to develop the films themselves.[52] Rather than following the original development procedures for amateurs from the 1920s, due to limitations in time and materials we used Kodak's D76 black and white negative film development process. It was chosen to develop the film in a lower contrast in order to increase the chances of getting a visible image.

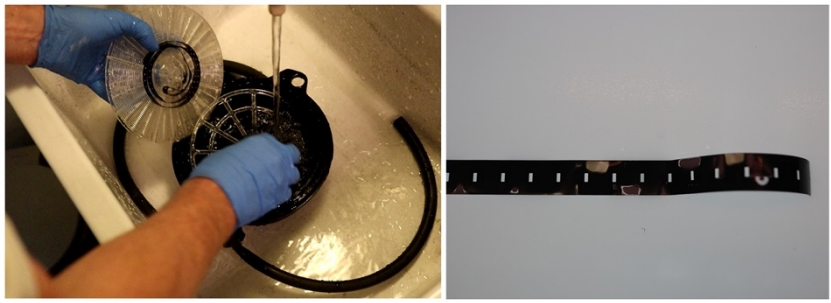

Fig. 6: Lomo tank and 9.5mm film development in action in the film lab.

In total, two recordings were made to test if any imagery was captured on the expired 9.5mm film. In the first test, the exposed frames were cut out of the cassette in the dark room and developed by means of the standard development procedure, reduced to taking four minutes in the development bath. Unfortunately, it resulted in a black negative film strip, showing no exposed images at all. In the second attempt, an even shorter development time – 2 minutes and 30 seconds – was used, but no results appeared either.

The reason for the failure was, most likely, the aged state and quality of the expired film. Despite the unsatisfactory outcome, the experiment was a helpful exercise, as it brought insights into the practices of loading and operating the camera, it illustrated how to set the exposure, and gave the experience of what it actually feels like to hold the camera when filming with a loaded cassette inside. While the cassette obviously adds weight to the camera, running the camera also generates a slightly different sound with a cassette inside. This kind of sensorial awareness was also important for past amateur users, as Abbott wrote:

> After a little experience, one becomes familiar with the sounds of a ciné-camera, and can tell immediately whether or not the film is travelling properly. Those who have not yet acquired this knowledge may not discover the trouble until they attempt to change the film, when (if trouble has occurred) they will observe that the film is not exhausted and it may possibly be damaged.53

At least, the hands-on experiment was a way to acquire some of this 'tacit knowledge'.

Re-enacting Pippo Barzizza's 9.5mm film program (1929)

Our second case study investigates a 9.5mm film from 1929, assembled on a 100-metre reel, belonging to the Pippo Barzizza collection, preserved by Home Movies - Archivio Nazionale del Film di Famiglia in Bologna.[54] Pippo Barzizza was born in Genoa in 1902 and lived in Sanremo, Italy. He was a professional composer and a multi-instrumentalist orchestra performer, as well as an amateur filmmaker in his spare time. His compositional style was inspired by American swing music, so much so that he became a truly exceptional swing musician in the 1920s. In 1929, Pippo Barzizza began filming with a spring-motor driven Pathé Baby camera, before making the transition to 16mm film after the war. He was a talented and virtuoso filmmaker. He participated in various competitions for amateur filmmakers and won several prizes. The Barzizza family collection includes various 9.5mm, 16mm, 8mm, and Super 8 films.[55] In total, there are 28 films made on 9.5mm film. The oldest 9.5mm film from the Barzizza collection dates from 1929, coinciding with the year of birth of his daughter Isa. His last 9.5mm film was made in the 1940s. A characteristic feature of some of Barzizza's 9.5mm films, compiled on 100-metre reels, was the co-existence of original film recordings, shot with the portable Pathé Baby camera, and fragments from edition reels from the Pathé Baby catalogues, including fiction films, documentaries, and animations.[56]

These mixed reels, originally edited by Pippo Barzizza, can be labelled 'screening programs'.[57] During an original chez soi cinema session, Barzizza's son testified they were shown during family and private events, usually accompanied by live piano. The reels represent the physical traces of historical 9.5mm film viewing practices and home cinema performances. As a participatory device, the projector is key to the alternation of home cinema and family memory screening practices. The playful aspect is not only created by the juxtaposition of contents. The catalogue films also serve as an example for the home production of 'skits', pushing Barzizza to create 'special effects', such as reverse shooting, interruptions, and substitutions of actors. The commercialised films also inspired the amateur to seek a refined aesthetic with the Pathé Baby Motocamera, which as a spring-motor driven camera abandons the static nature of the tripod and frees the operator from

the necessity of manual cranking. At the time, the Pathé manuals, magazines, catalogues, and camera instruction booklets all suggested how to film in reverse and do other tricks and special effects to enrich the narration and the aesthetic value of the shots.[58] Such images illustrate how amateur films can be influenced by professional cinema and fairground shows.[59]

One of Barzizza's 9.5mm film montages (reel no. 0028, about 14 minutes in duration) includes five different elements:

1. One of the first films in the Pathé Baby catalogue: *L'infernal contortionniste* (1923), Pathé Baby version, red-tinted, based on a film by Fred Sato released in theatres in 1910/1911.

2. One of the first films in the Pathé Baby catalogue: *La plate-forme d'acier, équilibres et souplesse des soeurs Amalia et Leonora* (1922).

3. Amateur film recorded by Pippo Barzizza with scenes shot and edited deliberately 'upside down'.
4. An animated short film *Felix le chat soulève le peuple* (AKA Felix Revolts, USA, Otto Messmer, 1923).

5. Fragments from other amateur films, recorded by Pippo Barzizza.

Fig. 7: The Barzizza family collection. Courtesy of Home Movies - Archivio Nazionale del Film di Famiglia.

The aim of the hands-on experiment in this second case study was to reconstruct the historical, material, and performative aspects of 9.5mm film projection at home by making a 'new' 9.5mm copy of Pippo Barzizza's original film program from 1929, so the film program could be projected again today. But how could the information contained and the material and intrinsic characteristics of the 9.5mm films from the Barzizza collection be transmitted? In practice, the technical restoration and cleaning of film materials are preparatory operations, indispensable for the subsequent digitisation work. Altogether they allow a new access in the form of a digital copy of the original film. The challenge here is to go through a new film format, capable of restoring the experience of the projection made with the 9.5mm projector. The process then passes through the digital intermediate (and its historical implications) to a new print on 16mm film, which serves as a 'temporary' gauge.

The artisanal film-recording system, put in place by film craftsman Marco Emiliani, allows for the creation of a digital intermediary that acts as a negative film. Through a 3lcd matrix of a modified video projector, interfaced to a modified ArriflexBL 16mm film camera, it is possible to synchronously re-film the images of the negative digital file, directly impressing the film loaded in the camera magazine. The system is artisanal, but has the undoubted advantage of creating the possibility of restoring material consistency to films that, due to their uniqueness or their technical and technological specificities, could no longer be screened on their original medium. After the development, a conformed copy of the initial file is obtained on 16mm film. A roll of positive black and white triacetate film was used, which was difficult to find since polyester is now mainly used as a material in laboratories for making positive prints.[60] The new 16mm film then needs to be cut, trimmed on the edges and perforated in the centre of the line according to the specifications of the 9.5mm format. For this, a handcrafted 'punching' machine of the apparatus collection of the Lichtspiel / Kinemathek Bern in Switzerland was used.

Fig. 8: The 16/9.5mm cutting and perforation machine of the Lichtspiel / Kinemathek Bern in Switzerland. https://vimeo.com/778782484/8c9414ae21

Before cutting the new 16mm film print, two important 're-actualisation' choices were considered. The first is linked to the specificity of the projection system with the aforementioned notches developed by Pathé. Considering that the projection of the film will take place in a movie theatre, presenting it for an audience, the use of a Pathé Baby film projector with original notching function – like the one described in the first case study – will be limiting, also in terms of image brightness. We therefore decided to simulate the notches on the edge and the effect of freezing the image in the digital rendering, multiplying the image designated by the notch by 40 frames.[61]

The second choice was an attempt to reproduce the red colour present on the copy of the catalogue film *L'infernal contorsionniste* in an analogue way.[62] As for the simulation of the colour effect, the red present as 'pre-tinting' on the di-acetate of the original Pathé film was treated on the 16mm black and white print as if it were a post development tinting. In the film printing laboratory, again with the collaboration of Marco Emiliani and using his experience with previous experiments in colouring and treatment of the positive colour image with fade problems, we decided to use two types of dyes: inkjet ink for printers and coloured, concentrated food ink. The first tests were disappointing. The colour did not set and was very

light, almost invisible after the final rinse. So it was decided to increase the concentration of the dye, spreading it with a brush directly on the emulsion, after dipping the film in an acidifying solution that allows the gelatine to be prepared for absorption. The new test done on a few centimetres of additional triacetate print was definitely encouraging, even the mix of dyes used seemed to adequately simulate the colour visible on the film scan file. A continuously modified developer was used to process the approximately fifteen metres of the film to be coloured. Upon exiting the wet part, the film was dried and rewound. The result was better this time: the colour was homogeneous and bright. The reel was then re-assembled by joining it at the head of the 16mm duplicate.

Fig. 9: Conversion and colouring process of the 'new' Barzizza film print.

A test projection allowed us to see Barzizza's film on the new 16mm support, with the simulated notched still frames and red colour of the pre-tinted film by Fred Sato. The next step in the process was the cutting and perforation phase, in which we used a special cutting and perforation device that was manually created by the Swiss amateur filmmaker Paul Goy in the early 1970s. Being passionate about film projection, Goy did not give up on the possibility of reusing 16mm films that are

too worn and with joints weakened by wear. His machine is able to cut them to the 9.5mm format, allowing the films to have a second life in this format with central perforation as a distinguishing feature.[63] The cutting and perforation of the Barzizza film print was successful, thanks to the excellent support from the Lichtspiel / Kinemathek Bern team. Despite the fact that the perforations made by the machine did not have the exact same shape and pitch as the original 9.5mm film, this will not influence the projection ultimately, so the 'new' 9.5mm film copy can now be used to re-enact Barzizza's home cinema program from 90 years ago.

Fig. 10: Digitised version of Barzizza's 9.5mm film program from 1929.
https://vimeo.com/770531941/838fa2fe6e

Conclusion

In conclusion, we can present some of the lessons learned from our hands-on experiments and historical re-enactments with the Pathe Baby and 9.5mm film technologies. What did they teach us about the materiality, functionality, and practices of use of this 'revolutionary' amateur medium from 100 years ago? One of the greatest benefits of the hands-on experiments and re-enactments was that they

provided a first-person sensorial experience of 9.5mm film user practices, which triggered our historical imagination. They led to a different type of understanding of the materiality and historical user practices compared to when only studying traditional historical sources, such as patents, advertisements, handbooks, and manuals. In terms of Fickers and Van den Oever, the hands-on approach provided a way to 're-sensitize the media scholar to the social and cultural inscriptions in the materiality of media technologies beyond the discursive level'.[64]

Re-enacting 9.5mm film user practices with the historical media artefacts enhanced the tacit, embodied, and experiential knowledge associated with, for instance, handling the Pathé Baby projector, turning the crank, placing the curly film in the projector's take-up chamber, and sensing the notch function during rotation. In general, the hands-on experiments and re-enactments stimulated the role of our senses in the media historical inquiry, paying greater attention to, for instance, differences in sounds produced by the Pathé Baby camera before and after loading the film cassette. These sensorial experiences triggered new kinds of questions about the materiality and functionality of past media technologies as well as their user practices. For example, why did Pathé designers chose the flywheel/shutter combination, how were the notches made in the film, why did the notch function not result in film burn, what was experienced in domestic screenings as the optimal distance between the projector and projection screen, and how do our re-enacted user practices compare to the actual 9.5mm film recording and screening practices from the past as opposed to their idealised representations in historical sources?

Stimulating the historical imagination and triggering these kinds of questions is perhaps the greatest heuristic value of experimental media archaeology as a sensory-oriented and practice-based approach. Sometimes the hands-on experiment directly revealed experiential knowledge and insights. In the hands-on experiments with the Pathé Baby projector, for instance, the light produced by the original 12 volts projection lamp was very weak, even when the experimental setting was completely darkened. Other than suggested by the advertisements of the time (Fig. 1), it was not possible to produce a clear image, especially when the distance between the film projector and the screen was beyond a metre. In this case, the

new empirical knowledge produced within the hands-on experiment clearly contrasts with the historical user practice represented in the advertisements. In other words, there was a gap between the idealised or 'configured' user practice, conveyed by the industry in the past, and the 're-enacted' user practice in the present.[65] The experimental media archaeological approach then helps to critique and reinterpret the historical sources.

At the same time, it is important to reflect on the anachronisms the media archaeological experiment inevitably produces. The modifications of the Pathé Baby projector, for instance, made the projector safe for use in the hands-on experiments, yet arguably changed the authenticity of the material object, hence the user practices it aimed to re-enact. However, as also the examples from the 'new' 9.5mm film print of the Barzizza reel exemplified (e.g. simulated notches and red colour tinting), the heuristic value of the media archaeological experiments is not necessarily affected by their level of historical authenticity or accuracy. While our hands-on experiments with the 9.5mm film technologies arguably brought us closer to the actual historical practices of recording and screening 9.5mm films with the Pathé Baby, their aim was not to recreate 'authentic experiences'.[66] Instead, they provided a way to stimulate our senses, trigger the historical imagination, and acquire some of the often implicit, embodied, and tacit knowledge involved in using past media technologies; varying from knowledge involved in historical tinting processes, for instance, to ways of maintaining the right speed of rotation when using a hand-cranked Pathé Baby projector. Striving for historical authenticity is futile as historical user practices vary and past media technologies have a life cycle of their own. They may be altered or modified by previous owners, as the replaced plastic flywheel of one of our Pathé Baby projectors exemplified. Likewise, past or contemporary users may have exchanged the original filament lamp for more modern and accessible types.[67] Such modifications may trigger the question: to what extent do changes in the conditions of historical media artefacts impact their performative qualities? While historical authenticity should not be the goal of the media archaeological experiment, it can still serve as a reflexive tool and heuristic instrument for further hands-on inquiry.[68]

In addition to the scholarly approach, the hands-on reconstruction of the Barzizza film led to new practices of restoration and conservation. After the first attempt, described above, a second triacetate b/w 16mm print was made based on a new digitisation of the original 9.5mm film at 2K 10-bit resolution, without still frames on the notches. After perforating and cutting the edges, the notches were made with an original manual notcher, exactly at the same frames of the original film. This time the tinting was done *after* the cut and with only the red food colouring. The results of this second attempt came much closer to the orange-red of the original pre-tinted Pathé film (Fig. 11). Since this second print can be loaded and screened on 9.5mm film projectors with a notch function, like the motor-driven Pathé Baby, it so helps to reconstruct and preserve the materiality and functionality of this distinguishing technological feature.

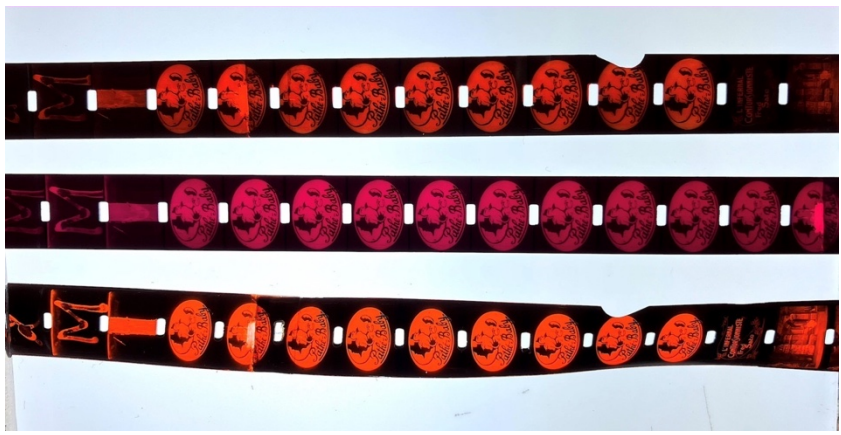

Fig. 11: Reconstructions of the Barzizza 9.5mm film print in orange-red colour and with notch on the edge. With the original Barzizza film at the bottom, the first copy in the middle, and the last copy with only red food colouring on top.

From a media historical perspective, the hands-on experiments furthermore led to questions about the 'uniqueness' of the 9.5mm film system and its distinguishing features within the history of amateur film at large. Although discourses surrounding its launch suggest a true revolution for home cinema, the Pathé Baby was not the first domestic medium for film projection.[69] Home cinema practices, including the distribution of reduction prints from professional film titles, had al-

ready been a modest success with the Pathé KOK 28mm film system ten years before, and even earlier with the Kinora flipbook-based motion picture system.[70] Even some of the distinguishing material features of 9.5mm film as a medium, such as the film's central perforation, acetate base, and direct reversal development process, were in fact shared by preceding or concurrent film technologies: the centrally perforated 17.5mm films from Biokam and Ernemann from 1899 and 1902, the acetate-based 28mm film (Pathé KOK) and 22mm film (Edison Home Kinetoscope) from 1912, and Kodak's 16mm reversal film from 1923, respectively.[71] Even the notch function, so prominently described in the aforementioned patent specification of the Pathé Frères company, seemed to have been anticipated with the Pathé KOK 28mm film projector, yet less effectively.[72] Although the Pathé Baby and 9.5mm film may not be unique in some of their material and technological characteristics, without a doubt they have put their mark on the history of amateur film by making, together with Kodak's 16mm small-gauge film, the production and screening of motion pictures at home more accessible.[73]

To sum up, within this article we have aimed to highlight the significance of 9.5mm film within the history of amateur film, and second, to demonstrate the heuristic value of doing historical re-enactments with 9.5mm film technologies to better understand their histories of use. Doing media archaeological experiments, we have argued, opens up new perspectives on the materiality of past media technologies and the tacit knowledge involved in their usages. Complementary to studying the historical sources, the hands-on inquiries offered new embodied and sensorial ways to 'zoom in' on the Pathé Baby and 9.5mm film technologies, for instance by 'thinkering' with some of the described distinguishing features. These explorations triggered our historical imagination and led to asking new questions, which subsequently allowed us to 'zoom out' and contextualise the medium's characteristics and distinguishing features from a broader media historical perspective. We would argue that this dynamic process of zooming in and out, which is at the heart of 'thinkering' as an exploratory mode of knowledge production, not only serves a scholarly aim, namely to better 'grasp' obsolete media technologies' histories of use, but also helps to document and preserve some of the medium's performative qualities, which serve an archival purpose as well. We hope that our various ways of 'thinkering' with the Pathé Baby and 9.5mm film technologies have shown the

potential and importance of such collaborations between media scholars and archivists in exploring, documenting, and preserving the materiality of past media technologies, their performative qualities, and practices of (re)use.

Happy Birthday, Pathé Baby!

Acknowledgements

We would like to thank the INEDITS Association - Amateur Film / Memory of Europe and the team curating the INEDITS 9.5mm film centenary (1922-2022), specifically coordinator Anna Briggs and the members of the 'materiality' working group. We thank the team members of the research project Doing Experimental Media Archaeology: Practice & Theory (DEMA) – Andreas Fickers, Stefan Krebs, Aleksander Kolkowski, and Christianne Blijleven – for their support. We are grateful to David Landolf, Brigitte Paulowitz, and Vladimir Malogajski from the Lichtspiel / Kinemathek Bern in Switzerland for their important input to this article. Furthermore, we express our gratitude to Onno Petersen, Emiel de Jong, Andrea Mariani, and Simona Schneider. Finally, we like to thank the editors of this special issue, Bregt Lameris, Josephine Diecke, and Laura Niebling, and the journal's anonymous reviewers.

Authors

Tim van der Heijden is an Assistant Professor of Media Studies at the Open University of the Netherlands. He obtained a PhD in Media History from Maastricht University. His dissertation *Hybrid Histories: Technologies of Memory and the Cultural Dynamics of Home Movies, 1895–2005* investigates the relationship between changing amateur media technologies (film, video, digital media) and home movie practices from a long-term historical perspective. His book *Doing Experimental Media Archaeology: Practice*, co-authored with Aleksander Kolkowski, is part of a dual-set publication (forthcoming in 2023) which explores the theory and practice of experimental media archaeology as a practice-based and sensorial approach to media historiography.

Mirco Santi is the co-founder of Home Movies - Archivio Nazionale del Film di Famiglia and manages the restoration and digitisation of films at the archive. He is a Doctor in Audiovisual Studies. He was a researcher at the University of Udine and actively collaborated with the restoration lab La Camera Ottica in Gorizia as part of a research project on the processing, preservation, and cataloguing of small-gauge formats (8mm, Super 8, 9.5mm, and 16mm). He is the current Presi-

dent of INEDITS Association - Amateur Films / Memory of Europe. Mirco is passionate about the materiality of film: he develops Super 8 and 16mm films in black and white and colour, and organises 16mm 'chromatic animation workshops' for children and adults.

References

Abbott, H. *Motion pictures with baby cine* (2nd Edition). London: Iliffe & Sons Ltd., 1930.

Anthony, B. *The Kinora: Motion pictures for the home 1896-1914: A history of the system*. London: The Projection Box, 1996.

Barnes, J. *The beginnings of the cinema in England, 1894-1901, Volume 5*. Exeter-Devon: University of Exeter Press, 1997.

Collingwood, R. *The idea of history*. Oxford: Oxford University Press, 1946.

Didiée, L. *Le Film Vierge Pathé: Manuel de Développement et de Tirage*. Paris: Établissements Pathé-Cinéma, 1926.

Fickers, A. and van den Oever, A. '(De)Habituation Histories: How to Re-Sensitize Media Historians' in *Hands on media history: A new methodology in the humanities and social sciences*, edited by N. Hall and J. Ellis. London: Routledge, 2019a: 58-75.

_____. 'Doing Experimental Media Archaeology: Epistemological and Methodological Reflections on Experiments with Historical Objects of Media Technologies' in *New media archaeologies*, edited by B. Roberts and M. Goodall. Amsterdam: Amsterdam University Press, 2019b: 45-68.

_____. *Doing experimental media archaeology: Theory*. Berlin: De Gruyter, 2022.

_____. 'Experimental Media Archaeology: A Plea for New Directions' in *Technē/Technology: Researching cinema and media technologies, their development, use, and impact*, edited by A. van den Oever. Amsterdam: Amsterdam University Press, 2014: 272-278.

Gourdet Marès, A. 'La Caméra Pathé-Baby: Le Cinéma Amateur à l'âge de l'experimentation' in *L'amateur en Cinéma: Un Autre Paradigme: Histoire, Esthétique, Marges et Institutions*, edited by V. Vignaux and B. Turquety. Histoire Culturelle. Paris: Afrhc, 2017: 75-93.

Herbert, S. 'The Birth of the Baby', *Amateur Cinematography Papers*, no. No. 4, 1983a.

_____. 'The Origins of the 28mm Film System', *Amateur Cinematography Papers*, no. No. 1, 1983b.

Huhtamo, E. 'Thinkering with Media: On the Art of Paul DeMarinis' in *Paul DeMarinis: Buried in noise*, edited by I. Beirer, S. Himmelsbach, and C. Seiffairth. Heidelberg-Berlin: Kehrer, 2010: 33-46.

Kattelle, A. *Home movies: A history of the American industry, 1897-1979*. Nashua: Transition Pub., 2000.

_____. 'The Evolution of Amateur Motion Picture Equipment 1895-1965', *Journal of Film and Video*, 38, no. 3/4, 1986: 47-57.

Kermabon, J (ed.). *Pathé: Premier Empire Du Cinéma*. Paris: Editions Du Centre Pompidou,

1994.

Lameris, B. and Flueckiger, B. 'Teaching the Materiality of Film', *The Moving Image: The Journal of the Association of Moving Image Archivists*, 19, no. 1, 2019: 93-101; https://doi.org/10.5749/movingimage.19.1.0093.

McKee, G. *The home cinema: Classic home movie projectors 1922-1940*. Gerrards Cross: Gerald McKee, 1989.

Motrescu-Mayes, A. 'Keynote Address', *The Little Apparatus: 100 Years of 9.5mm Film,* International Conference, University of Southampton, 16 June 2022: https://sites.google.com/view/100yearsof95mmconference/programme/day-1.

Motrescu-Mayes, A. and Aasman, S. *Amateur media and participatory cultures: Film, video, and digital media*. London: Routledge, 2019.

Moules, P. *The 9.5mm vintage film encyclopaedia: Revised edition.* Kibworth Beauchamp, Leicestershire: Matador, 2020.

Newnham, G. 'Pathéscope 200B Projector Lamp Modification', Pathefilm.uk, 2020: http://www.pathefilm.uk/95gear/95gearpathe/95gearpathe200blamp-mod.htm?fbclid=IwAR0_rAlABo168h8q0ZqjVUiLWm-7kCxKn-ngjrnztsNyFmZAAi_GMkdxUY3Q.

Pathé Cinema. 'Improved Motion Picture Projection Apparatus [GB Patent 175968A]', 21 February 1921: https://worldwide.espacenet.com/patent/search/family/008877762/publication/GB175968A?q=pn%3DGB175968A.

_____. 'Pathé Baby - Manual Pathéscope Motocamera, Type H', 1928.

_____. 'Pathé Baby - Manual Pathex Projector 1925', 1925: http://www.9-5usa.org/Pathex-Projector.pdf.

Ruedel, U., Currò, D., and Op den Kamp, C. 'Towards a More Accurate Preservation of Color: Heritage, Research and the Film Restoration Laboratory' in *Color and the moving image: History, theory, aesthetics, archive*, edited by S. Brown, S. Street, and L. Watkins. New York: Routledge, 2013: 219-229.

Van der Heijden, T. *Hybrid histories: Technologies of memory and the cultural dynamics of home movies, 1895-2005*. Maastricht: Maastricht University, 2018.

_____. 'Technologies of Memory: Amateur Storage Media and Home Movie Practices in the Longue Durée', *Le Temps des Médias,* no. 39, 2022: 141-159.

Van der Heijden, T. and Kolkowski, A. *Doing experimental media archaeology: Practice*. Berlin: De Gruyter, 2023.

Van der Heijden, T. and Wolf, C. 'Replicating the Kinora: 3D Modelling and Printing as Heuristics in Digital Media History', *Journal of Digital History*, no. 2, 2022. https://journalofdigitalhistory.org/en/article/33pRxE2dtUHP.

Santi, M. 'Petit, Simple, Bon Marché'. *Storia, Tecnologia e Pratiche d'archivio Del Pathé Baby*. Udine: Università degli Studi di Udine, 2011: https://air.uniud.it/handle/11390/1132504.

Schneider, A. '"Felice Logatto", "Bernardo l'Eremita" e "I Boys": Il Sistema Pathé-Baby e Il Caso Della Famiglia U', *Comunicazioni Sociali*, no. 27, 2005: 442-449.

_____. 'Time Travel with Pathé Baby: The Small-Gauge Film Collection as Historical Archive', *Film History: An International Journal*, 19, no. 4, 2007: 353-360.

Vignaux, V. 'Les animateurs français et le Pathé-Baby ou des usages privés des images cinématographiques dans la France de l'entre-deux-guerres', *1895. Mille huit cent quatre-vingt-quinze. Revue de l'association française de recherche sur l'histoire du cinéma*, no. 59, 1 December 2009): 82-95; https://doi.org/10.4000/1895.3919.

Watson, C. 'Babies, Kids, Cartoons and Comedies: Children and Pathéscope's 9.5mm Home Cinema in Britain' in *Movies on home ground: Explorations in amateur cinema*, edited by I. Craven. Newcastle upon Tyne: Cambridge Scholars, 2009: 65-92.

Zimmermann, P. *Reel families: A social history of amateur film*. Bloomington: Indiana University Press, 1995.

Notes

[1] This article is an outcome of the 9.5mm film centenary (1922-2022), initiated by the INEDITS Association - Amateur Films / Memory of Europe, and its 'materiality' working group. It is also an outcome of the research project Doing Experimental Media Archaeology: Practice and Theory, funded by the Luxembourg National Research Fund (FNR) (C18/SC/12703137) and hosted by the Luxembourg Centre for Contemporary and Digital History (C2DH), University of Luxembourg. Earlier versions of the content of this article have been presented at the International Workshop Preserving Amateur Cinema on Global Amateur Cinema Cultures, International Amateur Cinema Between the Wars (1919-1939): Amateur Movie Database Partnership Project; UNIUD, organised by Andrea Mariani and Simona Schneider and hosted at La Camera Ottica, Gorizia, University of Udine, 21-24 June 2022; and at the conference The Little Apparatus: 100 years of 9.5mm film, organised by Zoë Viney Burgess and hosted by the University of Southampton, UK. Parts of the article draw on examples of DEMA experiments also presented in the book *Doing Experimental Media Archaeology: Practice*, by Tim van der Heijden and Aleksander Kolkowski (forthcoming in 2023).

[2] Pathé Cinema 1921.

[3] Santi 2011.

[4] For more information about the DEMA project, see: www.dema.uni.lu.

[5] Van der Heijden 2018.

[6] Motrescu-Mayes 2022.

[7] Kermabon 1994.

[8] Examples include, for instance, the 9.5mm film / Pathé Baby centenary 1922-2022 Facebook group, coordinated by Anna Briggs on behalf of the INEDITS Association (https://www.facebook.com/groups/872246786711645), and the 9.5mm Films & Projectors & Cameras & related stuff Facebook group, coordinated by Clinton Hunt (https://www.facebook.com/groups/802452849859372).

[9] The conference The Little Apparatus: 100 years of 9.5mm film was hosted by the University of Southampton, UK; the conference 9.5mm: And Cinema Is Everywhere was hosted by the Lichtspiel / Kinemathek Bern in Switzerland; and the conference

From Pathé-Baby to 9.5mm: The Invention of Home Cinema was hosted by the Fondation Jérôme Seydoux-Pathé in Paris, France.

[10] See, for instance, the exhibition Pathé-Baby: Le Cinéma chez soi at the Fondation Jérôme Seydoux-Pathé (https://www.fondation-jeromeseydoux-pathe.com/event/309), and the interactive 9.5mm film scrapbook on the Lichtspiel website (https://lichtspiel.ch/9-5).

[11] Founded in 1991, INEDITS Association is a European not-for-profit organisation with the aim to encourage the collection, preservation, study, and promotion of amateur films. The joint efforts of archivists and researchers of the associative network, with the coordination of the INEDITS board of directors, has made it possible to develop a dense program to celebrate the centenary of the 9.5mm film format. For more information, see the INEDITS website: http://en.inedits-europe.org/.

[12] Kattelle 1986, p. 47.

[13] For a detailed and richly illustrated overview of the history and production of Pathé 9.5mm film as well as the complete catalogue of distributed Pathé Baby films, see Moules 2020.

[14] Abbott 1930, p. 15.

[15] Gourdet Marès 2017. Didiée also wrote a technical manual for Pathé film development (see Didiée 1926).

[16] Van der Heijden 2018, p. 77.

[17] Abbott 1930, Introduction.

[18] The 9.5mm films of the 1920s and 1930s were based on di-acetate cellulose. In the 1950s, di-acetate was replaced by tri-acetate cellulose film stock, which also became the standard in professional cinema, replacing the formerly dominant nitrate cellulose film stock.

[19] Van der Heijden 2022.

[20] Herbert 1983a; see also Kattelle 2000, p. 68.

[21] Watson 2019, p. 74. However, as Watson acknowledged, rather than 'everyone', the target group of Pathe Frères advertising especially involved 'members of the white middle class' (Watson 2019, p. 74). For discourses on the arrival of 9.5mm film technologies in the Netherlands, see Van der Heijden 2018.

[22] Watson 2019, p. 81.

[23] Kattelle 2000, p. 68.

[24] Abbott 1930, p. 116.

[25] Watson 2019, p. 72; cf. Schneider 2007. While many of the original 35mm films from the early cinema period have been lost, some of them have actually 'survived' on 9.5mm. See Pierce 2013: https://www.loc.gov/static/programs/national-film-preservation-board/documents/pub158.final_version_sept_2013.pdf.

[26] Watson 2009, p. 65.

[27] See https://www.torrossa.com/en/resources/an/2209524.

[28] Watson 2019.

[29] Van der Heijden 2018, p. 81.

[30] Abbott 1930, p. 5.

[31] McKee 1989, p. 52.

[32] Herbert 1983a, p. 3.

[33] Ibid.

[34] Watson 2009, p. 88; see also Abbott 1930, pp. 92-98.

[35] Abbott 1930, pp. 16-17; see also Herbert 1983a, p. 4.

[36] Pathé Cinema 1921.
[37] Kattelle 2000, p. 68.
[38] Abbott 1930, p. 9.
[39] Ibid, p. 6.
[40] Ibid, p. 29.
[41] Problems with the hand-cranked model were already addressed by Didiée, see Gourdet Marès 2017, p. 92.
[42] Abbott 1930, pp. 11-12.
[43] Ibid, p. 30.
[44] These images of the Pathé Baby camera and projector were produced for CRAFTED: Enrich and Promote Traditional and Contemporary Crafts, a project co-financed by the Connecting Europe Facility of the European Commission. For more information see https://pro.europeana.eu/project/crafted.

[45] Fickers & Van den Oever 2014, 2019a, 2019b, cf. Fickers & Van den Oever 2022; Van der Heijden & Kolkowski 2023.
[46] Collingwood 1946.
[47] Fickers & Van den Oever 2014, p. 276.
[48] Thinkering, a term coined by media archaeologist Erkki Huhtamo, refers to the hands-on method of 'thinking while doing'. Huhtamo 2010. See also Fickers & Van den Oever 2022, p. 11.
[49] Van der Heijden & Kolkowski 2023, p. 68.
[50] Pathé Cinema 1925.
[51] Pathé Cinema 1928, p. 4.
[52] Abbott 1930. For a reflection on Pathé's invention of film development at home, see Gourdet Marès 2017.
[53] Abbott 1930, p. 83.
[54] Home Movies - Archivio Nazionale del Film di Famiglia was established in Bologna in 2002. Its primary goal is that of preserving and exhibiting amateur and family cinema, consisting of films, particularly small-gauge works, about private individuals' everyday lives, family celebrations, and intimate memories in 8mm, Super 8, 9.5mm, and 16mm film. The personal and private audio-visual documentation preserved in the archive constitutes an exceptional repository of primary sources for the study of twentieth-century Italian history.
[55] The Barzizza family collection is made of 172 films, produced from 1929 to 1984, in particular on 9.5mm (28), Super 8 (59), 16mm (25), and 8mm (60).
[56] For the study of French animation in the context of the Pathé Baby 9.5mm format in the inter-war period, see Vignaux 2009.
[57] Schneider 2005.
[58] Abbott 1930, pp. 76-82.
[59] Zimmermann 1995.
[60] Thanks to Nicolas Ray and L'Abominable of Paris for their willingness to make available a 300 metre reel of Kodak positive black and white 7302 triacetate film that was stored in the refrigerator.
[61] The duration of the locking mechanism on the image is about 2½ inches, which at 16 fps is therefore 40 frames.
[62] For comparable hands-on experiments with film tinting and toning, see the work of Ulrich Ruedel, professor for conservation and restoration of modern media at the

University of Applied Sciences (HTW) Berlin. His experiments are highlighted, among others, in Ruedel & Currò & Op den Kamp 2013. See also Lameris & Flueckiger 2019.

[63] Paul Goy (1926-2018) was a precision mechanic and train driver by profession. He constructed the 16/9.5mm cutting machine in the early 1970s; it was partly made from Meccano pieces. In December 2013, the machine was donated to Lichtspiel, where it is used for demonstration purposes and to make 9.5mm film leader. For more information about this special handcrafted cutting and punching machine, see two videos produced by Lichtspiel / Kinemathek Bern: https://vimeo.com/657783002/b35ce84008 and https://vimeo.com/657783172/8b112a1676.

[63] Thanks to Nicolas Ray and L'Abominable of Paris for their willingness to make available a 300 metre reel of Kodak positive black and white 7302 triacetate film that was stored in the refrigerator.

[64] Fickers & Van den Oever 2014, p. 273.

[65] Fickers & Van den Oever 2019b, p. 49.

[66] Fickers & Van den Oever 2022, p. 118.

[67] See for instance Newnham 2020. The website by Grahame L. Newnham is a great resource for exploring the history of Pathé and 9.5mm in the United Kingdom: http://www.pathefilm.uk/.

[68] Van der Heijden & Kolkowski 2023, pp. 147-154.

[69] See for instance Barnes 1997.

[70] Anthony 1996; Van der Heijden & Wolf 2022.

[71] Kattelle 2000, p. 68.

[72] Herbert 1983b, p. 4.

[73] Van der Heijden 2018; see also Motrescu-Mayes & Aasman 2019.