An Update from the Association of Moving Image Archivists

By Leo Enticknap

Last week my fiancée invited me to look at some footage of her seven year-old niece performing at a school gymnastics competition, which she had "videotaped" (her word) on her new smartphone. This off-the-cuff remark in many ways encapsulates the opportunity and the challenge faced by anyone who is in the business of safeguarding moving image media for the long haul. The first and most obvious issue raised is that of technological specificity. What she had done was to create a computer file consisting of an MPEG-4 wrapper, which contained H.264 video and AAC audio components. There was of course no tape involved, but such is the ubiquity and widespread public recognition of what is now an essentially obsolete technology, which, as with the word "film," is a term that lives on as a generic noun and verb for an audiovisual storage medium and the act of recording.

The second issue is the implication of the rapidly shortening media obsolescence cycle for the archival community. Film (albeit in various chemical compositions, formats and configurations, many of which came and went) will have been in mainstream use for a century and a quarter by the time it ceases to be manufactured on a significant scale. The phonograph disc was used for a century, and analog magnetic tape for half a century. The most widespread forms of analog videotape were mainstream and commercially supported technologies for two to three decades. Most of today's digital media formats, and the encoding and compression algorithms that constitute them, remain useful as industry standards for a decade at most. If you are in the business of trying to preserve moving images and their associated audio recordings for multiples of centuries, film was bad enough. The technologies that have grown to dominate the creation of audiovisual media over the past decade, though, are changing the game of preservation so extensively and fundamentally that the archiving profession itself is beginning what will have to be an equally fundamental rebirth if it is to prevent what Paolo Cherchi Usai called a "digital dark age:"[1] in other words, the outright loss of much of the first generations of born digital content, for essentially the same reason that the independent consultant David Pierce's research estimates that only 27% of Hollywood's silent features have survived to the point of institutional archival preservation.[2] That is, quite simply, that material will be lost before we have acknowledged its cultural significance and developed the technology needed to save it.

And the final issue is the sheer volume of "born digital" content that these new technologies enable. When 16mm Kodachrome film first went on sale to consumers for amateur cinematography in 1935, it cost $9 ($150.97 in 2012 prices, adjusted for inflation) for a 100-ft roll.[3] At that price, few people could afford to film their nieces' school gymnastics competitions. Indeed, one of the problems that curators and researchers interested in the history of home movies have always had to deal with is that until relatively recently, the cost of the technology and the skills it required (for example, the first generation of Kodachrome had a speed equivalent to approximately EI15) were such that amateur film was shot almost exclusively by the wealthy and highly educated. That is essentially why the Zaprud er film exists, but there are no home movies (that are known to have been shot and which survive, at any rate) of the Watts riots. Amateur films are possibly an extreme example of the extent to which the cost of producing moving images has diminished, the skills barrier has evaporated, and the extent of production proliferated, but the same trend holds true across all sectors of production. The cost of using film and tape is not subject to Moore's Law, but the cost of using nonlinear digital storage media is. Combine that with the fact that the amount of storage and bandwidth needed for moving image applications is essentially finite (even for the uncompressed digital equivalent of large format 3D, there is a theoretical limit), whereas Moore's Law is a continuous process, and the direct technological costs of creating moving images here and now have the potential to diminish to the point of becoming negligible.

Trivial as it may appear at first sight, therefore, the cellphone video of a children's sporting competition exemplifies the challenge that the archiving profession, and its representative body, the Association of Moving Image Archivists (AMIA) are having to address as the digital revolution gathers pace. Half a century of research, from the work of pioneers such as Harold Brown in the 1930s to the Image Permanence Institute in the 1980s, has evolved the science of film preservation into widely accepted archival practice. Stored in a cool and dry environment, master film elements will survive for centuries, from which the copies required for access, either analog or digital, can be produced as needed. Compared to its successors, film was always relatively difficult and expensive to use, which to a certain extent kept the volume of it that flowed into archival collections within manageable limits. Film is, in short, the devil we know, and until the last decade has remained the gold standard in image quality, because all the electronic alternatives were limited in resolution, color space, and frame rate to the characteristics of the NTSC and PAL broadcast television standards. Standard-definition videotape recording, both analog and digital, could only offer advantages in flexibility and price at the point of production. Unlike film archiving, no satisfactory method exists of storing videotapes for prolonged periods and then recovering their content. A combination of the shortened format obsolescence cycle and chemical decomposition issues with the media itself mean that the only guaranteed way to preserve content originated on tape is to commit to regular format migration or post-digitization asset management. As a recent study by the Academy of Motion Picture Arts and Sciences put it, "this has left video archives full of many incompatible formats that run only on obsolete devices, requiring migration from old tape formats to new formats to access the value of the assets in their archives."[4]

But if the arrival (and now, it seems, imminent departure) of videotape represented an engineering challenge for the archivist, the nonlinear digital media technologies that are revolutionising moving image technology represent the perfect storm. Two developments in

the past decade will, I predict, turn the archiving profession upside down. The first is that for production purposes at any rate, standard-definition video is finished. If even my fiancée's cellphone can record footage at a much higher resolution than 480i (NTSC) or 576i (PAL), it is a safe bet that the world's television studios are doing likewise. Therefore, the volume of data generated in the creation of new moving images and the digitization of "born analog" material (including the "one shot" digitization of obsolete videotape formats, the output of which must be treated as preservation master material) has increased exponentially, and it has to be preserved somehow. A number of approaches have been developed for managing digital assets in long-term preservation, but the bottom line is that, as the former AMIA president and independent consultant Linda Tadic puts it, "there is no 'store and ignore' medium for digital files."[5]

The second is that film is also (almost) finished. Writing has been appearing on the wall at regular intervals since the turn of the century. Agfa and Ilford both pulled out of the motion picture film business, Fujifilm scaled back its presence in the market and Eastman Kodak discontinued a swathe of stock lines, many of which were used in archival preservation and restoration workflows. Kodak's Chapter 11 filing in January of this year, combined with the conversion to digital theater projection being two-thirds complete (and thus the rapid decline in demand for release print stock) all adds up to simple market economics dictating that film cannot have long to go as a commercially produced and supported imaging technology. The moving image archiving profession started out exclusively as a profession of film archivists, as embodied in the title of its first representative body, the International Federation of *Film* Archives. The movement's pioneers—legendary figures such as Ernest Lindgren, Henri Langlois, Iris Barry and James Card—saw themselves very much as custodians of a specific, physical medium. This is a unique legacy: after all, pioneer archivists of the written word did not regard themselves as custodians of parchment, vellum or slate tablets, but rather of the information recorded on them.

The almost theological belief in film as both a technologically and a culturally superior, more significant medium than its electronic successors survived largely unchallenged into the videotape era, and still retains a significant foothold to this day. A stark illustration of this can be found in the response of AMIA's members to the conversion to digital theater projection. As the use of film declines, the organizers of AMIA's annual conference have found it increasingly difficult to find theaters that are equipped to screen the range of film formats needed for the event's screening program, and to the requirements laid down by the world's leading archive institutions. This has led to an intense debate as to whether or not we should learn to stop worrying and love the Digital Cinema Package (DCP), so to speak—in other words, to accept that film projection is no longer practically possible or a curatorial imperative. Those who reject that position argue that it is ethically untenable to screen material that was originated on film using a digital surrogate, because doing so cannot provide an authentic recreation of an original viewing experience. Its supporters point to the fact that this format purism has not come to dominate the debate over other media (few would assert, for example, that the screening of a 2 in. Quadruplex tape dubbed to Digibeta is fundamentally unethical), that in most cases, high-definition digital surrogates can match the resolution and color space of original film elements and that in short, the job of an archivist should be to promote understanding of the past, not to live in it.

Photo: Leo Enticknap

The AMPAS building on Vine Street, Hollywood; home to the AMIA Office.

This, in a nutshell, is the challenge that AMIA's members and leadership face. The medium that initially defined the profession is going away, and that has both technological and cultural ramifications. The technological ones have been covered above. The cultural challenges include, for example, the issue of selection. As with videotape and the proliferation of production, this is, in principle, nothing new. The UK National Film Archive's infamous selection committee, for example, left behind it a trail of minutes recording 'blindingly obvious' and 'rather silly' decisions for acquiring and declining titles, resulting from a bureaucratic procedure that only the British civil service could have dreamt up.[6] And this was in the 1950s, when the country had a relatively small film industry and only two national television channels. Their successors are faced with a volume of media production that is an order of magnitude larger, and, because it is almost all born digital, a potentially unlimited financial liability for every minute of footage they commit to preserve. To put it bluntly, the advent of near-universal literacy in the late nineteenth century did not result in the emergence of a whole world full of Shakespeares and Hemingways. No attempt is made to preserve at least 99% of the written words that are now created or duplicated. If we accept that high-definition digital media can be seen as the moving image equivalent of near-universal literacy (almost everyone who wants to can now create moving images, just as by the close of the Victorian era, almost everyone who wanted to could read and write), the custodians of moving image archives are going to have to make similar choices. New curatorial approaches are needed, and with them a clear vision for redefining the mission of the moving image archive, especially in the non-profit sector.

That having been said, the AMIA is strongly placed to face those challenges, being a group of *moving image* archivists that is not exclusively allied to any one storage medium. AMIA's members and committees encompass the archiving of all media from nitrate film to digital files. We unite the technological and the cultural functions of the job, and the principal way we do that is having the individual, not the institution, as our core unit of membership. Moving image archivists come from a diverse range of backgrounds, and over the seven decades of its existence, the profession has evolved into a series of specialist job profiles. Some come from a film lab or broadcast engineering background and became archivists through a job move within a larger company or organization. Others went through "the programs"—one of five postgraduate degree courses that exist worldwide and are designed specifically to prepare students to work in the field. Some look after small collections of moving image media within larger, mainly paper-based archive institutions. Others undertake the activity on an amateur basis, either as private film collectors or volunteers at non-profits. All are welcome to join AMIA as individual members: we impose no membership requirements apart from acceptance of the organization's code of ethics.[7]

Another particular strength of AMIA is its ability to unite the for-profit and non-profit sectors, both in terms of archive institutions

themselves and the organisations that service them, from university research departments working on preservation issues to vendors of equipment and consumables used in the archiving process. One manifestation of the shift to digital has been the fragmentation of many core archival operations from in-house functions from those that are outsourced to specialist and focused vendors. Once again, this trend began to emerge towards the end of the film era, with labs such as the Film Technology Company and Colorlab in the U.S., and Prestech and Haghefilm in Europe concentrating primarily on the archival market. With the shift to digital, a number of post-production houses and software vendors have entered the market, especially in the area of digital restoration and reformatting. Many of them are discovering the benefits of institutional membership of AMIA, as our annual conference, newsletter, events program and online communications resources provide an effective way to connect with potential customers. Members of AMIA, such as My Eye Media, a post-production facility with restoration services, are able to better understand the importance of identifying any impairments that may be introduced by the ingest/scanning process, and ensuring the best digital representation when writing out onto physical media.

The list of challenges facing today's generation of moving image archivists is a formidable one. They will not only have to be able identify the provenance of a 1912 local newsreel from the shape of its perforations and camera aperture, but that of a 2012 cellphone video from its automatically generated metadata as well. The custodians of for-profit collections have to evolve new business models for determining optimum preservation and access strategies to safeguard their investment in born digital assets. Curators of non-profit archives are developing the selection strategies that will help to make coherent sense from the proliferation of media production they are now faced with. Technology vendors are facing ever more challenging demands from the archivists they service, not least for the holy grail of a true "store and ignore" digital carrier, comparable to film in cold storage. As one commentator at our last conference put it, "we desperately need a medium that isn't magnetic and isn't an optical disc." The access landscape is also changing rapidly, with high-definition broadcasting, digital theater projection and online delivery to consumers taking hold, and film, standard definition television and distribution to consumers on physical media in decline.

With respect to technologies that could conceivably replace film as an archival medium as the costs of film inevitably rise, there have been a host of proposals over the past decade including holographic optical media, digital information on film, and spinning computer disk drives. Unfortunately, none of these technologies have come anywhere near an actual commercial launch followed by sustained presence in the marketplace. The archival market overall is too small to justify the R & D costs of a truly viable "store and ignore" offline medium. With the increasing cost of film, the industry may well be stuck with a combination of hard drives and regular migration (be that offline or through an always-on infrastructure such as a RAID) for the foreseeable future.

Photo: Leo Enticknap

Delegates at AMIA's 2007 conference in Kodak's Theater on the Ridge in Rochester, NY.

AMIA is, and intends to remain, at the forefront of these developments. Our two journals, *The Moving Image* and *AMIA Tech Review*, keep members abreast of research and development in the cultural and technological aspects of the profession, respectively. Our annual conference and digital asset management symposium provide an opportunity for networking and to meet the field's leading practitioners and commentators. As we stand on the threshold of analog audiovisual media facing almost total obsolescence, AMIA's members are faced with a formidable task: to evolve the technologies, methods and advocacy needed to ensure that a representative range of today's moving images survive to be accessible to the generations that follow us. We aim to be at the forefront of the effort to do that job.

References

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2. Cited in Caroline Frick, *Saving Cinema: The Politics of Preservation*, (New York, Oxford University Press, 2011), p. 65.
3. Alan Kattelle, *Home Movies: A History of the American Industry, 1897-1999*, (Nashua, NH, Transition Publishing, 2000), p. 186.
4. Milt Shefter and Andy Maltz (eds.), *The Digital Dilemma: Strategic Issues in Archiving and Accessing Digital Motion Picture Materials* (Los Angeles, Academy of Motion Picture Arts and Sciences, 2007), p. 19.
5. Linda Tadic, 'Video Preservation for the Millennia', *AMIA Tech Review*, vol. 4 (May 2012), http://www.amiaconference.com/techrev/V12 05/tadic.htm , retrieved May 26, 2012.
6. Penelope Houston, *Keepers of the Frame: The Film Archives*, London, British Film Institute (1994), p. 40.
7. The full text can be found at http://www.amianet.org/about/mission.php.

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