aniki
Revista Portuguesa da Imagem em Movimento
Portuguese Journal of the Moving Image

Conceptual Synchronicity: Intermedial Encounters Between Film, Video and Computer[1]

Yvonne Spielmann[2]

For a contemporary discussion of the convergences that result from transgressions and the crossings of media borders, it will be useful to remind ourselves of the conceptual history of intermedia and intermediality as it emerged alongside the increase of technical media and avant-garde aesthetics in the twentieth century. Marshall McLuhan set the tone when he concluded that the encounter of older and newer media would be violent. Each emerging medium would rip up the structure, the 'gestalt', form and scale of its preceding media. Herein lies the *message* of the new medium that manifests as the *massage* of the older medium. In a similar spirit of exploration and experimentation, characteristic of post-war arts using novel technologies that break up genres, Dick Higgins determined intermedia as a *conceptual fusion*, whereby elements of different media are brought together and build a new form that is not the sum of its parts but the convergence into a third form: 1+1=3, an equation that reminds us of formalist film theory and practice in Eisenstein's concept of montage. It is in this contradictory tension between violent rupture and conceptual fusion that I wish to situate the importance and ongoing significance of expanded cinema.

Intermedia arts differ fundamentally from other forms of combinations such as multimedia, where, for example, sound adds to image, image adds to text. Historically, the concept of intermedia art was coined in the context of US arts practices by Dick Higgins around 1966 and used to talk about fusion of genres, styles and techniques in happening, fluxus and performance. The stress on the technological dimension came much later when contemporary media studies rediscovered McLuhan's notion of transformation that results from the *massage* effect. Generally speaking, intermedia forms lie in-between photography, film, music and performance, and computer when the boundaries are blurred.

Although intermediality has always been a tool in art practices, its application peaks with the introduction of novel technologies around the early 1960s. Notably, the processes of intermedial trans-

[1] Extended and revised version of "Conceptual Synchronicity: Intermedial Encounters between Film, Video and Computer". In *Expanded Cinema: Art, Performance, Film,* edited by, A. L. Rees, Duncan White, Steven Ball and David Curtis (London: Tate Publishing, 2011), 194-201.

[2] Dean, Faculty of Fine Arts, Lasalle College of the Arts, 1 McNally St, Singapore 187940.

formation are conceptually foregrounded in the theories and practices of Russian Formalism in the early twentieth century. They saw the interrelationship of poetry and visual arts generating a new typographic form of fusion: image-poems respectively poem-images that transgress the borders of text and picture. Following the conceptual development of intermedia, I regard artists' practices as intermedial that expand and exhaust the media technologies of their time. I will look in particular at the time span of the sixties and seventies when experiments between arts, science and technology were conceived and carried out vibrantly and properties were blended and mixed that film, video and early computers (namely analog computers) share or not share with each other. One target of experimentation was to understand how these media work and how they can be related to each other. Another aim was to identify structural differences and foster the core characteristics of each distinct medium by driving its capabilities to limits and make new convergences feasible.

When discussing such complexities in the interplay of film, video and computer, it might be useful to keep in mind the different phases that follow one another and sometimes also develop in parallel. The first phase marks the arrival of a new medium and its hostile and violent relationships to existing media. To remind, relations between film and video and later between digital computer and video were in the beginning antagonistic. The next phase regards the articulation of the expressive means and aesthetic vocabulary of the new medium and leads to the identification of properties that are specific to the individual medium and how they can be blended in experimental practices. Finally, the new medium will be accepted and integrated into the larger media environment and eventually become a building block for future developments of mixing and crossing. The following discussion focuses on the interplay of film, video and computer, and recognizes in particular the phase of establishing medium specificity. This step of convergence is important because it reveals the structural components that can be combined in the intermedial encounter. On these grounds, we can consider the conceptual overlapping and synchronous approaches in experiments done with and in-between film, video and computer images (and sounds). When we wish to understand how properties of diachronic media (as film and video are historically separate) are interrelated, it is important to identify the similarities as well as the differences.

The artists whom I consider most important here – Paul Sharits and Stan Vanderbeek – engaged in the examination of the specificities of film in relation to the surrounding media of television and video and early computer graphics. They developed artwork that sit in-between existing forms such as photography, film, video and painting in order to explore the common elements of diachronic media. In doing so, they 'expanded' film and video violently into the

sphere of another medium, thereby rendering the medium-specific properties of their given media in the most extreme way.

In order to acknowledge these works in the wider context of conceptual experiments, the violent in-between forms need to be situated, firstly in relation to expanded forms in film that exploit the effects, both visual and audio, available with and through the cinema and beyond. In this respect, Tony Conrad provides cinematic connections between sound and image that can be deconstructed. Secondly, the context of performative forms in film, video and computer experiments need to be mapped out, to demonstrate how intermedia arts exploit the performative capacity of different media forms. For example, Steina Vasulka exploits the electronic modulation of video signals and manoeuvers to play sound and vision live from the same source of a concert violin, whereas Jud Yalkut performs live filmic, kinetic and video projections that fuse the visual capacities of different media sources by expanding or abandoning their apparatuses. Finally, and in particular with regard to the computer as a calculating machine, it is important to note the endeavours of John Whitney and Woody Vasulka, who both determine a systematic abstraction by forcing the medium (Whitney in film and computer; Vasulka in video and computer) to reveal its matrix structure in a way that lays the ground for a more comprehensive structural comparison between different media.

The discussion of artists' strategies to explore and dismantle and rearrange newer media tools when they become available shall not be confused with the 'natural progression' within each medium that constantly happens by incorporation of advanced applications into the apparatus, necessary to cope with the technological standard at a time. If this would not happen, any medium would quickly die and disappear. Differently, cross-media passages that are used by the artists are carried out with the desire to technically realize forms that differ from the standard. They are also interested to find out how much film can be changed without losing film's identity as a medium of its own. By looking at the activities that bridge cinematic, electronic and computational elements, the goal is not to follow technological determinism but to make the point that technology can be used either in proper function or against the grain. These experimental processes in-between film, video and computer technologies do expand and at the same time interrelate divergent tools and can be characterised as intermedial practices.

Film and video

This violent encounter of media properties is particularly heard and seen in film installations by Paul Sharits, in which he systematically analyses the materials of film and the cinematic apparatus by questioning perception and projection. He expands the concept of

projecting film with multiple screen installations and aims to immerse the viewer in temporally and spatially disturbing perceptual film environments. This direction is grounded in Sharits' research interest in the persistence of vision. His curiosity about the projected image leads him to create distortions of the standard systems of film projection.

The approach in Sharits' films is twofold. He uses projection with variable frame rates in order to interfere with the viewing impression of apparent motion, and he inserts frame cuts to interrupt the image and disturb temporal development using flicker effects. In the silent film *Piece Mandala/End War* (1966), monochrome colour frames are interlaced with black-and-white images of a couple making love. The monochrome frames serve as an interval that separates and connects the still frames, which show different shots of the same couple from front, rear and either side, these perspectives alternating throughout the film. The flickering rhythm gives the impression of circular mobility as the figures rotate on the spot, denying the usual sense of development encountered in 'moving images'.

Sharits, like Hollis Frampton, was attempting to radicalise filmic development in time. Sharits, in a conversation with Hollis Frampton in 1973, asserts that film because of development always has some narrative connotation that cannot be fully destroyed because of film's linear movement in temporal direction (Frampton 2008, 280-291). Frampton examined filmic structures in order to explore the paradoxical idea of non-narrative movement in time by employing non-developmental (and thus non-filmic) structures. Because the development in time is unavoidable in any filmic movement, this work sits on the border between film and non-film. Frampton, for instance emphasised that his interest was not in making films 'about' light, colour and so on, but that he conceived of film as information 'on' light. The investigation of abstract mathematical orders in his film *Zorns Lemma* (1970) is not, in the end, about mathematics, but *is* in fact part of mathematics. By driving the inherent tension that exists in-between our understanding of film and non-film to the limits, the non-negotiable development in time is rendered crisp. Clearly, the crossing of antagonist concepts is needed to bring the specificities within one medium to evidence.

In the 1970s, Sharits, Frampton and Tony Conrad were faculty members at the Centre for Media Study at the State University of New York in Buffalo, where they explored the materiality of film in conjunction with pioneering video artists Steina and Woody Vasulka and Peter Weibel. Sharits engaged in disturbances via the projection of flicker, loop and frame cuts, and also the removal of the shutter so that he could gain paradoxical images that seem to move multi-directionally. With the goal of making the border between film and non-film perceptible by violently drawing the viewer's attention to recognising at the same time the frames and their apparent motion,

Sharits focuses on the visibility of the transition from one frame to the next. This is particularly evident in the films *Ray Gun Virus* (1966) and *N:O:T:H:I:N:G* (1968), in which each image is made to flicker as it makes the transition. Sharits interferes with the shutter and the frame rate to cause variations to the flicker effects and vibrating colour impulses that on a philosophical level correspond to the meaning of 'Nothing' in Zen Buddhism, where existence and nothingness are not separate entities and dualism is resolved. In his comment on *N:O:T:H:I:N:G*, Sharits stresses his concern with space and motion, to "create virtual shape": "in negative time, growth is inverse decay" (Sharits 2008a, 320). The film has at its centre the picture of a light bulb - not purely as a reminder of the projection source but of light meaning emptiness (or, for McLuhan, 'pure energy'). This concept of non-development manifests, when the film almost physically reverses the direction of projection through strong reflection effects that come from alternating frames at different speeds.

This is evident in something like *Epileptic Seizure Comparison* (1976), on which the two-screen loop projection is combined with the reflective walls of his spatially designed film installation (Fig. 1 and Fig. 2). It presents two types of images that appear like superimposition: frames of a medical study on epilepsy and frames with pure colour. Because of its flickering structure the film itself resembles the rhythm of an epileptic seizure (and might cause epileptic-like reactions in sensitive viewers). Sharits, however, withholds the movement of action and reduces the unavoidable narrative connotation of development toward abstraction. In this respect, the pulsating film shown on two screens that are vertically set above one another becomes a performance of the projection itself. Sharits explains how he wants to invert projection within the immersive space: "Side walls must be smooth and be painted with reflective aluminium paint to exaggerate the frenetic pulsing of the screen images" (Sharits 2008b, 353).

Fig. 1: Paul Sharits, *Epileptic Seizure Comparison* (1976)

Fig. 2: Paul Sharits, *Epileptic Seizure Comparison* (1976)

Indeed, Sharits' multiple-screen installations go beyond analysis of the material properties and movement structures of film. His research on the cinematic apparatus and the film strip brings his work close to the open structure of video and its internal instability of signal processing.

As well as using reflection, Sharits makes the appearance of the medium film as fluid as electronic processing, when he projects up to three film loops next to each other with variable frame rates in the installations of *Synchronoussoundtracks* (1973). The speeds of the loops differ and alternate between synchronous and asynchronous rhythms. This projection performance of film merges into a seamless interplay of the screen images, which seem to move in vertical and horizontal directions and out of frame. By blurring the visual impression of vertical and horizontal image movement, the projected images of colour are seen as travelling in horizontal motion through the screens installed next to each other. This horizontal drifting of film images across horizontally projected film frames gives the impression of out-of-sync and is not a recognizable feature of film. This concept of framing unbound images belongs to the open structure of electronic processes in video. Indeed, this concept of framing unbound images belongs to the open structure of electronic processes in video. There, horizontal drifting occurs when the electronic scan of the video signal is not adjusted so that the scan lines run adrift and the image moves out-of-sync horizontally.

Another element of convergence between film and video can be found in Sharits' treatment of sound in *Synchronoussoundtracks*. As Sharits describes the construction of visual analogy with tones:

> Three speakers arranged five feet apart and five feet from the floor. Each speaker is in logical relation to one of the three screens. The sound is of sprockets passing over a projector sound head. The frequency oscillates in

> direct (synchronous) relation to the sprocket hole images on the screen. (Sharits 1978a, 121)[3]

The resulting correspondences between sound and vision give the impression that image and sound are coming from the same source. This conceptual synchronicity resembles the audio-visual synchronicity that can be technically realised in video. It means that the video information can be displayed auditively and the audio signals can control the video, and both outputs, visual and audio, can be heard and seen simultaneously.

Notably, Sharits, in his radicalisation of time-based media, conceptually employs some of the properties of the electronic medium, and draws the viewer's attention to the fluidity of an image that looks like frame-unbound video. Sharits expressed his views on television when he noticed in commercials a rapid cutting that was similar to his use of flicker. He also suggested that non-filmic elements are better placed in video works. His research into the material possibilities "for developing both sound and image from the same structural principle" culminated in a vision of media systems that seem to blur film and video in particular. "One may find it necessary to construct systems involving either no projector at all or more than one projector and more than one flat screen, and more than one volumetric space between them. A focused film frame is not a 'limit'" (Sharits 1978b, 263). And Sharits' overall use of flickers, loops, rephotographed footage, frame cuts, and multi-screen projections with removed shutters served the goal of creating an essentially open cinematic apparatus[4].

The intermedia research context at the Centre for Media Study at Buffalo also fuelled Tony Conrad's consideration of convergences between filmic and electronic capacities. In his film performances, the ambiguity of sound-image relations stands out. In *Bowed Film*, a series of performances that Conrad has staged since early 1970s and continues to perform today, the artist uses the 'instrument' of a violin bow to 'play' a film strip that is spliced together as a loop and placed around his neck. The performance onto the surface of the film material blocks the vision – and it also does not allow the audience to 'see' the written text on the film strip that gives the instruction how to 'play' this film on its surface. The 'film' is to only be heard and not seen (although he has performed this piece using pickups, distortion pedals and amplifiers). Here, the enforced performance of the material source exceeds the standard representation (the spliced film loop cannot be projected) and transfers it to another medium. We hear the information we cannot see. But in video it is possible to present the source information visually and auditively at the same time be-

[3] Also in: *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973-1990*, edited by Woody Vasulka and Peter Weibel, 342. Karlruhe: ZKM; Cambridge: MIT Press.

[4] See also Spielmann 2007, 197-215.

cause of the structural transformativity of audio and video signals in the electronic medium.

Similarly, Steina Vasulka highlights the intermedial characteristics of the audiovisual medium video in her *Video Violin* performances (1970-1978), in which she plays live video with the violin. The performative qualities of the medium video are forced to become apparent, and the violin becomes an instrument for the simultaneous generation of image and sound, as the sound of the violin playing – recorded using a microphone connected to video devices (scan processors, and multikeyers). In real-time processes, the visual representation of the artist's performance, recorded simultaneously with two video cameras, is modulated by the audio signal (generated from the violin) and determines the electronic flow. The movements of the bow on the violin's strings in real time generate immediate deviations on the image position of this movement. Thus, Vasulka plays violin (sound) and video (images) at the same time as information form the same source is simultaneously heard and seen (Fig. 3).

Fig. 3: Steina Vasulka, *Video Violin* (1970-1978)

There are further intermedial shifts from film to video in Jud Yalkut's expanded cinema environments, which mark the fusion of projection and performance in spatial environments. Yalkut – who has collaborated with Nam June Paik on his videotape studies, and also documented Paik's magnetic performances with film – experiments with projection systems and, like Vanderbeek, works predominantly with multiple projection and portable screens and collage. For the spatial installation USCO, *Yin/Yang Sine/Pulse*

(1967) he uses two 16mm films as well as projectors, loops and semi-transparent weather balloons that hang from the ceiling and reflect images projected directly onto them. The reflection is overlaid by another reflection that comes from the silver-metallic walls of the space, which mirror the projected scene. The image and light sources are multiplied, dissolving any sense of uni-directional projection. A disturbing experience of perception arises, which destroys the usual understanding of film form – the effect comparable to Sharits' installations – and expands cinematic space into an almost immersive perceptual environment. These techniques continue in the video works, where effects of overlaying and superimposition are filmed and re-edited to create in-between forms of 'videofilms'. In exemplary ways, the concept of Yalkut's multi-directional and multi-layered intermedia art is executed in his 1966 film *Turn, Turn, Turn* (Fig. 4), which stands in-between a camera recording of the dynamics of free-floating images of kinetic and cinematic spaces in all directions on the one hand, and an expanded media installation that turns and meanders freely in space and behaves like an object in excess of standard limitations of projection and frame on the other. For the viewer, orientation and media levels defuse as internal and external views are merged into an almost three-dimensional media-film experience.

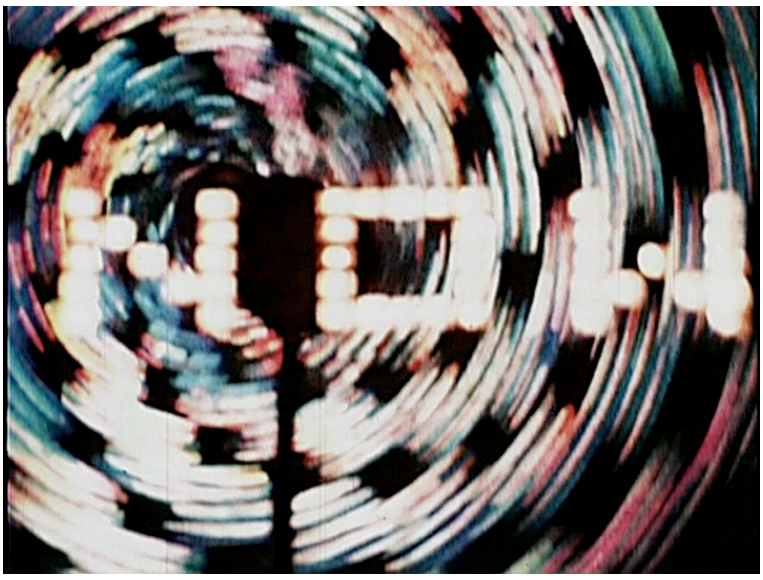

Fig. 4: Jud Yalkut, *Turn, Turn, Turn* (1966)

Film, Video, TV and the Computer

In the 1960s and 1970s, materialist experiments in film and the expansion of projection into spatial environment coincided with the development of a medium specific language of video. In the perspective of experimental film and video television was the 'antagonist' as well as the reference medium regarding its programme structure and

the institutionalisation of mass media. In this respect, artists' endeavours in expanded cinema shall be acknowledged in their groundbreaking attack of the commodification of media languages in television. They were seeking to build alternative media spaces and make connections to video and computer experiments in order to articulate and foster media critique.

John Whitney's film experiments with graphic notation and early computer technology informed many of the cross-media experiments of the time. In a series of works, *Matrix I-III* (1970-1972), Whitney created abstract films using computer graphics programming. These works, like Vanderbeek's studies, contribute to the emergence of the genre of computer films. Woody Vasulka, in a different approach of exploring the abstract and systematic languages of images, departed from film and worked with video thereby developing a 'lexicon of electronic vocabulary'. Steina and Woody Vasulka worked together searching for the formal languages of video, their series of studies, *Matrix* (1970-1972) and *Heraldic View* (1974), deliberately misadjusted the video signal and set it adrift so that it would travel horizontally across the frame. The idea was to 'free' video from the constraints of its limited appearance within the standard television format and to study frame-unbound video by unlocking the frame. The 'image' that travels horizontally across the frame fundamentally differs from the film frame and cut.

Going a stage further, Vanderbeek's remarkable film-video-computer experiments combine video image processors with computer graphics programming. This happened at a time when – with the exception of the chroma-key experiments of Ed Emshwiller and the computer films of Larry Cuba – there was little interest in converging (rather than mixing) different technologies. (The overriding concern for the artists was to get recognition that video is an art form of its own and opposed to television.) Yet, in the 1960s, Vanderbeek, with support of Bell Telephone Laboratories, had tried to develop multimedia performances and computer animation. His interest to bridge art and technology led to the project of *Movie Drome*, constructed in the mid-1960s at Stony Point, New York. Inside the building that had the shape of a dome, Vanderbeek would perform multiple projections of film loops, videos and computer graphic images that spatially surrounded the viewer as in a planetarium. The viewing experience was different because in Vanderbeek's dome the audience needed to lie on the floor and look up. Aesthetically, Vanderbeek had taken ideas from his early collage films and speeded up the image sequence in anticipation of videoclip montages.

In Vanderbeek's later video experiments, pulsating rhythm and concentric arrangements of extended feedback images create a form that comes across as the 'content' of a dynamic and process-based video work. But Vanderbeek not only uses forms specific to video, such as feedback; he also, and more importantly, makes inter-

medial transitions from film to image processing and early computer graphics, as with works such as *Symmetrics* (1972), which was made using primitive computer drawing techniques. After having completed a number of short films in the late 1950's that were inspired by happenings and included animated collage, Vanderbeek began to work with a compilation of different media forms in his work *Telephone Mural/Panels for Walls of the World* (1970). Here Vanderbeek explored the graphic potential of videotape-mixing "by way of electronic mattes, superimpositions, and other electronic means of integrating as many as eight separate images onto one screen" (LUX 2013). The kaleidoscope of this video collage shows the artist's vision of a simultaneous worldwide linkage that could be realised through satellite television. (Nam June Paik also pursued the idea of satellite transmission and was finally able to realise a full-scale live performance telecast to Korea, the Netherlands, Germany, the US and France in 1984*: Good Morning Mr. Orwell*.)

Since 1966, Vanderbeek had collaborated with Ken Knowlton at Bell Telephon Laboratories where he could realise computer animation films, multiple screen projections and broadcast on multiple television channels. His early works using computer graphics programming were based on analogue systems. *Poem Field* (1966) show primitive dot patterns that were rearranged in mosaic-like geometrical configurations. What was possible at the time were small points of light that were turned on or off at high speed (Youngblood 1970, 246-249). The abstract electronic-optical configuration of *Symmetrics* mixes hand drawing and computer graphics.

Vanderbeek's experiments with TV were crucial to the development of his conception of expanded cinema. He would use "the world's most expensive optical bench", as Vanderbeek explains the mixing/switching system at the WGBH television studio. Gene Youngblood has described how the WGBH television/video system had monitors and switching circuits, "by which different sources of video information are selected, mixed and routed in various ways". And he has suggested that "within its basic ingredient – alternating current – exists the potential for an art of image-synthesizing that could exceed the boldest dreams of the most inspired visionary" (Youngblood 1970, 276). In the video *Vanishing Point Left*, produced at WGBH in 1977, Vanderbeek focuses the visual potential of the electronic medium, and experiments with its capacity for abstraction and image flow. He works with movement, layering and flicker to transform forms that refer back to the projection surface of video and clearly articulate video as 'constant flow of images'.

Other experiments with television are an important example of this intermedia approach to expanded cinema. British video pioneer David Hall developed a series of 'TV Interruptions', a way of interrupting the televisual programme flow by talking back to the medium with its own means. In a similar way, his videotape *This is a*

Television Receiver (1976) enforced video's encounter with television through rewinding and re-recording the same videotape three times in a row until the material on screen becomes a hopelessly jumbled series of ghost-images - until both the meaning and the material of the video are destroyed while it is still being screened. The loss of sound and vision from generation to generation of videotape exhausted the capacities of the analogue medium of the time. Hall's installation tape, which needs to be shown on a monitor, merges video and television on the same technical basis, both visually and aurally, and uses video as an intervention into an intermedial enrichment of television.

Expanded Cinema into Expanded Media

In 1966, Stan Vanderbeek has a visionary view about the future landscape of worldwide-interconnected media and suggests further research of the possibilities to combine audio-visual devices to make them suitable for international transmission. This is meant to expand single media applications. His 'manifesto' on "Culture: Intercom" and "Expanded Cinema" says:

> That audio-visual research centres be established on an international scale to explore the existing audio-visual devices and procedures, develop new image-making devices and store and transfer image materials, motion pictures, television, computers, video-tape, etc. (VanDerBeek 2008, 73)

With the focus on pioneering examples of expanding film into media, and on Sharits and Vanderbeek in particular, I wanted to present two striking examples of 'expanded media'. In a historical view, I see close interrelationships with neighbouring media technologies: in particular, performance and video and computer graphics. I find it important to highlight such interrelationships where artists have explored and extended the intermedial potential of the media they use in ways that blend ideas of film with video and the computer. Striking endeavours, traceable in the expanded cinema of the 1960s and 1970s, have contributed to expanded media. The filmmakers and video artists who cross borders provide an intermedial model for the convergence of elements of different media in an artwork. This happened before the digital computer made it possible to integrate such machine operations and dissolve media borders. When in 1966 John Whitney was given access to one of the first IBM computers, it was an analogue machine ready for visual graphics to explore their aesthetic potential. Whitney, in collaboration with Larry Cuba, wanted to employ analogue computers for creating abstract films and could only later use digital computers for the purpose of creating 'digital harmony' in graphic abstraction. However, he was not interested in exploring other media, and in particular – as Cuba confirms – not interested in the video technologies that developed in parallel after the mid-1960s. A comprehensive interplay of media is crucial to the notion of expanded cinema where the exhaustion, radicalisation or

extension of the capacities of film, for example, are realised in the encounter with surrounding media technologies. This manifests itself in the interrelationships between media that either integrate and blend elements, or explore the overlapping capabilities of video and computer animation. These mergers have violently pushed film and cinema to their limits and transformed their elements.

There will be many more examples than the ones discussed in this article that are suitable to demonstrate the interplay between film, video, and computer in the 1960s and 1970s. This was a vital historical period: film was fully developed, video was emerging and computer technologies provided the horizon. The recognition of cross-media concepts and practices, however, requires an intermedial perspective in the research that looks at borrowing, blending and conceptual synchronicity in both directions. It is not sufficient to regard how video relates to or differs from film and computer graphics, or vice versa. Nonetheless, I find it important to look (on a structural level) into film's extension into video, and video's relation to analogue and digital computers. Artists at the time were systematically looking for similarities and differences between the existing and the new media technologies to pave the way for more complex media mergers that are characteristic of our present time. And it is in this perspective that experiments with film in relation to video and the crossings between film, video, and computer technologies have contributed to expanding the film medium into plural media.

REFERENCES

Frampton, Hollis. 2008. "Interview with Paul Sharits". In *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973-1990*, edited by Woody Vasulka and Peter Weibel, 280-291. Karlruhe: ZKM; Cambridge: MIT Press.

LUX. 2013. "Panels for the Walls of the World by Stan Vanderbeek." Accessed November 4, 2014. http://lux.org.uk/collection/works/panels-walls-world

Sharits, Paul. 1978a. "Filmography". In *Film Culture: Paul Sharits*, 65-66:121. Reprinted in *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973-1990*, edited by Woody Vasulka and Peter Weibel, 342. Karlruhe: ZKM; Cambridge: MIT Pres.

———. 1978b. "From 'Words Per Page'". In *The Avant-Garde Film. A Reader of Theory and Criticism*, Anthology, edited by P.A. Sitney, 260-263. New York: Film Culture/New York University Press.

———. 2008a. “N:O:T:H:I:N:G”. In *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973-1990*, edited by Woody Vasulka and Peter Weibel, 320. Karlruhe: ZKM; Cambridge: MIT Press.

———. 2008b. “Sketch and instruction for the performance of the two screen loop projection *Epileptic Seizure Comparison*, 1976”. *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973-1990*, edited by Woody Vasulka and Peter Weibel, 353. Karlruhe: ZKM; Cambridge: MIT Press.

Spielmann, Yvonne. 2007. “Paul Sharits: From Cinematic Movement to Non-directional Motion”. In *Avant-Garde Film*, edited by Alexander Graf and Dietrich Scheunemann, 197-215. Amsterdam; New York: Rodopi.

Youngblood, Gene. 1970. *Expanded Cinema*. London: Studio Vista.

Vanderbeek, Stan. 2008. “‘Culture: Intercom’ and Expanded Cinema: A Proposal and Manifesto.” In *Art and the Moving Image. A Critical Reader*, edited by Tanya Leighton, 72-74. London: Tate.