Techniques Developed In Early Cinema To Edit And Choreograph Unscripted Footage

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Abstract

This article explores some of the editing and filming techniques developed in Early Cinema, and that are still valid when choreographing found footage today. The Lumière Brothers started revealing the choreographic nature of daily actions. Georges Méliès choreographed with editing by cutting, overlaying, dissolving and the substitution splice.

Fernand Léger applied looping and kaleidoscope effects to create new rhythms and patterns. Lev Kuleshov experimented with assembling together footage of different nature, creating new semantics. Dziga Vertov choreographed footage of different sources, theorizing the rhythmical editing. Leni Riefenstahl composed new movement trajectories with editing and inverting speed.

Keywords: Editing, montage, movement continuity, early cinema, screendance, unscripted footage, documentary, urban symphony, rhythmic editing, cinéma pur, pure cinema

This article proposes an analysis and re-discovery of the editing techniques that were explored in historic cinema, as those techniques still apply nowadays when creating a new work from archival footage. The main period of interest in this article is the decade of the 1920s, when many art forms underwent a period of radical experimentation, and in particular when many artists dedicated themselves to exploring the possibilities of the new art of cinema.[1] For instance, in the 1920's avant-garde artists such as Fernand Léger, Marcel Duchamp, René Clair and Germaine Dulac theorized and applied the concept of "cinéma pur" (pure cinema)[2], insisting on the importance of detaching cinema from narrative theatrical plays and literature in order to use purely cinematic elements of rhythmic editing, split screen, super-impositions and speed modifications. René Clair stated that "pure cinema" occurrs "as soon as a sensation is aroused in the viewer by purely visual means"[3]. This (mostly French) pure cinema used primarily recorded figurative footage, imposing new movements, rhythms and shapes through editing. This differs from other forms of abstract cinema developed primarily in Germany that used animated drawings.[4]

This avant-garde movement of pure cinema is paramount in the development of films from archival footage, in particular when there is a choreographic intention of creating rhythm and movement. On one hand it proposed to further explore editing techniques to develop their full potential, and on the other hand, it proposed a new mind set: footage had to be seen for its abstract visual/movement properties and editing was a means to create abstract rhythm patterns and visual composition. In this sense, pure cinema rejected the creation of works based on a narrative script that implied a theatrical staging and filming of the script, and proposed to observe the movement and composition that arose from unscripted and non-staged footage.

The 1920s also represented a moment for the crystallization of film theory when many practitioners in the Soviet Union (such as Sergey Eisenstein or Lev Kuleshov, and of course Dziga Vertov, whose works and theories I will explore in greater detail) attempted to understand and formalize the language of cinema. For instance, Jean Rouch, a filmmaker-anthropologist that documented and analyzed ritual dances across the African continent in the 1960's and 1970's and remains very influential in the field of documentary cinema, indicated that his work "is based on experimentation with direct cinema, deriving from the theories, under the name cinéma-vérité, prophesized in 1927 by the Russian filmmaker Dziga Vertov."[5] Rouch points out that "kinopravda" (cinéma-vérité, or "film-truth") is "an ambiguous or self-contradictory expression since, fundamentally, film truncates, accelerates, and slows down actions, thus distorting the truth."[6]

Jean Rouch insisted on the opposition between working with unscripted footage, which was common to kinopravda and his anthropological activities, and working with scripted footage which prompts a very different editing process. In dance films and screendance, there is also a distinction between scripted and unscripted footage, and in this case the pre-existing choreography can act as a script. Some dance films simply capture the choreography as it is performed on stage, and others apply more sophisticated filming and editing, but the movement, time and structure are set by the choreography. On the opposite end of the spectrum, works of screendance based on pre-existing footage use editing techniques in order to "choregraph" the footage and create a new work with a new structure and rhythm. This footage can be considered unscripted material, even if it comes from a narrative fictional film or from a scripted dance, because the new work selects, assembles and cuts these disparate materials with a different intention from the original script. One of the main advantages when working with scripted material is the fact that the position of the actors or dancers and the framing of the camera are defined by the script and follow a logic intended for subsequent editing, taking into account movement continuity and direction, and the shot order.[7] The editor must then select their preferred takes from each shot and cut at the adequate moment. In contrast, the main challenge when editing unscripted material is discovering the potential movement commonality or continuity between shots that have not been recorded for a shared purpose.

Most creators whose techniques are studied in this article came from the world of documentary and communication, assembling unscripted footage to create newsreels or longer documentaries, such as Dziga Vertov, Walter Ruttmann in the 1920's, and later Leni Riefenstahl. As they needed to create coherent feature films from footage of sports, city streets, industrial machines, they developed an "eye" and techniques to detect the movement patterns, continuity and/or similarity of movement between different shots and built new meaning(s) via editing. Narrative editing as we know it today was developed primarily for scripted works, in particular by D.W. Griffith, (*The Birth of a Nation*, 1915), but in this article I am going to focus on artists who worked with unscripted footage. Other creators from the 1920s whose techniques I will analyze are related to "cinéma pur" and come from the visual arts and are related to cubism or abstract painting, such as Fernand Léger, or narrative fiction that were instrumental in creating an independent art cinema, such as Abel Gance.

In every instance, the aim of this article is to reveal and describe the editing techniques that apply to unscripted footage, rather than establish a history of the genre of archival-based screendance or the historical influences of different artistic currents.

Revealing The Choreographic Nature Of Daily Actions And Existing Movement: The Lumière Brothers

For many, the first task of the creator using unscripted footage is to perceive the movement within the footage and reveal its potentially choreographic nature. The first footage that the Lumière Brothers recorded in 1895 (France) was *La sortie de l'usine Lumière à Lyon* and is a perfect example of revealing the choreographic nature of a daily action: employees walking out of the factory at the end of their shift. First the women workers, then the managers all walking briskly due to the cold temperature, and finally the doors closing, are filmed in a single take of 45 seconds to 1 minute.[8] By capturing this daily action from a given angle and revealing its choreographic interest, the Lumière Brothers showed that the movement contained in unscripted movement could be as interesting as filming choreographed stage dance, for instance their footage of Loïe Fuller's choreography, *Danse Serpentine*.

In the "roaring twenties" avant-garde artists grew increasingly interested in the movement of urban life; for instance, Fernand Léger wrote in his 1924 essay *The Spectacle* that "the rhythm of modern life is so dynamic that a slice of life seen from a café terrace is a spectacle. The most diverse elements collide and jostle one another there."[9] A mass of people walking is also the choreographic subject found in *Manhatta* (USA 1921) and other urban symphonies, as well as in many recent screendance pieces where "individuals, couples and groups map a journey across time and space by walking in different paces and/or standing still; passengers become a performative ensemble which creates multiple trajectories

and random encounters."[10] Other daily activities have more organized and rhythmic patterns, that are easily converted into choreographic sequences: Some modern found choreographies reveal, for example, the "dances formed by the execution of certain physical works. This revelation of the choreographic effects of certain labors or sports activities is of course not new"[11]: it can be found to varying degrees in the works of René Clair, Leni Riefenstahl, Dziga Vertov, etc. In general, the unscripted footage of human masses in urban landscapes or human activities in industrial contexts became both a point of interest for the French avant-garde and Soviet artists[12], a time when industrialization was seen as a source of movement and human progress and the role of the filmmaker was to reveal the rhythm of this footage through editing.

Revealing The Choreographic Nature Of Machine Movements: From Gance To Vertov

La roue (*The Wheel*, France 1922) by Abel Gance marks several innovations in editing, and in the integration of mechanic movement as part of visual spectacle. "Its importance lies in the place it gives, for the first time in the history of cinema in this way, not only to mechanics, to the machine - in this case the railway - whose parts are shown in close-ups, which are detailed, but also to the cadence, to the rhythm of the machine as a model for editing."[13] "The most radical of Gance's many technical innovations, ...was the use of propulsive rhythms and metrical, frame-by-frame cutting to create perceptual paroxysms.[...] Gance's editing is founded not on dialectical collision but on the explosive power of image clusters, what he called *dynamite images*. His goal was to link images, both horizontally and vertically, in an ecstatic synthesis in which every constituent part played a necessary role. Lines of motion are emphatically contrasted with one another".[14] It is relevant to note that this type of editing is applicable to both scripted and unscripted footage, as the sensation of rhythm and energy arises from the contrast, acceleration, and use of shortened frame length, and that those techniques are perfectly applicable to unscripted footage, and therefore to screendance created from archival footage. "*La Roue* generated many subsequent radical experiments, starting with Léger's *Ballet mécanique* (France, 1924)."[15] It was a projection of extracts of *La Roue* in 1923 with pure mechanical movement, dances of wheels, rails and pistons, that stimulated Fernand Léger and René Clair[16] to make movement-based short films. *La Roue* also prompted an essay by Fernand Léger, where he theorizes his views on pure cinema:

> Abel Gance's film [*The Wheel*] has three states of interest that alternate in contrast - a dramatic state, a sentimental state, a plastic state. It is this plastic contribution that I will try to bring out [...]. This new element is presented to us with an infinite variety of means, under all its faces - close-ups, mechanical fragments, fixed

or mobile, projected at an accelerated rhythm which touches the simultaneous state and which crushes, eliminates the human object, reduces it of interest, pulverizes it.

Fernand Léger, 1925.[17]

Machine movement was a very popular theme in the arts at the beginning of the 20th century[18], as cities were bustling with new mechanical transportation and industrial machines impressed by their precision and speed. *Machinism* became a concept for avant-garde artists of the 1920's and Léger praises the fact that in *La roue* "the machine becomes the leading character"[19] We can find moving machines in Fernand Léger's *Ballet mécanique* (France 1924), where the title itself states the intention of revealing the choreographic nature of machines in movement and subordinating human movement to mechanical rhythms[20]. The "ballets" of streetcars are the main component of Walter Ruttmann's *Berlin, Symphony of a Great City* (Germany 1927), but in the case of Ruttmann's urban symphony, the streetcars tend to be filmed in wide shots that reveal the general movement of the ballet in their duration, while the footage used by Léger tends to use close-ups and an editing that imposes a rhythm.

Choreographing With Editing: Georges Méliès And Cutting, Changing Speed, Overlaying, Dissolving

Georges Méliès was a pioneer in the art of "special effects" and magical tricks in cinema. One of the techniques he developed is the **substitution splice** or **stop trick** (*arrêt de caméra*), a technique in which a scene is filmed, the camera stops recording, an element of the scene is changed, and then the camera starts recording again, making a magical appearance or disappearance of the modified element. Other techniques he developed were **multiple exposures**, time-lapse photography and changes of speed, **dissolves**, which allowed elements in parts of the frame to appear or disappear, to make a progressive transformation from one state to the other of a given character (cross dissolve) or to multiply subjects on screen.[21] Méliès used these techniques to create magical tricks, and in some cases, he created clear cine-choreographic developments, such as *L'homme orchestre* (*The One-Man Band*, France 1900) in which a man and chairs continue to multiply on screen, and the numerous iterations of the man have an organized collective movement. Today, these effects can be executed in postproduction and do not require in-camera editing.

Choreographing With Editing: Fernand Léger And Looping

In order to understand the possibilities offered by the repetition of a fragment of film in a loop, it is useful to refer to the musical realm, as looping was one of the

main new ways to create musical patterns in the early Tape Music or *Musique concrète* as devised by Pierre Schaeffer in the 1940s. One of the findings is that the duration or period of the loop carries perceptually different results[22]:

- A period (duration of the loop) inferior to 100ms results in the perception of a new timbre and frequency with what is named "grain" in electroacoustic music. It is important to note that we cannot freeze sound the same way that we can easily freeze the image by maintaining a frame as a static picture.

- When the period of the loop is above 100ms we start to perceive a pulse, a rhythmic figure that corresponds to the duration of the loop.

- When the period goes beyond 5 seconds, we perceive a (looping) phrase, where the internal events of the loop can be perceived and generate a pattern that is repeated.

This distinction can be applied to cinema, although the visual and auditory perception of rhythm are quite different. When we apply a very-short-period loop to a moving image we create a vibration, then, with longer periods we go from jerky movements to gestures, and when the loop exceeds 5 seconds, we perceive choreographic phrases.

The first systematic use of the loop in film is likely found in *Ballet mécanique* by Fernand Léger, who labeled it as a "plastic emotion obtained through the simultaneous projection of fragments of the image at an accelerated rate."[23] In this experimental work, we can find relatively short loops that create a pulsation and rhythms, new gestures, but also longer loops. In particular, we observe a laundress "climbing a ladder with her bundle of laundry, and when she has reached the top she finds herself again on the first step: this repeats twenty-one times."[24] This longer loop becomes a new choreographic phrase, with its internal rhythm and events. The combination of longer and shorter loops corresponds to cine-choreographic phrases and gestures.

As I mentioned earlier, *Ballet mécanique* focuses to a large extent on machines and the similarities of their rhythmic movements to human beings. Jump cuts are employed to create a mechanical pulse, as the same shot of a man is repeated five times, with a piston picking up their rhythmic beat. "This section is unified by a regular rhythm that in the case of the machines is created by their movements, but with the humans is manufactured through jump cuts and the repetition of shots."[25] Looping is used by Léger to create and unify rhythmic patterns, truly choreographing together disparate unscripted footage.

Dziga Vertov: Establishing Movement, Rhythm, And A Poetical Sense In The Archival Compilation

Editing archival footage became a very practical need that appeared with the newsreels that consisted of "compilation films" of archival footage from different

sources edited together, starting with the newsreel compilations covering the first world war, 1914–1918.

> The maker of compilation films extends this hypothetical experiment into a practical method of film production. Working with newsreel and allied material which has not been scripted or shot for the purpose for which the compiler will use it, he is able to make films with a smooth, logically developing continuity. Without the advantages of a planned shooting script —without directed performances from actors, properly interrelating shots, etc.—the compiler's sole assets are his skill as an editor and his ability to exploit the remarkable suggestive power of spoken commentary.[26]

These compilation films became a full genre of their own, and in particular "Russian director Dziga Vertov experimented in the *genre* as early as 1923 (*Kine Truth*, *Kine Calendar*) and followed his early experiments with more ambitious ventures in the early days of sound, in *Enthusiasm* (1931) and *Three Songs about Lenin* (1934)."[27] Vertov is of particular relevance regarding the question of "choreographing the archive", as he developed a new poetic way to capture movement and edit it, which established new techniques of early screendance, although Vertov's work is categorized within the *genre* of "Urban symphonies":

> a particularly prolific genre of experimental cinema that was exemplified in the 1920s by Paul Strand and Charles Sheeler (*Manhatta*, 1921), Alberto Cavalcanti (*Nothing but the Hours*, 1926), Walter Ruttmann (*Berlin, Symphony of a Great City*, 1927), and Dziga Vertov (*The Man with a Movie Camera*, 1929). In these films, the circulation of cars, buses and trains, the movements of pedestrians and the gestures of urban sociability take on choreographic qualities due to the musicality of the editing and, often, the subsequent addition of music whose rhythm, as if by magic, seems to correspond to the pulsations of urban animation.[28]

Vertov was also influential in the concepts of editing as described in modern manuals[29] where movement and rhythm are defined as follows:

- Movement, differentiating two criteria: the direction and speed of a movement. It is assumed that the direction in which an object or character moves in one

plane is maintained in the next plane; and that speed remains unchanged so as to maintain its coherence.[30]

- Rhythm: the intervals at which the shots change allow us to establish various relations between them, whether of parallelism or contrast, similarity or difference. Likewise, the rhythms of the events shown or of the actions of characters can be decisive for the rhythmic continuity of perception.[31]

These criteria are particularly relevant when editing unscripted or archival footage, as the great challenge any editor faces is to create the continuity or opposition between disparate shots. Based on his experience of documentary footage editing, Vertov developed the "theory of intervals" that is the basis for creating a rhythmic editing akin to poetry[32], in which intervals are based upon the "movement between the pieces, the frames; upon the proportions of these pieces between themselves, upon the transition from one visual impulse to the one following it". Karen Pearlman--a film editor, screendance maker and academic--bases the "physical rhythm" on the "meaningful rhythmic visual order" defined by Vertov, "not as a means to something else but as a revelation in and of itself":

> "Physical rhythm" is the rhythm created by the editor when she prioritizes the flow of the visible and audible physical movement in the film over other types of movement (such as emotional interactions of characters or larger patterns of events in stories). [...]
>
> If an editor is working primarily with physical rhythm, she is working primarily with physical movement's size, speed, force, direction, and other visible or audible elements. Her cine-phrases are made by shaping arcs of movement in the frame, of the frame, and across the joins of two or more shots. Her choices pertain to linkage or collision, to the rise and fall of energy, to the rate and concentration of movement, to the pulses and cycles of tension and release of physical movement.[33]

Assembling Footage Of A Different Nature: Semantics And Kuleshov Effect

Lev Kuleshov is a Soviet filmmaker celebrated for his experiments in film editing developed in the 1920's that are particularly relevant when "choreographing the archive". One of his experiments concerned the creative geography, or artificial landscape, where he filmed footage at various locations and times, and then the shots were assembled through editing so that they appear to happen in the same location and time. This is a very common practice in fictional filmmaking today,

but was a conceptual revolution at the time. Kuleshov experimented further by "creating a woman"[34] using footage of body parts from different women.

The most famous experiment, that has received the name of the Kuleshov effect, relates to the different meaning that the audience associates with a given shot depending on the context of the editing. For instance, when we see someone's face and then the shot of a scene B, we establish an association, and the person appears to be thinking about scene B. Depending on the nature of scene B, the person will seem hopeful, hungry, depressed... Sergei Eisenstein applied this type of editing in his first feature film *The Strike* (Soviet Union, 1925) in which scenes of cattle being slaughtered are intercut with scenes of the proletarian masses fleeing attack, generating a very direct emotional effect that opens a path to use archival footage for semantic and emotional purposes. This effect is commonplace today, but is paramount when connecting footage in order to create a common meaning.

Choreographing Footage From Different Sources: Rhythmic Editing From Abel Gance To Dziga Vertov And Leni Riefenstahl

As mentioned earlier, *La roue* by Abel Gance (France 1923) inspired many avant-garde works of pure cinema, including *Ballet mécanique*.[35] This is a completely scripted film, but Gance developed editing ideas that are relevant to creating a rhythm with unscripted and non-staged footage.[36] For instance, Gance used rapid scene changes and montages with cuts between different shots to create a vertiginous sensation: this is essential as it is clearly the editing and not the filmed action that creates the rhythm and the energy. Furthermore, the accelerating and rhythmic editing unifies the different shots into a montage that is a new entity with a separate trajectory from its individual parts. Avant-garde artist René Clair, praised the editing in *La roue*: "We had already seen trains moving along tracks at a velocity heightened by the obliging movie camera, but we had not yet felt ourselves absorbed – orchestra, seats, auditorium and everything around us – by the screen as by a whirlpool".[37] René Clair valued "not just the cinema's capacity to represent movement but its ability to impart the sensation of motion to the viewer, to make the viewer *feel* movement"[38], which he referred to as "pure cinema" lyricism and that we can consider kinesthetic transmission.

Image 1: Parallel editing of an exterior wide shot and an interior close-up with matching movement in *La roue* (Abel Gance), LaRoueGance.jpg, Credit: screencapture by the author

In *La roue*, Gance also proposes parallel editing with a group dancing in a circle in the mountains filmed in a wide angle that alternates with a single character dancing in a circle inside her house at a similar tempo, filmed in a close-up (figure 1). This matching of movement from different frames is patent in the Urban Symphonies such as Ruttmann's *Berlin, Symphony of a Great City*, and even more clearly in Dziga Vertov 's *Man with a Movie Camera*, where we can see the continuous movement of the city and the succession of machines, tramways, and people at work or doing sports with a continuity of movement quality across the different shots. It is more difficult to match the internal movement of different shots[39] than to create a montage with aggressive editing that cancels the internal properties and imposes the rhythm of the cutting. Vertov really developed his theories of intervals to set a rhythm in editing (or the physical rhythm, as described by Karen Pearlman[40]) after having edited hours of documentary footage himself, and possibly feeling how delicate and sometimes elusive it is to find matching points and cutting between the movement of different shots.

Image 2: Leni Riefenstahl performing her *Dance to the Sea* with the images of the sea that are intercut to match her dance, from *Der Heilige Berg* (1926), DanceToTheSea.jpg, Credit: screencapture by the author

I will not dwell as long as I should on Eisenstein, who worked principally on scripted cinema, but his writings, and above all, his implementations of metric and rhythmic editing, including the famous "Odessa steps" scene in *The Battleship Potemkin* (Soviet Union, 1925) constitute a milestone in the art of editing. Eisenstein showed the importance of mixing different angles and types of shots, combining close ups, wide shots, details, and to use the direction and movement to create a montage which is very expressive and easy to understand by the audience, in spite of (or thanks to) the complexity and diversity of the shots. Regardless of the disputes about fiction and non-fiction in the early Soviet period, Eisenstein revealed a new way of editing that fully applies when choreographing unscripted footage.

Even prior to the urban symphonies created by Ruttmann (1927) and Vertov (1928), the *Dance to the Sea* by Leni Riefenstahl, which serves as a "prelude" in the film *Der Heilige Berg* (*The Holy Mountain*, Germany, 1926) by Arnold Franck, represents an achievement with regards to choreographing footage taken from different sources. This sequence presents an adaptation of the stage choreography that Riefenstahl performed across Europe, where time and space are fragmented and non-linear, and is edited with shots of the sea and clouds that mimic the movement and shape of the dance (or vice versa), giving the feeling that Leni Riefenstahl is directing the sea with her gestures. Thanks to the carefully crafted common evolution in the movements of the sea and the dancer, with periods of intensification and lulls, this prelude reaches a more poetic result, and is also easier to perceive. The prelude uses montage as a form of *choreographic composition*[41] or reconstruction of movement by allowing inanimate objects to dance in juxtaposition with different body parts, building upon the editing achievements of Fernand Léger in *Ballet Mécanique.*

Composing The Movement Within The Frame: Splitting The Frame From Léger To Vertov

In order to make dance from different types of footage, the split screen was used in *Ballet mécanique* and in *Man with a Movie Camera*: in image 3, we see examples of a screen split into four portions, revealing people dancing with different framing and hands moving on a piano, and it becomes a composed cine-choreography, where even if some parts don't have the same rhythm, they offer a counterpoint (instead of a mismatch in movement that would result in a classical successive editing). We also see how Vertov split the screen to reveal two instances of telephone workers moving cables, increasing the organized and choreographic nature of the movement on screen.

Image 3: Split screen examples in *Man with a Movie Camera* (Dziga Vertov), VertovSplit.jpg, Credit: screencapture by the author

Another way to transform the footage is by creating kaleidoscopic effects that create new figures and therefore new movement patterns within the frame, and this is amply developed in *Ballet mécanique*. Vertov went one step further by moving the kaleidoscopic effect with a rotation of the different frames (see image 4): this created a double effect of re-choreographing the footage, as on one hand the symmetries of the kaleidoscope made new movement patterns emerge, and on the other hand, a new complex choreographic phrase emerged that corresponds to the progressive rotation of the frame. This kind of non-linear transformation[42] of the image is very effective and receives plenty of use in recent screendance, creating completely new figures and choreographies with evolving kaleidoscopic transformations.
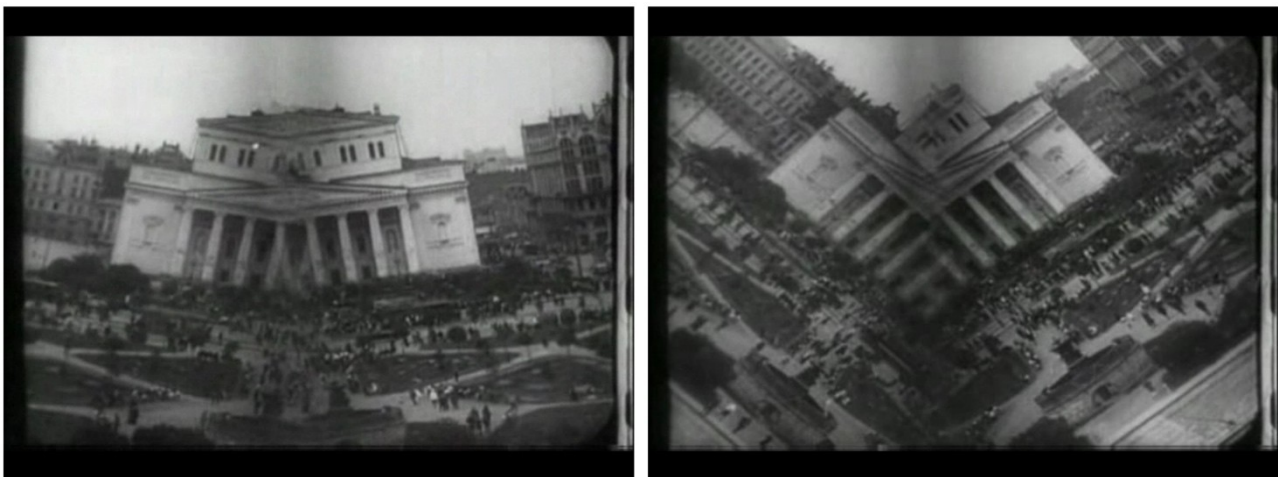
Image 4: Evolving split screen in *Man with a Movie Camera* (Dziga Vertov), VertovEvolvingSplit.jpg, Credit: screencapture by the author

Composing New Movement Trajectories: Leni Riefenstahl Re-Choreographing Sports

Leni Riefenstahl(1902-2003) was trained as a swimmer and a dancer, and after a career as a dancer on stage, she became an actress in films involving sports and dance. This experience provided her with a deep understanding of body movement for the camera. She became a film director in the 1930's and was later hired by the Nazi Party to create its propaganda films, collaborating and replacing Walter Ruttmann as a film director.[43]

Leni Riefenstahl was in charge of filming the Olympic Games of Munich in 1936, during the Nazi rule of Germany. In retrospect, despite Riefenstahl's unquestioning of the propaganda she was supporting, she introduced and explored many artistic and technical innovations in filmmaking, including a system for filming underwater and changing from above water to underwater in a continuous take, using 6 cameras to film an action, changing angles and introducing new views, framing with partial close-ups, and training a year in advance with the film crews to understand the motion dynamics in each sport and set the camera accordingly.

Additionally, in post-production Leni Riefenstahl also made movement the focus of her editing that shifted sports into a new realm, different from traditional documentation and more in favour of poetic and choregraphic compositions. The combination of all the takes from the different angles led to over 1,300,000 feet[44] of exposed film, and the postproduction process spanned two years, resulting in two films *Olympia 1* and *Olympia 2, Fest der Schönheit* (*Olympia 2nd part – Celebration of Beauty*). I will refer (images 5 & 6) to this second feature film, whose title strongly indicates that the intention was on extracting poetics rather than the competitive aspect of the games.

Image 5: A continuity montage of different athletes on the pommel horse, in *Olympia 2* (Riefenstahl, 1936-8). The cuts between the athletes are made in full movement, with a continuity of the movement. OlympiaPotro.jpg, Credit: screencapture by the author

Leni Riefenstahl's filmmaking innovations are numerous, but I will focus on her contributions to editing.

1- Movement continuity editing (movement *raccord*): in image 5 we see an example of montage featuring different athletes executing their gymnastic performance on the pommel horse. We see one athlete after the other with matching movements and framing, creating continuity, and this feeling of unity persists even when the angle changes, as there is a general continuity of movement. Riefenstahl enhances the unity of these athletes and the beauty of their movements, rather than the competition.

2- Creating completely new movement phrases with editing and time reversal: in this case, Riefenstahl breaks away from the documentary aspect of the film, to really enter into a pure world of movement creation. Image 6 shows a moment of the final high diving sequence from *Olympia 2, Celebration of Beauty*. It starts with a reversed shot of a diver that emerges from the water and appears to ascend into the sky where he realizes some of the acrobatics of the trampoline jumping, and this is cut with other acrobatics from other athletes filmed at the climax of their jump, to create a continuous movement of people flying in the cloudy sky.

3- Slow motion is used profusely throughout the film to enhance the elegance of the movement and the athletes' mastery of the athletes' bodies.

Image 6: A montage of the high diving sequence, with a reversed shot of a diver emerging from the water and ascending into the cloudy sky, then interspersed with shots of other divers at the climax of their jump, creating an endless floating flow in *Olympia* (Riefenstahl, 1936-8). RiefenstahlDiving.jpg, Credit: screencapture by the author

Authorship And Creating Through Editing Archival Footage

I would like to emphasize this point with respect to the authorship of archival films: Riefenstahl decided that the large amount of still "unused footage would be used by her young assistants as an opportunity to work with film-making on their own. She allowed them to experiment with the footage, making Kulturfilmen (cultural films) and short films to be played before the feature attractions".[45] The filmmakers (authors) of these films were the editors, even if the "direction" of the takes was by Leni Riefenstahl. She firmly believed that the creation of a film is essentially made in the editing room, and this is a dilemma that continues today

in screendance: who is the author among the choreographer, the cameraperson, the editor and visual effects creator, and the director of the shoot?

According to Spanish Intellectual Property Law (which is conceptually similar to other Latin legal systems, such as French or Italian law), the authors of an audiovisual work are the director, the screenwriter and the composer of the original soundtrack.[46] The editor is not considered an author. When choreography is simply filmed on stage, it is not considered an audiovisual work whereby a director will obtain an author's rights[47]: it will be considered a documentation of the choreography, even if it is recorded with multiple cameras and there is editing. There is a legal ambiguity regarding screendance, in that there is a director who will be the author of the screendance, but the role of the choreographer is not made explicit, although in reality they hold similar functions to that of the screenwriter, who is considered an author by law in many countries.

Regarding works that result from editing archival footage, French Intellectual Property Law proposes the concept of "composite work": "a new work is said to be composite when it incorporates a pre-existing work without the collaboration of the author of the latter." The composite work "is the property of the author who made it, subject to the rights of the author of the pre-existing work".[48] Therefore, one can consider that the Intellectual Property Law indicates that the editor of pre-existing works is considered the author of the resulting film when there is a creative process, as is the case when choreographing archival footage. But in contrast, the editor of a newsreel compilation is not considered an author, even if it requires great skill[49] because a compilation is not considered an original new work.

Discussion And Conclusion

I have discussed a variety of editing and postproduction techniques that were developed in early 20th century films, in particular during the 1920's, that apply to contemporary practices of editing unscripted or archival footage with an intention to create new work with its own rhythms and temporal structures. This is not an exhaustive list and I did not wish to enter into discussions of who was the first to apply a precise technique. For instance, the technique of stopping the recording in-camera for a moment in order to create a jump cut (the stop trick) was developed by the Edison studios a year earlier than first used by Georges Méliès[50] The importance here is that Méliès discovered the possibilities of this and other techniques and applied them in numerous short films, often with a choreographic intent, and that these techniques remain in use today. Many early filmmakers also explored and perfected techniques that are not referenced here, as an exhaustive historic overview is outside the scope of this article.

To summarize, the potential techniques that compose the language of archival footage choreography through editing are:

- Editing within the frame: split frame, kaleidoscopic transformations, dissolving, overlaying

- Modifying movement: looping, jump cut, quick editing/splicing, speed change and speed reverse

- Creating new choreographies from different materials: rhythm and movement continuity editing, matching frames and movement, creating new meanings by assembling contrasting shots.

These techniques are still in operation today, although contemporary technology makes it much easier to put them into practice. It is essential to note that the contribution of these pioneering artists does not concern exclusively the purely technical aspects of their work, it also concerns the new mentality they brought, a new approach to what cinematographic creation can be. Their focus on "pure cinema" generated an interest in rhythm, composition and movement that has encouraged the use of these techniques to create truly original works. For instance, applying the technique of reversing time or looping a fragment can create a surprising or amusing effect on the audience, but these artists went beyond technical gadgets or visual trickery, and used these techniques to create works with an original artistic language. They demonstrated that the editing process was a fully creative tool in cinema, and that its possibilities went beyond the mere assembling of staged shots based on a script. These pioneers showed that dedicating time and effort to the artistic editing of unscripted footage can yield outstanding works.

Finally, attention to the artsits and the works discussed in this paper can be of relevance to Screendance makers today who work with unscripted footage. The editing techniques that arose from the various experiments and developmemnts in technique and concepts can serve as inspirational references and provide a foundational stepping stone, while still acknowldeging that technological advancement does allow editors (and choreographic ones) to apply effects without necessarily knowing their historic 'origins'.

Biography

Blas Payri is a professor of Audiovisual Communication at Universitat Politècnica de València, and his teaching activities focus on digital postproduction, sound design and film music analysis and creation. He has created numerous screendance pieces, taking in charge directly the direction, the editing and postproduction and the creation of the music. This has allowed him to explore the creative possibilities of editing including issues of rhythm, music co-articulation, movement continuity, and rhythmic editing and the use of postproduction to impose a rhythm to the footage.

Blas Payri has a training in computer science (Engineering Degree at Institut National de Sciences Appliquées, Lyon; Master's Degree at École Normale Supérieure, Lyon), in scientific research in sound perception (PhD at LIMSI-CNRS, Orsay, Paris; Postdoc at UCLA, Los Angeles), and in music composition (Composition Degree at Ecole Nationale de Musique de Villeurbanne, Specialization Degree at Conservatoire de Nanterre) and has published research articles in computer science, music and film perception, film music and screendance.

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