The Optically Animated Artwork of Rufus Butler Seder

On a panel of large wall tiles, an image of a debonair male tap dancer in tuxedo springs into life. The 8 foot-high blue and white cyanotype Astaire-dance-alike spins around and moves alongside you as you walk past, a head-turning effect that mesmerises anyone who sees it. However familiar we have become with the ubiquitous moving image; through tv, movies, and the web, the effect of this installation – when we move, it moves – makes it a captivating experience. “Movies for the Wall: Boston artist creates art that awes, thrills and entertains,” is how journalist Tom Gillspie describes these kinetic works by optical artist Rufus Butler Seder. The artist calls them “a new sort of moving picture using no electricity, special lighting, or moving parts.”

LIFETILES

Although life-size, *Tap Dancer* is one of Rufus’s smaller works. The optical glass-tiled LIFETILES display for Amtrack at Union Station, Washington – showing the Acela train passing through changing locations – is 100 feet long. For almost two decades Rufus has been known for his optically animated public art installations for public spaces and exhibitions in the US and other countries. He is now making smaller LIFETILES compositions available to the art lover who is looking for something unusual and dynamic to display at home. Over recent years, he has also developed a series of similar (but mostly smaller) patented optical inventions, gifts and toys novelties and souvenirs that anyone can own.

CineSpinner Animated Suncatchers

The main optical novelty that Rufus produces today is the CineSpinner, a crystal-clear acrylic disk printed on both sides in black ink. When hung at eye level against a white wall or diffused light, the images spring into living motion when the CineSpinner gently rotates at the end of its string by the natural movement of the surrounding air. Rufus was the first to conceive of a display with no moving parts, in which an image animates continuously in 360 degree rotation. CineSpinners are mostly inexpensive souvenirs, but Rufus has also created large scale versions up to four feet in diameter for public places, and one recent project is a giant Blinking Eye for a Manhattan storefront: two sheets of 6' x 8' plate glass, one imprinted with black stripes, the other with a scrambled image, one sliding left then right. The giant eye will blink, and observers will simultaneously be able to look through the clear glass of the animated display to see the products in the window behind it.

Making movies

Rufus Butler Seder did not start his career making these kinetic works, but has always been attracted to the moving image, and to visual magic. He chose early on to sign all his work simply "Rufus." The name is unusual enough to stand alone, and growing up, he was shaped by it to be more original than he otherwise might have been.

Rufus's mother Harriet was a piano teacher, and his father Eugene (Gus) a journalist / photographer. Seder senior was a profound influence on Rufus's development. He took his son to see Fellini movies, wrote news stories about inventors, and was himself an inventor and a capable electrical and mechanical engineer. Encouraged in his creative endeavors early on, Rufus won numerous art awards in elementary and high school. His father taught him photography, and of course, trick photography shortly followed, both in-camera and in-darkroom. As a journalist, Gus also shot occasional newsreels for television on a hand-wound 16mm Bolex camera, and he helped 12-year-old Rufus build an animation board and camera mount, for producing his own animated cartoons. Rufus soon moved from illustrated animations to animating human beings, including his younger sister Diana, who was made to appear to fly around the back yard (by clicking individual frames every time she jumped in the air).

Continuing to explore the plastic possibilities of film, Rufus bagged a number of teenage film trophies, including the coveted Kodak Cine Golden Eagle award, which he won in collaboration with high school chum Tod Gangler. (Gangler went on to become the world's leading carbon printing photography expert.) An independent filmmaker from the age of 12 to the age of 36 – at this writing he is 52 years old – Rufus's movies have won a number of prestigious short film festival awards and grants, including the Cannes Medal and funding from the National Endowment for the Arts. He attended the American Film Institute as a directing fellow, and taught filmmaking for nine years at the School of the Museum of Fine Arts, Boston.

Rufus's many years of experimental film production include a variety of references to the earliest motion picture pioneers, his own work evolving and buiding upon many of the same themes and images. This education profoundly transformed his views on the moving image, influencing his work beyond cinema, to what he does today. While following established traditions, he was to blaze altogether new trails.

To understand the forces that shaped Rufus's current pioneering work with the moving image, it helps to know something of those who preceded him – the founders of motion picture technology and the groundbreaking artists who worked in these mediums.

It's all magic

For Rufus as filmmaker, the most influential pioneer was French producer / director Georges Méliès, who had been in at the beginning of motion pictures. This influence was perhaps inevitable. At the age of six, Rufus's lifelong fascination with illusion was

sparked by the gift of a Remco Magic set from his Grandfather. He became an amateur magician.

Back in 1895, Georges Méliès had been a famous French stage magician. Invited to the Lumière Brothers' first preview of their Cinématographe show, in Paris in December of that year, he failed to persuade them to sell him a motion picture camera. Nevertheless, within weeks Méliès was making enchanting motion pictures to supplement his stage magic presentations, and very soon he dropped live magic to concentrate on movie production. Most famously he produced hundreds of short trick-effect and 'fairie' films in which devils appeared in puffs of smoke, and interstellar travel became possible by means of double-exposure in the camera. Méliès' 1902 science fiction fantasy *A Trip to the Moon* has provided us with an icon of early cinema: the grimacing face of the moon punctured by the lunar rocket. This unforgettable image haunted Rufus, who produced an affectionate reference in one of his own movies.

Another important influence on Rufus's film work was Slavko Vorkapich (1892-1976), a special effects artist, film theoretician, director, and montage specialist. A Yugoslav (Serbian) emigrant in the United States, Vorkapich had been one of the most respected film workers in the period between the two World Wars, best known for his montage work on classic films such as *Viva Villa*, *The Good Earth*, and *Mr. Smith Goes to Washington*. He was also a highly original and influential filmmaking teacher, serving as head of the cinema department of the University of Southern California.

Rufus's short films

Phantom Subways (1977) is the study of an underground railway station, in stark high-contrast black and white. (Much of Rufus's film work is in black and white.) Dissolving, transparent people enter and exit a ghostly train. The images become frantically intercut, a montage technique that is central to Rufus's film work. The effect is to highlight the transient nature of individuals within the structure of our cities, epitomised by the endlessly repeating and impersonal nature of their journeys on our subway systems.

Sun Run (1978) has the 'pixilated' – in the sense of jerky motion – feel of an animated short by Norman MacLaren. A woman sunbather, reading Kafka, is thwarted in her attempts to get a tan, as the creeping shadows of nearby buildings put her in the shade. Expanding on his early stop-motion experiments featuring his sister, Rufus uses the same technique – more usually associated with the manipulation of models, most famously in the original *King Kong* (1933) – to maintain full control over the central character, as well as the encroaching shadows. This frame-by-frame motion also lends an aura of unreality to the production.

Rufus's invented character Personable Eyeball stars in *Live in Fear* (1978). This somewhat disturbing character – a giant eyeball atop a human body – is a journo who has to deal with a giant cat (shades of *The Incredible Shrinking Man*) and similarly huge parrot. He eventually falls from a skyscraper into an enormous hand.

The longer movie *City Slickers* (1980) is a tour-de-force of cinematic technique, exhibiting Rufus's deep understanding of the potential of the medium. Set in a bar, white-suited card players smoke and drink as a pianist plays. A tiny ballerina swirls amongst the bottles and glasses, as jazz dancers swing amid spinning playing cards and scattering pool table balls. Two characters propose a toast – but their glasses spin away into the maelstrom. The next scene features, in close-up but sharing the night sky with swinging sky-tracker beams, a clear and tender homage to Georges Méliès' 'moon face'. In the following long-shot a succession of characters– a road-sweeper, unicyclist, and even Personable Eyeball – pass along the cityscape skyline as fireworks cascade amid an eruption of swirling, revolving stars. The moon becomes a dollar piece, and the short but gripping scene ends with the miniature ballerina figure dancing in a beer glass. As with *Live in Fear*, the black backgrounds – in the tradition of Méliès – allow huge flexibility for superimposed images of differing scale, but unlike the continuous theatrical fixed-camera view that Méliès was restricted to, Rufus's moving camera, close-ups, and montage editing combine to form a modern style of striking intensity. The evocative images of this urban fantasy remain with us long after the movie has played.

Screamplay

As the founder and creative force behind the Boston Black and White Movie Company, Rufus would later write, direct, edit, and star in a feature film, *Screamplay* (1985), the story of aspiring screenwriter Edgar Allen who arrives in Hollywood with just a suitcase and a typewriter. Allen agrees to work for room and board as a janitor of the ramshackle Welcome Apartments. Rufus contracted his friend, famous underground filmmaker George Kuchar (*Hold Me While I'm Naked*) to play Martin, the belligerent manager of the apartment complex. Allen is writing a horror murder mystery – and imagines the murders so vividly, they become real. To quote the blurb: "Edgar Allen must confront old actresses, rock stars, and the police in the bleak setting of broken dreams in Hollywood." *Screamplay* is brimming with special effects all designed by Rufus, ranging from turn of the century techniques such as in-camera glass shots, to a hand built state-of-the-art front projection system. Under the title 'Cinema Genius' the Internet Movie Database quotes New Zealand fan Hans Versluys: "Rufus Seder belongs to that extremely select club of film directors who have only made one [feature] film ever and a masterpiece at that ... Rarely have I been entertained so much during a film screening ... The story rocks and the projected backgrounds in many scenes are gorgeous."

Movie titling for the deaf

Rufus's interest in optical devices and conventional motion pictures came together in his work a decade ago. The first patent he ever received was in 1996, for an optically-based motion picture captioning delivery system for the deaf: the Rear Window Caption system. Distributed by educational TV station WGBH, there have now been over a thousand installations, including scores of Disney Land and Disney World theaters, many

IMAX and OMNIMAX venues, and a growing number of conventional motion picture theaters. Rufus was approached by the head of the Media Access group at WBGH television, suggesting that he enter a competition to come up with a method of delivering movie captions to a deaf audience. Knowing about Rufus's optical artwork, WGBH hoped that maybe there would be an optical solution to the problem. The captions had to be available to any audience member who wanted them, but without forcing others in the audience to see them. And the captions could not be "ghettoized" (delivered only to selected areas of the theater). Everyone should be able to see their individual captions from wherever they chose to sit. Rufus explains:

"My idea for the Rear Window System came from my experience in creating special effects for motion pictures. The heart of the system is a semi-transparent reflector which permits the viewer to watch the movie through it, while capturing the reflection of a glowing caption from the back of the theater. By adjusting the unit, the user can position the caption reflections beneath the movie, or superimpose them over the movie itself. This simple piece of plastic works like a two-way mirror, well known in the movie business as a 'beam splitter', and is directly related to my experience with the front projection beam splitter system I had employed when directing Screamplay*."*

Rufus enthuses:
"In the silent movie days, everyone, including deaf people, could fully appreciate what was going on while watching a movie, because everything was visual – the musical accompaniment was not essential to the understanding of the movie. But when talkies came in, filmmakers stopped thinking visually because they found, as with a play, they could rely more on spoken dialog to communicate the story. This approach slowed development of visual storytelling in moviemaking, and threw up a wall between those who could hear and those who couldn't. Today, we're starting to come full circle. The Rear Window System provides a way to more fully communicate what's happening on screen to deaf audiences."

The Rear Window System was central to Rufus's fascination with the moving image, and optical means to accomplish the manipulation of those images.

A long tradition

Although Rufus spent some time in Los Angeles writing scripts, he was never headed for big budget Hollywood filmmaking. His interests lay in a more formal, experimental direction. All the while Rufus was making movies he was developing a deep understanding of the conceptually simple – but at the same time, frequently technically complex – mechanical workings of basic kinetic image techniques, and the elusive perceptual processes involved.

What factors and influences does it take to create such a unique, single minded vision? Rufus cites Reynaud, Méliès and others as his inspirations. So who were these people, and how did their work contribute to Rufus's development as an artist?

Photographing time

Motion pictures, or to be more precise, photographic motion picture films, first appeared in the 1890s. The technology had been around for a while, with a different purpose. In the last quarter of the 19th century scientists and other investigators were keen to discover more about human and animal movement.
Would-be aviators wanted to slow down the flight of birds so that they could examine the nature of the wing movements. Gymnasts aspired to see the precise action of the limbs of athletes, to better understand how the human body worked. The first technical success was achieved when a rich racehorse owner – Leland Stanford of California – commissioned an eccentric photographer, Eadweard Muybridge, to photograph a horse in motion, to determine whether or not it had all four feet off the ground at one time; a question of hot debate in the 1870s. This new science of time-sequence analysis by means of the camera became known as chronophotography. A sequence of photographs taken by Muybridge confirmed that a horse was indeed "unsupported" for brief periods while it trotted or galloped, and the resulting pictures caused quite a stir in scientific and artistic circles. Muybridge even managed to screen enlarged silhouette images based on his sequence photographs, illustrating the phases of movement of both animals and humans. In his own optical animations, Rufus has manipulated images based on Muybridges famous photographs, including a dynamic running cat.

In 1880s-90s France, physiologist Etienne Jules Marey was using a number of technologies – large glass plates on which several images were exposed in sequence, strips of paper bearing a removable photographic emulsion, and eventually celluloid 'film' strips – to capture his images. Marey was less concerned with re-synthesizing the images in motion; he was content to be able to analyze the individual photographs. In some cases he attached white markers to athletes and photographed them against a black background, resulting in a sequence of overlapping images. These studies were of great, if accidental, aesthetic charm. The linear sequences produced by Marey (one image succeeding another, on a long strip) can be seen as an influence on Rufus's work, who transforms the scientific Muybridge / Marey sequence aesthetic with his own artistic interpretation.

The movies begin

At this time, the 1890s, other inventors were experimenting with paper and celluloid 'filmstrips' for another purpose – the development of photographic movies for public exhibition. In the US, Edison's assistants started experiments that led to the kinetoscope, a commercial peepshow machine using 35mm film – the same format still used in motion picture theaters today. From the spring of 1894 skirt dancers swirled, boxers battled, and Annie Oakley fired at clay pellets for the Edison camera, in these first half-minute motion pictures.

A rival group, later known as Biograph, attempted to make a more practical motion picture peepshow, with images from larger negatives printed onto a series of paper photographic leaves, in the manner of the flip book. By the time they launched their mutoscope viewer, Edison's kinetoscope was dead and big-screen movies had arrived. The peepshow mutoscope had some initial success, but the limitations of its running time as motion pictures got longer, and the competition from the high impact of the big screen, meant that it was soon marginalized. For many decades the rugged, low-maintenance mutoscope lived on in amusement arcades around the world. The voyeuristic, provocatively risqué nature of many of the scenes shown led to it becoming known in Britain as the 'What the Butler Saw' machine. An important aspect of the mutoscope was the possibility for the viewer to slow down, and even stop, the action at any moment. Here, unusually – it wasn't a feature of either the kinetoscope or motion picture theater projection – the viewer was in control of the action. That same level of control can be exercised by anyone viewing Rufus's LIFETILES. Slow down while walking past, and the action slows – to a stop, if required. The movement can even be seen in reverse, simply by moving backwards. With the mutoscope, just a turn of the wrist dictated this action. Rufus takes this involvement further. With a LIFETILE, the whole of the viewer's body is involved in creating and controlling the movement of the image.

Revolving mirrors

Decades before photographic celluloid movies, inventors had devised other methods for making pictures move. Optical 'animation', mostly projected onto the magic lantern screen, had been produced by various ingenious mechanical means, but the physical components actually moved – an image on one piece of glass slipping or revolving on another – to produce the simple results. More lifelike movement could only be achieved by substituting a series of figure, each in a slightly different pose. One such toy was the praxinoscope, devised by French artist-inventor Emile Reynaud in 1877. Reynaud's revolving drum had a center ring of mirrors, in which the successive pictures were viewed. The result was bright and sharp, and his candle-lit picture strips of a circus juggler and other repetitive motion scenes, printed in color from his own drawings, are still enchanting today. A special 'praxinoscope theatre' version of the toy, built into a small box, used reflected background cards to show the miniature performers against changing backdrops. There was even a full-size public version, the Théatre Optique, featuring longer sequences painted onto a belt of transparencies. Characters were superimposed onto projected lantern slide backgrounds, the result anticipating the movie cartoon industry by more than a decade. For eight years Reynaud enchanted Parisian audiences with his 'Luminous Pantomimes', manipulating the movements with great dexterity to musical accompaniment, before the ubiquitous cinematograph – the movies – finally closed his show in 1901.

Half a century later the Praxinoscope had a profound influence on Rufus, who remembers his first encounter with a 1953 children's toy version, at the impressionable age of just two years. A mirrored hub designed to look like a red and yellow striped circus tent was

placed on a specially printed vinyl record, which had a series of sequential drawings on the label. As the disk played a tune the colored drawings, viewed in the spinning hub, came instantly to life. “I was entranced by the thing,” recalls Rufus, “a cartoon train rolled realistically down the tracks, puffing smoke.” Scores of years passed until Rufus’s wife, Penny Sander, purchase one of the devices from an antique store as a birthday present. Now he has a growing collection of the original Magic Mirror / Red Raven animated records.

Spinning disks and drums

The praxinoscope was just one of many such toys. The spinning disc phenakistiscope, invented earlier by Belgian physicist Joseph Plateau (and simultaneously by an Austrian, Simon Stampfer) had been the first device to produce motion from a sequence of images – each one slightly different, and quickly substituted for the next to produce the illusion. The phenakistiscope was limited to individual viewing. Its successor, the zoetrope – the familiar spinning-drum device – enables several viewers to view the moving scene simultaneously. We look through the slots around the drum as it turns, and see the simple images, printed on a removable strip inside, spring into life. Frequently revived as a plastic or cardboard toy, the zoetrope was devised by the English mathematician William Horner in 1834, and named by an American, William F. Lincoln, in the 1860s.

The inspirational zoetrope

The notion of making movies for the wall came to Rufus when he permitted an animator colleague to build a large-scale experimental zoetrope in his Boston loft in the mid ‘80s. On the wall, he’d drawn a long series of fish in different phases of motion, and lit them with fluorescent lights. In front of the wall he positioned a big strip of black cardboard with a series of vertical slits cut in it. If one ran alongside the wall with one’s head turned at a neck-cramping 90 degree angle, the impression of movement was obtainable, although a bit dark and blurry. Rufus’s friend seemed disappointed by the result of his efforts, but Rufus thought it was great. He’d always been a fan of classic motion picture toys and techniques, and routinely employed classic tricks of the trade in his films, so it naturally occurred to him that there might be a way to do what his friend was trying to do, only using lenses. Rufus started experimenting by pasting a dozen successive flip book drawings on the wall, and positioning a dozen dime-store magnifying glasses in front of them. When he walked by, the images ‘popped’, but they didn’t animate.

Rufus’s first steps

It was at this point that Rufus progressed to the technique that would engage him until now. He later recalled these early first steps:

“I thought if I could only get one image to change to another, I’d be on my way. I glued

together one-quarter-inch-thick clear plastic rods side by side, to create a lenticular sheet. (Lenticular means 'comprised of lenses'.) On a piece of paper I then drew a series of side-by-side thin lines. I lightly drew a triangle over the whole paper, and then colored in the triangular shape on every alternate 1/8" strip. I then drew a circle, in a different color, in all the intermediate strips. The drawing looked like a circle superimposed over a triangle, but when I put my homemade lenticular sheet over it, an amazing transformation took place. Viewed from the left I could see a solid triangle. When I stepped to the right, the triangle dissolved away, becoming a circle!"

Enthused, Rufus stuck a series of evenly-spaced vertical black tape stripes onto a giant sheet of glass. He built a free-standing frame for the glass which permitted the glass to slide left and right when pushed. With his Rollieflex camera he then took double exposures of friends, shot through the striped glass. In the first exposure, for instance, they would have their hands in their laps. Then, he'd slide the glass over a fraction of an inch, so that where there had been black tape stripes was now clear, and what had been clear was now black. Next, he'd have his subject raise their hands and smile, and take the second exposure. Rufus finally printed the resulting photo the correct size to line it up behind his homemade lenticular sheets. When you walked by, the image of the person would appear to raise their hands and smile. (These two phases would repeat, or 'cycle', about three times before the viewing angle made the image blurry.) Rufus experimented with multiple exposures using the black tape stripes in different configurations – changing the distance between each stripe – and was able to create up to three phases of movement clearly with his rod-based lenticular sheets. Beyond three phases, the images would become confusingly mixed.

About this time, Rufus's animator friend returned from his patent investigations looking more disappointed than ever. First of all, he'd found that something like his flat-wall zoetrope idea had already been patented, and in fact one had already been installed in the Brooklyn Subway system. He also had come across a number of lenticular patents, dating back as far as 1910 or so, some of them for depicting changing billboard-type signs. "There's nothing new under the sun," he sighed. Rufus's study of these lenticular patents revealed that, in conventional lenticular technology – like those little Crackerjack 'wiggle pictures', called Vari Vues – instead of complete round rods clustered together, only the topmost section of each rod's optical arc was used. In effect, the lenticular surface was a cluster of partial semicircles. An artist in stained glass, who knew of Rufus's experiments, gave him an old 1 ft by 2 ft sample of glass called Band-Lite. Made in the 1930s, this had a similar lensed configuration. He experimented with it, and later recalled these important tests:

"The Band-Lite glass had one-inch wide vertical ribs on the surface, with shallow arcs. By shining a light through the glass, I could project a series of very sharp bright lines onto a piece of paper four inches away, each strip of focused light 1/5th of an inch wide. I could now produce animated photographs of five phases of movement. I cast a mold from the Band-Lite glass sample and manufactured a dozen clear plastic replicas, suspending them with fishing line from the ceiling, four inches from the wall. Preparing a number of 5-phase animated photos, I mounted them on the wall behind the hanging lenticular

sheets. When I swung the sheets from side to side and stood back, the images animated nicely: an eye blinked, hands opened and closed."

Even though the resolution was poor – how much clarity could be expected if each line was one-inch wide and there were only 24 lines across? – Rufus was excited. He advertised in a glass trade journal looking for more Band-Lite glass, hoping to get his hands on a giant sheet with which to make a full-sized animated figure. He got a response to his ad from Howard Bowen (MBC Glass, Inc), a glass artist in Bloomingburg NY, who thought he could help. As it turned out, Bowen was unable to get access to more Band-Lite glass. But he did get Rufus started in a different, better direction.

Bigger pictures

Bowen introduced Rufus to Michael Benzer of Architectural Glass (Beacon, NY). Michael casts his own line of beautiful architectural glass tiles. His tiles have ribbed surfaces, although rough-hewn and angular. Rufus recalls:

"It occurred to me that, if it were possible to design a lenticular tile of similar dimensions, it could be used as a building block to create animated murals of any size. Furthermore, since I was designing it from the bottom up, I could get better resolution (closely spaced ribs) and a shorter focal length (the thickness of the tile itself)."

Casting experimental clear lenticular tiles in polyester resin from a series of homemade rubber molds derived, in turn, from aluminum molds, Rufus finally came up with a prototype with which he produced his first large scale lenticular work. The 4 feet wide by 6 feet high prototype was *Nude Descending a Staircase*. When you walked by, the nude actually descended! This piece was inspired by a famous painting by Marcel Duchamp, *Nude Descending a Staircase No.2*. The subject had caused a scandal when revealed at an International Modern Art Exhibition in New York in 1913. With this painting Duchamp had been influenced by the overlapping images of Marey's 1890s photo sequences, and by Muybridge's earlier sequence *Nude Descending Stairs* (1887).

Duchamp had emulated motion with his *Nude Descending a Staircase*. Rufus brashly created both a tribute and a commentary on Duchamp's painting: why suggest motion in a work of art when you can actually show it? This "utter lack of pretense" [pretention?] is consistent throughout Rufus's work. From the start, he became part of a long tradition of moving image artists, while pushing forward with new developments and ideas.

At this time Rufus moved to a larger loft in Providence, to expand production – and then a huge fire swept through the area, wiping out his new studio.

Glass LIFETILES

When all his molds were lost in the spectacular 1989 studio fire (along with his original

artwork, including the *Nude Descending a Staircase*), Rufus decided this was the time to start fresh; in glass. With a Mellon Grant obtained through the School of the Museum of Fine Arts in Boston – where he continued to teach film – he contracted Michael Benzer to mill a steel mold, and to cast the first glass LIFETILE based on Rufus's plastic tile design. Beautiful in appearance, though rough-hewn and filled with tiny bubbles and swirls, the glass LIFETILE was capable of supporting up to six different phases of movement. By now Rufus was figuring out better ways to created the striped, or 'coded' image (the thin strips being alternating slices from several different phases of action):

"Instead of using 'live' subjects I'd make a series of prints from motion picture frames, and re-photograph them as multiple exposures through striped glass sheets. Each image was then broken up into tiny squares, and each square fit a separate LIFETILE. Later, leaving the striped glass technique behind, I computer-scanned the images instead, and broke them into stripes. I'd re-photograph the coded image printouts, creating exact-size prints to glue onto the back of the glass tiles."

[INSERT TWO-PAGE GRAPHIC LAYOUT "PRODUCING LIFETILES" HERE?]

Looping the loop

In 1990, Rufus made his biggest LIFETILES work to date at that point: *Brian Jones, Tap Dancer*. He first filmed Jones, arguably the greatest tap dancer in New England, on 16mm motion picture film. Using a home-made cyanotype photographic process, he created 144 separate coded-image blue photos on archival drawing paper, and aligned and glued them to the back of the glass tiles. When you walked by, the 8 ft high dancing figure would leap and spin alongside you. Although *Tap Dancer* had only four phases of movement, as you walked along, the dancer went through more than nine separate moves, progressing from one side of the mural to the other, never seeming to repeat a move.

This 'non-repeating' effect, never before applied to optical animation on such a grand scale, is based on an ingenious 'film looping' technique, which is made possible in part by the fact that the medium will 'cycle' the same set of three, four or five images about 3 times clearly as the observer walks by.

This method had been devised by the earliest motion sequence artists, who produced picture discs for the phenakistiscope, and strips for the zoetrope. As they were working with drawings, it was relatively easy to arrange a sequence of imagined movement to go through exactly one cycle in a dozen or so phases, returning to the same position at the end of the cycle, enabling the action to be repeated endlessly.

When Eadweard Muybridge used the technique for his Zoopraxiscope (projection) discs he discovered problems, as they were based on his photographic sequences of live animals and people in real motion. Their 'stride' cycle didn't always take place in the

right number of phases to create a repeating ‘loop’, so Muybridge would select images from series taken with a bank of 24 cameras. This provided the necessary sequence that would ‘repeat’, avoiding a jump at the end of a cycle. But it was another thing entirely to create images that appeared to transcend this inherent repetitiveness to create the illusion of non-repeating progress, and this is where the more artful pioneers triumphed. With his projected animations, Muybridge had some success with this. More than a century later, others were discovering and developing these methods.

Rufus had already experimented with this technique, back in art school. Long before his experience with his friend’s giant zoetrope, Rufus had produced his own. While taking a series of still photos, he had directed his friend Ed Callahan to rise from a chair and step to the left out of frame. Then Callahan had entered from the right, and sat down in the chair. Rufus had produced about thirty small prints, and mounted each credit card-sized photo on heavy black card stock, positioning each one upright, facing inward, along the perimeter of an 18-inch disk. Employing a little shrewd cutting and pasting, Rufus had manipulated each picture so that when the disk was put on a rotating turntable and the image viewed through the slits between the upright photos, his school friend appeared to come to life, stand up, step out of frame *through* the slit and *into* the neighboring photograph, and sit down again. The sequence not only ‘looped’ without a jump, the character also progressed from one position to the next, adding interest and pushing the limits of the zoetrope medium.

Now Rufus was working once again with photographic ‘frames’, carefully selecting the appropriate images from within a filmed shot, to create a ‘looped’ sequence that would repeat without any jumps, and also to ensure that (where appropriate to the subject) the moving image could ‘progress’ linearly across the LIFETILE installation, as the viewer moved past it.

“In the case of Tap Dancer*, the image in Phase 1 has the first dancer just entering from the left, as well as the dancer in a different pose five 'moves' away to the right, starting to leave the frame.*

In Phase 2 the first dancer (left) has almost completely entered, with the other dancer (right) almost departed.

Phase 3 has the first dancer now fully entered from the left, and just a part of the other dancer (right), almost completely out of the frame.

Phase 4 has the dancer in the middle of the picture.”

Rufus was now free to design entire hallway-length animated displays of fish Swimming, cats running, and any other action scene that he could imagine.

It is important to understand that Rufus does not simply go out in the field and film or videotape the subject and ‘slap’ the result onto his murals. His videos and films become his study material: after choosing and rearranging the frames he wishes to use *as guides,*

he redraws everything from the bottom up – not simply removing the backgrounds from the subjects, but actually changing arm and leg positions, reworking the look of the subject completely, combing some poses and redrawing the subject from the toes to the head. Rufus knows what will work for the medium he's using, and what won't. Originally he did everything with charcoal and paper, cutting and pasting; now he uses Photoshop for the same purpose.

Plastic and glass

After seeing his *Tap Dancer* piece, a Boston exhibit firm contracted Rufus to create an animated mural of Duke Ellington playing the piano – from frames of a 1935 movie called *Hit Parade* – for a traveling Smithsonian Institute exhibit, and Rufus's LIFETILES career was started. To keep this particular display light for travel, he made it from clear plastic LIFETILES with coded-image photos glued to the back. However, Rufus knew that if he was going to sell his work architecturally in glass, he'd have to find a way to make the images more permanent.

As chairman of the Boston Museum School's film department, Rufus now took advantage of the school's glass fabricating facilities, where he learned how to sandblast and fire images permanently into blasted areas. He used the down payment from his first major job, a 50 foot-long marine mammal mural for the National Aquarium in Baltimore, to set up an industrial-strength LIFETILES studio with a kiln and sandblaster. That was a 6-month long, 720-LIFETILE installation which Howard Bowen and his wife Deb installed.

It was on this first large-scale LIFETILES project that Rufus met Penny Sander, head of exhibits for Cambridge Seven Architects (the firm responsible for building the Boston, Lisbon and Osaka aquariums) and she supervised his installation of that mural in 1993. They were married several years later. Penny's eye is their animated company logo, and those are her hands playing the piano in Rufus's animated artwork. Penny is also Rufus's business partner in Eye Think, Inc. In 2004 one of Rufus's earlier sequences, based on his black and white photos of a leopard in a cage, was adapted by Penny as the design for a wall quilt – a gift for a newborn nephew – the fabric hand-printed using cyanotype imaging. The result gained a People's Choice Award at the Rising Star Quilt Show.

Although Rufus developed the LIFETILES medium around 1987, he did not patent it. Instead, to deter others from copying the idea, he has chosen to copyright each LIFETILES work that he creates.

A patented novelty

After seven or eight years of creating LIFETILES murals, Rufus developed and received a patent for a "Manually Operated Moveable Display Device", patent 5,901,484, otherwise known as the Kineticard optical toy. The inspiration this time was from a mid-

20th-century domestic novelty. He recalls:

"I'd always liked those 1950s animated moiré pattern lamps with the inner rotating cylinder – you know, the ones that have Niagara Falls falling and forest fires burning, etc. – and I set out to create something similar: a lamp with images that would actually come to life and move."

Rufus would use his 'coded' images, rotating behind a clear cylinder printed with lenticular ribs or black stripes. He never had time to build the lamp, but along the way he built paper and plastic prototypes.

This type of animation is known as the 'picket fence' technique – because if you look through a picket fence while you're going past it, anything moving on the other side appears to be traveling in a jerky way. The combination of 'coded' images and black stripes creates the illusion of fluid motion. The principle was of course very similar to that of the LIFETILES – and indeed identical to the camera technique Rufus used for his first LIFETILES photography experiments – but for these smaller novelties, a simple arrangement of black lines, rather than the ribbed lenticular sheet, was all that was needed for viewing. The pictures can be moved to and fro beneath an overlay of striped plastic, so that a series of sequential, still pictures is revealed one by one. The brain merges this succession of images together, creating the illusion of movement. Eyes blink, animals leap, people dance.

Rufus's Picket Fence Animation—a new twist on an abandoned technique

A definitive history of the picket-fence type animation method – for want of a better description – has yet to be written, possibly because the technique, by and large, was abandoned decades ago, perhaps because it was seen as limited in its potential. There are several earlier precursors.

One late-18th-century device gave an illusion of movement by making use of the dynamic patterning that can be produced by moving a lined screen in conjunction with a perforated picture. The result was descriptively known as 'artificial fireworks'. The optical cabinets and perforated pictures constructed at that period by anonymous, now forgotten artist-technicians to produce such effects are now extremely rare. The example shown here dates from around 1800. A clockwork mechanism turns a translucent paper disc on which are painted radiating curves. Illuminated from behind by candles, the interaction of the interrupted light pattern with the perforated paper view in front, produces a surprisingly effective twinkling, swirling effect. These cabinets, which were viewed in much the same way as we watch a TV screen today, probably inspired the invention of the chromatrope, for projection onto a larger screen, in the 1820s. This magic lantern slide comprised a wooden frame into which two glass discs were inset. One of these discs rotated when a crank was turned – or better still, in the best examples both discs turned, in opposite directions. The repeating, hypnotic, scintillating multi-colored spirals – projected onto screens up to 20 feet in diameter – remained a popular part of the

magic lantern show throughout the 19th century.

A similar illusion was produced by the 1898 *Motograph Moving Picture Book* (reproduced in the 1970's by Dover Publications). Engravings of objects in motion were brought to life when an acetate transparency covered with a very fine line pattern was moved very slowly up and down over the pictures. Wheels turned, fish swam, smoke swirled, and water flowed. The apparent motion was caused by a moiré-effect. (The French word moiré, meaning 'to water', was originally used to describe an effect applied to silk material to give it a wavy or rippled texture.)

Around 1920, a popular and effective toy was the Ombre Cinema, which originated in France. The box featured a paper roll, printed with characters and vehicles fragmented into two phases, which appeared animated as the clockwork motor slowly pulled the paper strip across the aperture behind a ruled transparent 'picket fence' screen. Charlie Chaplin was a popular subject. Simple versions of the toy were given free in the *Children's Encyclopaedia* artwork. Smaller examples with a single moving picture were also popular novelty items in many countries throughout the 20th century; the example shown here is from the Betsy Ross house in Philadelphia: 'Birthplace of Old Glory'.

Photographic portraits could also be treated in a similar manner. When found today, there is something slightly disturbing about the long-gone faces that continue to wink, smile, and roll their eyes at us, down through the years. The basic idea of the 'picket fence' – a bar or strip obscuring one phase of movement, while revealing another – could also be used to reveal alternate images that were not necessarily phases of motion. A popular English picture postcard of 1911 showed the new King, George V, and when the 'shutter' was moved, Queen Mary, in their Coronation year.

And there, it appears, the progress of picket fence animation technology finally came to an ignominious end, supplanted by the advent of conventional motion pictures, lenticular plasic imaging, holography and video. It appeared the world had moved on in the name of progress. Yet, Rufus picked up the abandoned technology, dusted it off and gave it new life, proving that progress is not always a linear process – sometimes it can branch off in many directions at once.

Rufus's 'picket fence' toys

"I'd already seen and collected a number of antique and contemporary cards and postcards using the 'picket fence' technique. Most examples used only two, three, or, at best, four different images. My experiments revealed the reason for the limited number: in a flat format, there is no way to ensure perfect contact or registration between the two sliding layers. More phases means smaller coded image stripes, increasing the chances of seeing a 'double image' when the layers separate slightly, or go out of alignment."

Rufus devised a white paper cylinder on which was printed the 'coded' image, snugly fit

inside a clear outer cylinder with black bars on it.

*"To my delight, my snug 'cylinder within a cylinder' ensured almost perfect registration: when you slid one tube inside the other, the stripes remained almost perfectly parallel, the two layers staying flat up against one another. I could achieve six phase animations, and more; enough moves to create a fluid image using the 'zoetropic' technique. (*Tap Dancer*, remember, is only a 4 phase piece). To make the device mailable, I squashed it flat."*

This was the KINETICARD, now superseded by a whole range of similar novelties.

· Apparent in the results is Rufus's skill in distilling the animated forms into meaningful and compelling silhouettes, a medium with a long tradition. Silhouette portraits, deftly cut without any prepared outline, were very popular in the early 19th century, before photography provided an alternative. Moving silhouettes go back much further, to the shadow plays of Java, China, and Turkey, which used articulated puppets. In late 19th-century Paris, silhouette shows at such fashionable venues as the Chat Noir (Black Cat) Theater were very popular, and the tradition continued into the silent movie era, with Lotte Reiniger's charming silhouette films, including the first animated feature production, *The Adventures of Prince Ahmed* (1926). It takes a great deal of artistry to create silhouettes, especially ones in motion, that clearly exhibit the essential details of the character portrayed.

The improved technical design, and careful selection and preparation of suitable subjects, has ensured the success of Rufus's various optical toys and his bestselling Scanimation books, which are now available globally.

LIFETILES are spreading

The LIFETILES installations have continued, and are still as popular as ever. Typical of Rufus's installations is that for a North Carolina Zoo's "Rocky Coast" exhibit. "We wanted something that would represent the diversity of marine arctic life," said Ellen Greer, the zoo's curator of design. "These murals illustrate so well that diversity, and are successful in themselves as aesthetic pieces of art. Then add the visual attraction – they work on so many different levels."

The nine panels range in size from 24 inches by 40 inches to the largest at 40 inches by 24 feet. Taking about a year to complete, they represent the varied mammals and birds found in the arctic north. The murals have a pleasing aesthetic and are fun to view, but there is more to them than that. They carry an underlying message of conservation, and of the diversity of Arctic Ocean ecosystems.

Rufus has 16 installations dominating the entire 700 foot long South San Francisco BART subway stop, which reflect the rich history of the area. Panels featuring puffing locomotives frame old scenic photographs, breathing life into static images. The potential

of the LIFETILES medium is extended beyond the usual human, animal, and machine movement. One panel shows a succession of blending views of the local main street, as it develops thru the whole span of the 20th century. The effect of time itself is animated, to enable us to see changes that would otherwise be invisible.

Janet Kennedy, of the Parker River National Wildlife Refuge Visitor Center, Plum Island, MA, says: “Lifetiles are the perfect addition to our exhibitory. Our LIFETILES tell the story of the piping plover, a threatened bird species. Visitors are wowed by the unique format and gleefully move along the display, learning about the birds' migration, feeding, nesting, and protection of young all in just a few tiles. As a manager, I appreciate the unique visual appeal, the durability and low-maintenance of this wonderfully interactive exhibit. Rufus is fun to work with, very responsive to our needs, and is committed to creating and delivering a high-quality, biologically accurate display.”

Barbara Punt, Director of Project Management at the California Science Center, where Rufus has two intricate and beautiful Biology and Technology murals, observes, “It's such a joy to watch visitors encounter the LIFETILE murals for the first time. They frequently stride right by them, only to back up and do a double-take as they realize the images are 'moving'.”

The artist retains control

Like many of the pioneers in the visual arts who preceded him, Rufus must build almost everything himself, from the ground up, to fully understand its essence. In his moviemaking career he not only designed and constructed the sets himself, he devised and built all the special effects equipment, painted the matte paintings, sometimes acted in the films, always directed them, and processed and printed them too – in a home-grown 16mm black and white reversal laboratory in a basement in Boston.

Rufus takes the same “do-it-yourself” approach with his work today. He developed, designed and cast the original LIFETILE through trial and error, rejecting the premanufactured plastic lenticular sheeting used by other artists working in the medium. He designed a unique layout system for the LIFETILES in his studio, involving a giant glass table and a series of adjustable mirrors. Rufus also originated techniques related to aligning and applying images to the tiles. Developing his own computer interlacing program from scratch, he created the “coded” images necessary for both the LIFETILES and the picket fence creations; he does not use existing “interlacing programs”.

That rare combination of artist and inventor, Rufus has a singular talent to see old concepts in a new way; he gives new interpretation and inventive life to abandoned and tired technologies – picket fence animation, lenticular imaging – whose potential had been thought to be fully exploited decades or even a century ago. His work is appreciated by many cultures. Rufus is especially pleased at the positive reception to his work in Japan, a country in which he traveled extensively as a teenager, developing a close affinity. He sells a great deal of his artwork and inventions to Japan, and his talents are

currently licensed to several Japanese companies.

Rufus's artworks and inventions have touched upon and enriched the lives of millions. His LIFETILES murals are experienced daily in public venues around the globe, his smaller works are purchased by countless customers in the US and abroad, and his Rear Window captioning system, installed in hundreds of motion picture theaters, has transformed the movie going experience of the deaf and hard of hearing community.

"I want people to walk away from (the murals) with the idea of the joy of life," Rufus says, "and that comes from the movement – the way a whale breaches, and twists and turns as it descends back into the water. This is what excites me about them because it's like you're watching a living thing."

About the author.

Stephen Herbert is a writer-publisher, specializing in the projected and moving image. He has edited *A History of Early Cinema*, *A History of Early Film*, and *A History of Early Television* for Routledge, and contributes to academic journals and encyclopedias on motion pictures and photography. His paper on 'Persistence of Vision' has been accessible on the web for a decade. Published research includes significant work on Eadweard Muybridge – he has been consultant to the museum at Muybridge's home town, Kingston, for 15 years – optical projection, and kinetic toys. His own books include a biography of Theodore Brown, eccentric inventor of the pop-up book and many moving image novelties. Since 1994, with partner Mo Heard, Herbert has run The Projection Box, a small publishing partnership.

With a background as a film technician, the author's past projects have involved recreating early motion picture presentations with both original and replica machines: including Lumière Cinématographe film equipment, Edison peepshow kinetoscopes, and Reynaud's Théatre Optique. Exhibitions curated by Herbert at the Museum of the Moving Image, London, included magic lantern slides and chronophotography. He created a mutoscope installation for the National Gallery (UK), where he has lectured on early motion portraits. He currently advises on the construction of modern zoetropes and mutoscopes. Stephen Herbert met Rufus Butler Seder ten years ago, and since then has followed Rufus's career with interest.

In preparing this text, the author would like to acknowledge the work of those who have written about Rufus's art over the years.