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Clay animation comes out of the inkwell

The Fleischer brothers and clay animation

Michael Frierson

Clay animated films were produced in the United States as early as 1908 when Edison Manufacturing released a trick film entitled *The Sculptor's Welsh Rarebit Dream.* In 1916, clay animation became something of a fad, as an East Coast artist named Helena Smith Dayton and a West Coast animator named Willie Hopkins produced clay animated films on a wide range of subjects. Hopkins in particular was quite prolific, producing over 50 clay animated segments for the weekly *Universal Screen Magazine.* But by the 1920s, cartoon animation using either cels or the slash system was firmly established as the dominant mode of animation production. Increasingly, three-dimensional forms such as clay were driven into relative obscurity as the cel method became preferred for studio cartoon production.

Nevertheless, in 1921, clay animation appeared in a film called *Modeling,* an *Out of the Inkwell* film from the newly formed Fleischer Brothers studio. *Modeling* is one of the few known shorts using clay that was released during the 1920s. *Modeling* included animated clay in eight shots, a novel integration of the technique into an existing cartoon series and one of the rare uses of clay animation in a theatrical short from the 1920s. A closer examination of this Fleischer film is thus significant for two reasons. First, it illustrates how the clay technique 'fits' in the Fleischers' *Inkwell* series. Second, it reveals a number of traits of the *Inkwell* format itself. In particular, *Modeling* shows how the studio maintained an element of novelty in the series by integrating different animation techniques to visualise Ko-Ko the Clown's fight for corporeal existence, the unvarying central conflict of the series. This broader look at the *Inkwell* format will show that it embraced a duality of conformity and surprise, of static format and novel technique, of conventional cartoon action set in cartoon space and unconventional animation set in live action studio space. Indeed, even the central star of the series created humour by incorporating within his established 'star' persona the regular comic routines of a clown and an antagonistic tendency to leave his cartoon world, disrupting the conven-

tions of film narrative and film space. These dualities became central to the audience's enjoyment. On the one hand, viewers are comfortable with familiar characters in a familiar format, while on the other, they came to expect from the Fleischer studio the innovative use of animation techniques to visualise Ko-Ko's on-going subversion of filmic conventions.[1] Before turning to a specific examination of Fleischers' films, an overview of the changes occurring in the emerging animation industry will show what broader impact the slash and cel techniques was having on three-dimensional forms of animation like clay.

Historical context: The emergence of division of labour in East Coast animation houses

The slash system was developed around 1914 by Raoul Barre and Bill Nolan, one of many contemporaneous developments aimed at reducing the amount of labour involved in producing drawn animation. The system involved cutting a hole in a paper background drawing so that, through careful composition, character drawings could be animated underneath. Later, the more common incarnation of the slash system was similar to cel animation: it involved cutting around the foreground character so that, through careful composition, the paper drawing could be laid over a single background drawing without obscuring the majority of it, thereby reducing the amount of the background that had to be retraced. Much of the Fleischer studio's early animation uses this form of the slash system, a method that was widely used in the early animation shops but never patented. Since slash animation required cutting each foreground drawing but did not require the payment of a licensing fee to use it, it was cheaper but more time consuming than cel animation.

By contrast, cel animation was a more expensive but faster method that also aimed to eliminate the need to redrawing backgrounds. The rise and consolidation of the cel technique – one well suited to division of labour and assembly-line production methods – to fill the demand for theatrical shorts is well documented by Crafton and others.[2] The cel system, formed by consolidating the patents of John Randolph Bray and Earl Hurd in the Bray-Hurd Process Company in 1914, is the traditional method of cartoon animation in which foreground characters are animated using a series of drawings on clear cels which overlay a single background drawing. But because the cel method eliminates the need to cut out the foreground action, it had an immediate impact on the emerging animation industry, and over the long term it became the dominant mode of production in Hollywood.

From the producer's point of view, the slash system and cel technique were manageable, industrial processes that could be 'Taylorised' through division of labour by applying the system of management that Frederick Taylor outlined in his *Principles of Scientific Management* (1911). Breaking down the substantial amount of labour involved in the production of an animated short into many specialised tasks performed by animators, inkers and cel painters, etc., presented a viable solution to the producer's problem: delivering enough product on a regular schedule to a marketplace hungry for films.[3]

By contrast, clay was and continues to be a medium that resists division of labour, since the character movements are created through manipulation in front of the camera, usually by a single animator. And as a practical matter, setting up a studio to produce clay animation circa 1914 would have been a difficult business proposition, for despite the rising popularity of sculpture in the early 1900s, the existing pool of sculptors and

the existing audience for sculpture was relatively small, compared with the pool of artists and the audience for comic strips in the penny press. 'Animating sculpture' meant bringing an artform usually confined to museums, expositions and fine homes to the screen. Drawn animation could easily build on the cultural production that penny press comic strips had brought to the masses.

From the audience's point of view, early drawn animation was very accessible and familiar. Its content was an extension of famous comic strip characters and gags into a new, moving medium that retained many familiar conventions: text for dialogue in comic strip 'bubbles', 'sightlines' to indicate what a character was looking at, shot selection and staging that was similar to the strips. Grounded in the visual humour of penny press cartoons, the mass audience found familiar visual cues and many of the same characters in the weekly cartoon at the movie house. This connection to the penny press probably derives from what Conrad Smith calls 'a heritage of newsprint',[4] since many early animators, including J.S. Blackton, Winsor McCay, Paul Terry, John R. Bray and Max Fleischer were newspaper cartoonists, while others like Sidney Smith, Wallace Carlson and Raoul Barre were employed as illustrators or staff artists at newspapers.

Format: The patterning of content in the *Inkwell* series

Because it moved beyond the conventions established in early cartoons and produced cartoon 'stars' not derived from the strips, *Out of The Inkwell*, a series produced by the Fleischer Brothers from 1915 through to the 1920s,[5] is crucial to understanding the progression of American animation before the advent of sound. Much attention has been paid to the rise of the Disney studio beginning with *Steamboat Willie,* yet there is little discussion of how the *Inkwell* series explored the humorous integration of animation with live action film throughout the 1920s. During these years, the *Inkwell* series' adaptation of slash and later cel techniques shows a patterning of 'content' – what we would today call 'format' – that was very successful with audiences. In many early episodes, the basic *Inkwell* plot follows a 'visitor format' that runs like this:

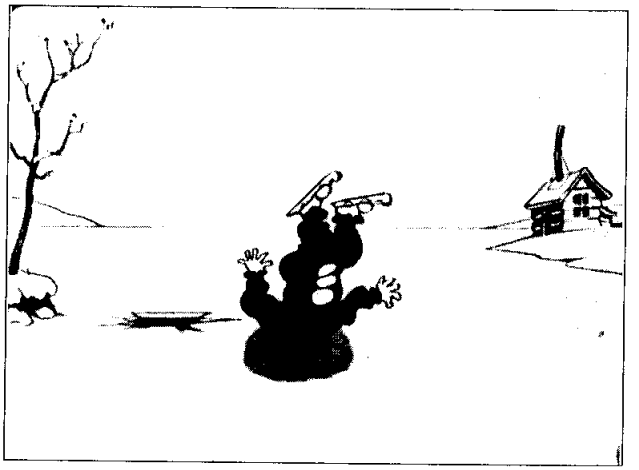
1. The animator's hand brings Ko-Ko out of the inkwell by drawing him in an innovative way (i.e. the hand draws a group of ink drops that metamorphose into Ko-Ko).
2. Max is established in the studio, often working with animator Roland Crandall.
3. The action crosscuts between studio and animated scenes.
4. Gags are created that involve the movement of three-dimensional objects from the live action space into the animated space or vice versa.
5. A visitor enters the studio with an easily identifiable motive.
6. Ko-Ko enters the world of the studio to 'dissolve' the situation, creating a string of physical comedy gags that astonish all present.
7. Ko-Ko is ultimately forced to return to the inkwell.

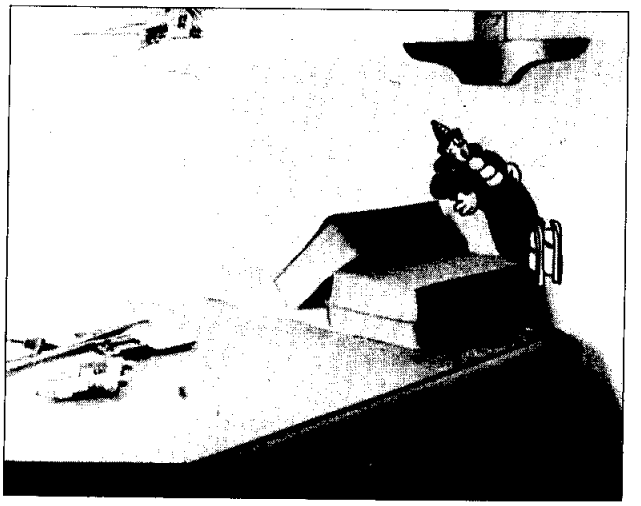
This pattern is repeated in early shorts like *The Ouija Board* (between 1915 and 1920) and *Perpetual Motion* (between 1915 and 1920). *Modeling* also follows the 'visitor format'

Max's hand brings the clown out of the inkwell as a series of ink droplets that metamorphose into Ko-Ko. Next, Max is established at the drawing board, trying to give Ko-Ko some pep while animator Roland Crandall works at another easel. An ugly gentleman with a large nose, dressed in top hat and tails enters to examine a clay likeness that Crandall is sculpting of him in clay. After some disagreement between them – the gent thinks the bust resembles him too closely – Crandall calls for Max's help. To busy the clown, Max draws ice skates on Ko-Ko and a frozen lake for him to skate on. As Max and Crandall try to resculpt the bust, Ko-Ko skates through a series of pratfalls and gags: he chases a bear who has stolen his hat, wrestles in an ice house, rolls the bear up in a huge snowball and finally sculpts that ball into a bust of the gent. Angry at Ko-Ko's antics, Max turns to throw a wad of clay at him. As clay begins to fly back and forth, Ko-Ko escapes into the studio, hides in the nostril of the bust, is chased wiggling across the floor by Max, Crandall and the Gent, only to return to the safety of the inkwell.

Below and overleaf
Patterning of content in the Inkwell *series*

©Republic Pictures (Stills courtesy US Library of Congress)





As the *Inkwell* cast became established cartoon characters, later shorts relied less on the live action context and the introduction of visitors to the studio, leaving more time for interaction between live action and cartoon space and ultimately for longer bits of pure animation. In short, later *Inkwell* films have more Ko-Ko and less Max. But in the early *Inkwell* films, establishing a live action context for Ko-Ko to exercise his struggle for corporeal existence was a format that was easy to produce, since only a small percentage of the short was truly animated.

The *Inkwell* series probably adopted this format initially because of the economic realities of cartoon production in the 1920s. It became a successful format because it fulfilled the narrative needs of a five- to seven-minute short and because the Fleischers endeavoured to maintain the novelty of the series by exploring a number of animation techniques, mixing live action and stop motion footage with the central drawn character Ko-Ko. In this regard, Michael Wassenaar's description of the Fleischers' later *Popeye* series fits the *Inkwell* series equally well:

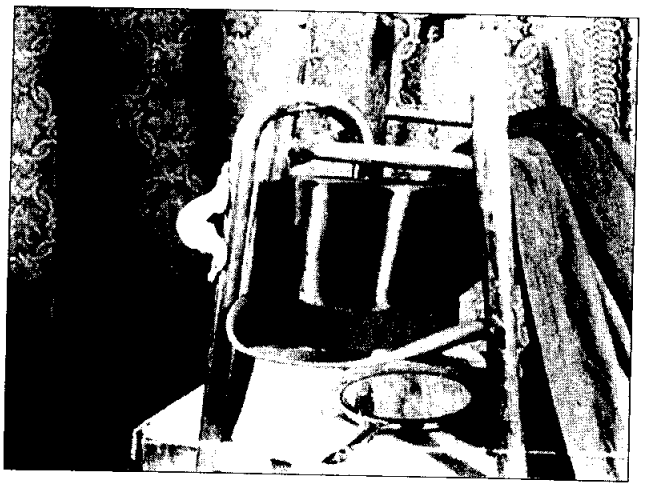
> [E]conomy is inscribed in the production process itself through a repetition of plot structures for the utmost effect . . .What is characteristic of these cartoons is a minimal amount of invention going into plot development and a maximal amount of effort going into the construction of gags within a

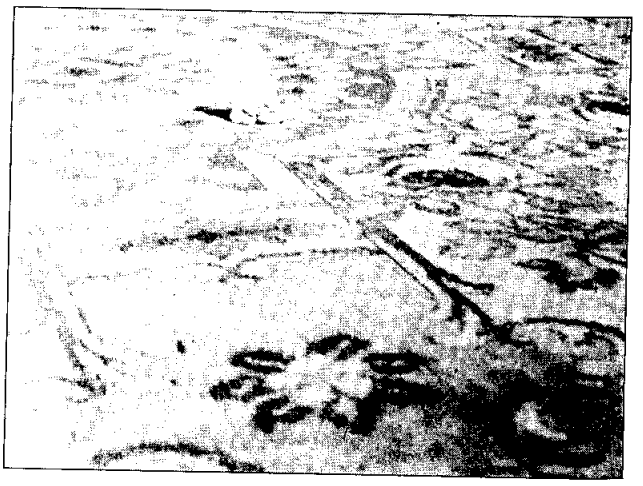
certain context.[6]

Over time, the *Inkwell* format became a comfortable, repetitive vehicle for audiences.

Technique in Fleischer films

Working within the *Inkwell* format, the Fleischers could redirect their energies from narrative construction towards the development of new techniques – rotoscoping, sound, composite imagery, the bouncing ball, setbacks – and towards tinkering with the gadgets that litter their cartoons as props. For the Fleischers, animation was the intersection of their interests in drawing and mechanics. Max's self-described 'keen and instinctive sense of mechanics'[7] is evident not only in their methods, but in their subject matter in futuristic cartoons like *Perpetual Motion* (between 1915 and 1920) *The First Man to the Moon* (1921) *Ko-Ko in 1999* (1924) and *Ko-Ko's Earth Control* (1928). Within the constraints of the *Inkwell's* repetitive plots, the Fleischers found freedom to experiment with the mechanics of animation. In the *Inkwell* series, the 'construction of gags' revolved around film techniques for visualising the interaction of the live action world and the cartoon world. As the *Inkwell* series unveiled its new technical tricks week after week, the results were successful enough to help to maintain the elevated status of cinema-as-novelty for audiences of the 1920s, audiences that were no longer fascinated by animated movement alone.





Unlike later character animation done at the Fleischer studios, the *Inkwell* films tend to rely more heavily on tricks and effects *as effects* for their entertainment. For example, although sophisticated technical tricks like setbacks were developed for later *Popeye* cartoons, they support stronger characters and narratives. In contrast, the central premise of the *Inkwell* format – Ko-Ko interacts with the live action world – coupled with the format's scant plots and limited characters forced the Fleischer studio to develop new ways to integrate live action and cartoon footage. These novel techniques sustain Ko-Ko's 'exciting habit of leaving his own world', providing a more complex filmic space and richer layers of visual imagery to decode.

Some of the animated tricks for combining live action and cartoon footage are quite simple, others are more elaborate. In *Bubbles* (1922), a simple still photograph of Max is overlaid with cels of an animated soap bubble, creating the half-hearted suggestion that Max is blowing tremendous bubbles in his living room, even though he is frozen in a still. *The Ouija Board* (between 1915 and 1920) shows Max's surprise by freezing a frame of him with mouth agape and adding an animated overlay of his hair standing on end. More elabourate interaction between Ko-Ko and the live action world is achieved in *The Clown's Little Brother* (between 1915 and 1922) where Ko-Ko rides and wrestles with a live action cat. This frame-by-frame composite of cel and live action background footage – called rotographing – grew naturally out of the Fleischer's development of the rotoscoping process in 1917 and was used to combine live action with cel in shorts as late as the 1940s.[8] The use of this kind of 'special effects' technique facilitated the integration of live action elements into *Inkwell* films and underlines their fascination with technique over story.

With live action space shown in virtually every episode, pixillation of objects is a logical method for suggesting the presence of Ko-Ko in that space. Typically, the Fleischers suggest through continuity editing that Ko-Ko climbs under a three-dimensional object in the studio space and then they pixillate that object. For example, *The Clown's Little Brother* and *Ouija Board* imply that Ko-Ko is inside a pixillated inkwell and a pixillated hat respectively. These tidy, arresting bits make Ko-Ko's presence in the live action space more concrete. In *Modeling*, the same pattern is followed, except the object Ko-Ko climbs under happens to be the nose of a clay bust. The clay is animated first on the bust, then moves to the floor of the studio. In this context, the use of clay at the Fleischer studios appears to be just another kind of raw material to pixillate, a different technique used to maintain novelty in the series and in a larger sense, to maintain cinema as a perpetual novelty.

The clay animation in *Modeling* is primitive in conception, but fairly sophisticated in execution. First, the notion that a clay bust must be used to set a context for clay animation is a quaint holdover from earlier works such as *The Sculptor's Nightmare* (1908) and *Swat the Fly* (1916), but the popular domestic sculpture seems more at home here. In the *Inkwell* series, the Fleischers cultivated an image of their studio as a homey *atelier*, bustling with all manner of artists and tinkerers, often in dressed in lab coats. Using a literal motivation like a bust to introduce a new technique into the series might be plodding, but, given the minimal amount of effort they applied to narrative development, it is pure Fleischer Brothers. Second, the primary clay form used here is a common coil – the 'snake' – often the first object rolled out by a child who plays with clay. Though simple, the form is handled well by the animator(s) (unknown), who show the clay-covered Ko-Ko inching down a real cane and along the floor. Here, the movement is well paced and suggests the frantic futility of Ko-Ko's flight. Later, the

clay inchworm 'stands up and looks around' before it is captured, an expressive touch. Throughout, the accumulated expertise of the Fleischer studio with line animation shines through the simplicity of the inchworm and its movements. *Modeling* demonstrates that, in 1921, clay animation remained a simple, accessible, expressive technique, particularly for experienced animators with a knack for experimentation.

At the same time, the appearance of clay animation in only one out of six Fleischer films released that year clearly indicates that it had not established much of a foothold in the East Coast animation shops. Comparing *Modeling* to the great number of slash and cel films produced in 1921 it is clear that (a) these flat methods were becoming the central mode of production to meet the demand for theatrical shorts and (b) clay and other methods that resisted division of labour were becoming marginal production techniques. But the fact that clay was used once in the *Inkwell* series says more about a format that invited technical innovation than the perceived advantages or disadvantages of clay in a demand-driven system of production. At the Fleischer studio, clay animation was another technique that could be plugged into their format, in the same way as they used cutout animation and pixillation, to maintain an offbeat element of surprise and novelty for the audience.

The role of Ko-Ko in the *Inkwell* series: Narrative function and spatial explorations

The *Inkwell* format was characterised by a recurrent style and theme. The signature style of the *Inkwell* format revolved around whatever novel techniques could be brought to bear to visualise the filmic space where Ko-Ko's struggle for corporeal existence occurs. Thematically, this struggle was central to the *Inkwell* format: Ko-Ko's departs from his natural domain of the drawing board and explores the cartoon studio, a journey that inevitably ends when his creators return him to the inkwell.

The *Inkwell*'s central theme was also one of animation's greatest themes. As Crafton notes:

> Drawings that 'come to life' may be said to be the great theme of all animation ... the narrative content of many animated films, especially in the silent period, may be seen as a heroic struggle by the drawings to retain their unexpected corporeal existence. This is usually expressed pictorially by having the drawings deny their obvious two-dimensionality and enter the world of real objects, with whimsical and spatially confusing results. Usually the artist succeeds in restoring order to the world; Koko must always be recapped in the Inkwell.[9]

As early as 22 February 1920, a *New York Times* review touched on this theme as a source of the *Inkwell* series' popularity:

> This little Inkwell clown has attracted much favourable attention because of a number of distinguishing characteristics ... he has an exciting habit of leaving his own world, that of the rectangular sheet on which he is drawn and climbing all over the surrounding furniture.[10]

Here, the reviewer identifies Ko-Ko's 'habit of leaving his own world' as a primary source of audience pleasure. This weekly habit offered audiences a behind-the-scenes glimpse of the workings of an animation studio and provided a rich source of new gags for the cartoons, while locating Ko-ko's surprising transmigration within the reassurance of a fixed format. Ko-Ko provided the vehicle for moving Fleischer cartoons

beyond conventional action set in cartoon space. Using 'unconventional' animation techniques like clay, pixillation and cut-outs, the early *Inkwell* films explored the clown's disruptive forays into live action studio space.

This repetitive journey, Ko-Ko's recurrent struggle within the Inkwell format fits the historical role that the archetypal clown has played in Western drama. Summarising this role, Enid Welsford states in *The Fool: His Social and Literary History*, that:

> . . . the Fool or Clown . . . as a dramatic character . . . usually stands apart from the main action of the play, having a tendency not to focus but to dissolve events and also to act as an intermediary between the stage and the audience . . . The Fool, in fact, is an amphibian, equally at home in the world of reality and the world of imagination. The serious hero focuses events, forces issues and causes catastrophes; but the Fool by his mere presence dissolves events, evades issues, throws doubt on the finality of fact.[11]

As an intermediate character between the stage and audience, the clown can comment on the action taking place, giving voice to the audience's thoughts. Though part of the story, the clown is free to defy its conventions.

Welsford's notion of the 'fool-as-amphibian' resonates throughout Fleischer cartoons, as Ko-Ko fulfills many archetypical functions: not only does he 'dissolve events,' but he also moves between the world of reality and the world of imagination. As an 'amphibian', Ko-Ko exploits the tension between narrative chaos and spatial unity in the *Inkwell* format. As an antagonist in the *Inkwell's* narratives, Ko-Ko works in many shorts to destroy the filmic space through a kind of malicious playfulness that exhibits many of the primary jokes of the clown: falls, blows, surprise, knavery, mimicry and stupidity.[12] In *Modeling*, for example, we see a rotoscoped Ko-Ko in a traditional knockabout routine attempting to ice skate, hitting the Gent with a wad of clay, surprising the Gent right off his stool by hiding in the nostril of the clay bust, mimicking the sculpting of Crandall to the exasperation of Max and stupidly lying upside down on the drawing board with a wad of clay on his head. As Ko-Ko foments a confrontation between the Gent, Crandall and Max, the momentum builds in a series of pratfalls and crude slapstick. Here, as in many of the *Inkwell* films, Ko-Ko tests the live action characters. And as the film degenerates into a kind of 'pie-fight-in-clay', the narrative premise of the short – however slight – dissolves.

As Ko-Ko dissolves the narrative unity of the film, he also disrupts the viewer's understanding of filmic space. In *Modeling* and throughout the *Inkwell* series, Ko-Ko frequently ventures forth from his drawing board into the 'real' space of the Fleischer studio. This act is, at once, the central assertion of his corporeal existence, a defiance of standard cartoon conventions and a visual confirmation of Ko-Ko's amphibian status between the worlds of imagination and reality.

The conventions of filmic space in the *Inkwell* series are firmly established at the beginning of virtually every episode, a foundation that Ko-Ko will later play against. At the beginning of most *Inkwell* shorts, we see the artist's hand (or a cutout photograph of a hand) drawing Ko-Ko, a simple act that immediately offers a wealth of cues for decoding spatial relationships in the film. Firstly, it visually differentiates cartoon space – depicted with only black and white lines – from live action space – depicted with a gray scale and realistic photographic detail. Secondly, it shows them to be 'adjacent': Max at the drawing board occupies a space relative to the cartoon space that Noel Burch in his *Theory of Film Practice* calls the fifth segment of offscreen space: 'behind the

camera'.[13] Finally, the artist's hand shows the relative scale of the drawn space. These cues, taken together, establish the larger context of the live action studio space in which a smaller, drawn cartoon space exists. Given the temporal order of their presentation – the artist's hand usually draws Ko-Ko's world, the cartoon world is rarely established first – it seems clear that the Fleischers' carefully crafted this reading and not the inverse, in which Ko-Ko's cartoon space is shattered by a kind of Brechtian intrusion of the artist's hand.

This reading of the filmic space in the *Inkwell* series is consistent with the aesthetic theories articulated by Herbert Zettl in his groundbreaking text *Sight, Sound and Motion.* Zettl argues that whenever 'graphicated second order space' (e.g. a keyed-in box over the shoulder of a newscaster) is presented with 'first order space' (e.g. the newsroom set), the audience tends 'to perceive the people operating in first-order space as more "real" than the people appearing in graphicated second-order space'.[14] Throughout the *Inkwell* series, Ko-Ko's two dimensional drawing board functions like a video key, as a 'graphicated' second-order space. The black-and-white line-cartoon world of Ko-Ko is repeatedly articulated as smaller, less 'real' and adjacent to the photographic, live action world of the Fleischer studio.

Having established these spatial parameters, the early part of *Modeling* shows us either Max and Crandall in their discrete, live action space, Ko-Ko in his discrete, 'cartoon space', or the area where the two spaces adjoin; namely, Max's hand interacting with Ko-Ko on the drawing board. Longer animated segments in the middle of the film lull the viewer into accepting Ko-Ko's world, the conventional cartoon space with its drawn linear perspective and 'distant' horizon line. Each of these shots is a freestanding bit of animation having no direct interaction with the live action space, save crosscutting. During these freestanding segments, no 'live action' elements intrude in the camera's framing. Visual elements that would maintain the viewer's awareness of the 'adjacent' studio space' – such as registration pegs, the edge of the drawing board or Max's hand – are beyond the camera's frame. In these longer shots, Ko-Ko inhabits traditional cartoon space and the audience's focus shifts from curiosity about the studio and the production process to enjoyment of the clown's antics. There is one shot of almost a minute of pure animation, of sufficient duration to draw the viewer into the cartoon space without referencing the larger studio context. Although intercut with live action shots of the studio, these longer animated shots establish a conventional cartoon space the viewer is accustomed to.

Having established this cartoon space over the past few minutes, Ko-Ko's mischievous escape into the live action space becomes a more daring transmigration. In *Modeling*, the escape takes place when the background of a cartoon scene presents a hole in an ice covered lake. This drawn element in a sense 'punctures' the plane of the drawing board and as Max fishes in the drawn hole for Ko-Ko, the clown moves through it and skates into real space from behind the drawing board.[15]

Throughout, the illusion of movement into 'real space' is maintained primarily through editing. Match cutting in the *Inkwell* films suggest the temporal continuity and spatial proximity of the animated space and the 'real' studio space. Typically, Ko-Ko leaps forward 'from his drawn space', and the camera cuts to Ko-Ko 'landing' on a desk top or a carpeted floor. The cel overlays of the jump are drawn to suggest seamless and continuous action, while the background changes dramatically at the cut, from the predominantly white field of the animated space to a photographic background of the

desk top or carpet. The use of photographic backgrounds that match the live action studio space and the maintenance of screen direction complete the illusion. Relying on codes of editing that were firmly entrenched by the 1920s – in particular the maintenance of motion vectors from shot to shot – the Fleischers were able to convincingly suggest Ko-Ko's movement from the drawing board into the live action filmic space. For viewers who are technically naive, this suggestion is complete enough to be transparent and the narrative flows. For viewers who are technically sophisticated, part of the 'entertainment', as it has always been in animation and special effects films, is to decode how the illusion is being created.

Eisenstein described *Merbabies*, a Disney cartoon from 1938 as a 'comical liberation from the timelock mechanism of American life. A five minute "break" for the psyche'.[16] In a sense, the *Inkwell* series served a similar function for 1920s audiences. The very format of the series – an animation studio whose work routines are constantly being thwarted by a cartoon character – embodies in it a comical liberation from the dull drudgery of work, the focus of American life. With its abundance of technical innovations, with its gags based on the magical interaction of live action and cartoon world, with its central character a knavish amphibian who moves between these two worlds, the *Inkwell* series gave audiences a comfortable format with just the right touch of chaos. As an example of clay animation from the early 1920s, the appeal of *Modeling* lies in the tension between stable format and novel technique, in the balance between traditional clown routines and the destruction of spatial conventions and ultimately, in a created character who thrives on confounding his creators, traits that support the entire series as well.

This is a revised version of a paper given at the 1990 SAS Conference and was first published, in a slightly shorter version, in the *Animation Journal*, vol. 2 issue 1 (Fall 1993). It forms part of a book by Frierson, *Clay Animation: American Highlights 1908 to the Present* (New York: Twayne Publishers, 1994), reprinted by kind permission.

Notes

1. I am indebted to Maureen Furniss for broadening my thinking on the use of static and novel elements throughout the *Inkwell* series.
2. See Donald Crafton's chapter 'The Henry Ford of Animation: John Randolph Bray', in *Before Mickey: The Animated Film 1891–28*, 137–168, and Kristin Thompson, 'Implications of the Cel Technique', *The Cinematic Apparatus* (London: The Macmillan Press Ltd., 1980), 106–120.
3. Kristin Thompson argues that as cel became the dominant production method, the net effect of this demand-driven system was a severe limitation of cel's boundaries, a trivialisation of the technique into the narrow confines of the Hollywood cartoon. Thompson writes in her essay, 'Implications of the Cel Technique', *The Cinematic Apparatus* (London: The Macmillan Press Ltd., 1980), 111, that the ideology of the cel technique – 'cartoons are secondary to live action, virtually always comic and/or fanciful, for children and trivial' – was imposed primarily by the exhibition marketplace it supplied. Cartoons were not only trivalised in the exhibition arena, but many animators past and present have found that cel technique – as it came to be used in American studio animation – trivialised and restricted their creativity. Shamus Culhane calls cel 'mind shackling' in an article entitled 'Frustration', in *Storytelling in Animation: The Art of the Animated Image Volume 2*, edited by John Canemaker (Los Angeles: The American Film Institute, 1988), 40. After viewing a program of films by National Film Board of Canada artists one night, Culhane was compelled to write: 'How totally restrictive, constrictive and dulling to freedom of expression the cel system has been. What a shock it was to realize that I have never enjoyed the excitement of making an entire film myself.'
4. Conrad Smith, 'The Early History of Animation: Saturday Morning TV Discovers 1915', *Journal of the University Film Association*, XXIX (Summer 1977): 23.

5. Leonard Maltin identifies fourteen Fleischer *Out of the Inkwell* shorts from 1915 to 1920 that were produced by John Bray and released in *Paramount Screen Magazines*. After 1927, the series was called *Inkwell Imps*. See Leonard Maltin, *Of Mice and Magic* (New York: The New American Library, 1980), 358–359.
6. Michael Wassenaar, 'Strong to the Finich: Machines, Metaphor and Popeye the Sailor', *The Velvet Light Trap*, no. 24 (Fall 1989): 28.
7. Max Fleischer writing in a studio autobiography, cited in Leslie Cabarga, *The Fleischer Story*, (New York: Nostalgia Press, 1976), chapters 2 and 6.
8. For a discussion of the Fleischer's rotoscope, see Mark Langer's introduction to a facsimile reproduction of 'The Fleischer Rotoscope Patent' in *Animation Journal*, vol. 1 issue 2 (Spring 1993).
9. Donald Crafton, 'Animation Iconography: The 'Hand of the Artist', *Quarterly Review of Film Studies*, IV (Fall 1979): 414.
10. *The New York Times* (22 February 1920), x, 9.
11. Enid Welsford, *The Fool: His Social and Literary History* (London: Faber and Faber, 1935), 320.
12. Maurice Willson Disher, *Clowns and Pantomimes* (1925; reprint New York: Benjamin Bloom, 1968), 3–23.
13. Noel Burch, *Theory of Film Practice*, translated by H.R. Lane, (Princeton: Princeton University Press, 1981), 17. Burch argues that off-screen space is divided into six segments. The four borders of the frame define four of those segments and the fifth is a distinct space located behind the camera. The sixth segment includes the space existing behind the set.
14. Herbert Zettl, *Sight, Sound and Motion: Applied Media Aesthetics*, Second Edition (Belmont, CA: Wadsworth Publishing, 1990), 206.
15. The idea of a 'punctured' background plane is found with variations throughout the series. In *Tantalising the Fly* (between 1915 and 1920), Ko-Ko goes through the puncture and ends up on the back of the sheet of paper, and in *Ko-Ko the Kop* (1927), Ko-Ko moves through the puncture to a new cartoon space.
16. Sergei Eisenstein, *Eisenstein on Disney*, edited by Jay Leyda (London: Methuen, 1988), 23.