

# I :: **Time and Space**

# 1 :: Animation and History

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## Animation's Ahistory

Does animation have a history? Does it evolve as would any other medium that is born and grows up, all the while refining and developing its techniques? This appears to be how film developed. Film moved from the front-on static-camera view to the dollying and swooping camera eye; from black-and-white, through hand tinting, to color; from silent to noisy; and from 2-D to 3-D, while developing editing techniques and honing its acting styles. Then came the day, quite recently, when film merged, through CGI, with animation. This thing that was called film, and still is, evolves from simplicity to complexity, blaring out a narrative of progress, at least in the commercial realm. Each new film is to be bigger, better, more immersive, more expensive, more profitable, and more “life-like” (if not more realistic) than the last. The latest gambits are 3-D and HD, though they are also part of the increasing entwining of film and animation via the digital. In its quest to be ever more real, film mobilizes the unreal arts of animation. Does animation proceed through time and technique in the same progressive way, rarely looking back? Can one tell for sure when any one animation was made? Can one date a single animation by its technique, its ideas, its structure, the quality of its coloration or film stock? Of course, it is possible to perceive celluloid’s deterioration and posit oldness. Of course, the coloration or absence of color may give a clue. The technical properties of the strip along with the music and the ideas may well indicate the date when it was made. But animation is not as clear-cut as film, because in film the passing fads of a world out there impress themselves upon the medium more definitely through a technical and a social reaction. Every detail, the fashions, the hairstyles, the makeup (even if the film purports to be a historical one), the attitudes, the quality of color, the pace of the editing, the rhythms of the soundtrack, the clarity of the image, the

shape of the bodily gestures, all this bears a date stamp. Film, in general, bears a rigidly progressive relationship toward both social and technical developments (though now part of that technical development has absorbed into itself the technical capacities of computer-generated animation). Film reflects its age into itself. But animation does not, or not quite so straightforwardly. It would be barely possible to place in any chronological order, in some line of responsible historical development, the myriad flimsy fragments that make up animation's legacy, for these fragments, by their very (different) nature, are so detached, reattached, and misattached from and to the world outside of them that they pose only questions, riddles, essays. Animation makes many starts. It makes many false starts. Animation starts and stops, by nature. It combines and cuts and undercuts, and reconstructs and constructs, tricks and reveals the trick and perhaps all at once. Film may do this too, but it tends to obscure the traces of the work upon it. In the mid-1930s Walter Benjamin described the output: "The equipment-free aspect of reality here has become the height of artifice."<sup>1</sup>

Animation is too obviously manifold to set out upon a single line of development. It begins with shadow play or with thumb cinemas, with zoetropes or magic lanterns, with lightning sketches or cel animation, with hidden wheels and pulleys or with stop-motion photography. It starts and stops in many places. It is at one and the same time a beginning and a culmination. To accept a thought such as this could explain the never-flagging bounciness of Walter Ruttmann's cavorting shapes of the early 1920s. Or it could allow an understanding of why Disney's feature cartoons are reissued periodically, not as historical items but as entities to occupy the present, even if nowadays morphed into 3-D. The banal way to put this is stated by Alan Bergman, the president of the Walt Disney Studios, in a press release: "Great stories and great characters are timeless, and at Disney we're fortunate to have a treasure trove of both."<sup>2</sup> In wayward terms, the sentiment taps into something of the otherworldly character of animation, which makes it truly ahistorical in relation to our world.

But this is not to say that animation always exchanges its relation to its moment for an arrival in ours. Its moment of making marks itself on the animation too, but perhaps more covertly than film's historical moment does. What does Ruttmann's outburst against Lotte Reiniger and her silhouette animation suggest about animation's particular hold on its moment of making? Reiniger animated cutouts, black delicacies set in flat fairy-tale worlds of filigreed detail. Ruttmann was a collabora-

tor on what is now labeled the oldest surviving feature-length animation. Reiniger's fairy tale, *The Adventures of Prince Achmed*, was released in 1926. Ruttmann sat assembled with the other animators for the first time to watch the marked copy and is reported to have exclaimed, "What has this to do with 1923?"<sup>3</sup> What did the dancing shadows, trapped in a flat world of genies and demons, caught only with sidelong glances, have to do with the spectacular collapse of the German economy in the epoch of hyperinflation? This was a time when, as Benjamin notes, "for this nation [Germany], a period of just seven years separates the introduction of the calculation with half-pfennigs (by the postal authorities in 1916) from the validity of the ten thousand mark note as the smallest currency unit in use (1923)."<sup>4</sup> But Ruttmann was wrong to think that the fairy-tale film was simply at variance to the economic devastations of the epoch and only a frivolous play of paper and light. In any case, paper in those charged years of billion-mark banknotes and financial ruin was far from a frivolous topic. Perhaps indeed this animation had *everything* to do with the crisis years, re-presenting, in graphic form, a fading out of all life's color, a distancing from the graspable three-dimensionality of reality, the world or life as bare, a shadow of its former self.<sup>5</sup> Perhaps Reiniger's animation steps toward satisfying the needs of a new audience—composed of those who Georg Simmel had earlier termed the "blasé" type of industrialized modernity, for whom overstimulation promotes a withdrawal from the distinctions between things—in order to favor that which is homogenous.<sup>6</sup> Perhaps this withdrawal anticipates what Herbert Marcuse would later call the "One Dimensional Man."<sup>7</sup> Arguably, Reiniger's animation dramatizes a local, historical alienation of life through mobilization of its shadow forms by unseen hands and unseen technologies. Except, sometimes, the scissors make their appearance—and they reveal the whole confection to be a dance of light and paper and agile hands. Snip snip: the film is made of cuts. The film presents, through another nature, a sidelong reflection on ours.

Perhaps it is also true that the animation had nothing specifically to do with 1923. Animation, the one by Reiniger, just like countless others, always asks the viewer to take a leap out of now, out of physics, out of time, out of this world, in short, a leap of faith, to don the seven-league boots of folklore and replace the substance with the silhouette, the shadow. Animation is not a depiction of a recognizable world. The mission of animation is often to tarry with the shadow side, the "night side of nature," that obscured realm in which all unexplained and magical, illogical events occur.<sup>8</sup> Animation goes, in all its superficiality, deeply

into the substance of being, the hidden realms, the crevices beneath usual exposure, the constructions and reconstructions. Animation as the visualization of the shadow side is also an allegory of filmic actuality, albeit a truth that film most usually works to obscure. For film, the secret must be maintained: film asks viewers to believe in those shadows cavorting in two dimensions on the flat screen in the “kingdom of shadows,” who all too often seem to live for us.<sup>9</sup> Film is the unknowing suspension of disbelief in stand-ins, doppelgangers, avatars, things that only pretend to be real, full-blooded, breathing, but are in fact chemical confections, celluloid compositions. Which is also to say, film is and has always been just a subset of animation—in contrast to how critics presented the relation—if animation is understood to be the inputting of life, or the inputting of the illusion of life, into that which is flat or inert or a model or an image. Reiniger, intentionally or not, made an emblem of this spectacularity, in a cine-world that was also incidentally—with the victories of the culture industry—flattening out into platitudes, façades, surfaces, and flimsiness. In giving the shadows delicate life, she made a virtue of film’s flimsy flattening, decried its dull mimetics, and opened it, through animation, onto fantastic speculation and the possibility of revelation.

### **Telling Fairy Tales**

In “Better Castles in the Sky,” an essay from 1959 in *The Utopian Function of Art and Literature*, Ernst Bloch wrote of how clouds are a “fairy tale qualit[y] of nature.”<sup>10</sup> They are, so think children, “distant mountains,” entities in “a towering and wonderful foreign land above our heads,” a Switzerland in the sky. The cloud is not only a “castle or ice-mountain to the fairy tale gaze.” It is also an “island in the sea of heaven or a ship, and the blue skies on which it sails resemble the ocean.” In the child’s mind, the fluffy clouds turn into solid mountains. The airy blue sky is imagination’s watery sea. The heavens are like a mirror, reflecting the Earth’s inversion. All this transformation is a fundamentally animational principle. And so, if down below on earth is the world of body and action, then up there above is the world of mind, thought, imagination, and other histories, including better ones. Clouds are the fuzzy matter of utopian speculation for Bloch. They are moving screens onto which can be projected a revolutionary “not yet,” the contents of an unbounded “anticipatory consciousness.” This anticipatory consciousness as cloud is the antithesis of the clouds that Leni Riefenstahl allows to frame Hitler

in *Triumph of the Will* (1935). These filmic clouds are the backdrop for one who is to be seen as a new god come down to earth from his airplane. The nebulous clouds of blue-sky thinking are also unlike the swastika-shaped clouds of Nutzi Land, projected by Disney in *Der Fuehrer's Face* (1942). But these Nutzi clouds, in their twisting of nature into political form, do illustrate an astute recognition that even, or especially, nature is not immune from the fascist colonizing impulse. The cloudscape, castles and mountains in the sky, the crystals of ice that make up those clouds—these are the indistinct, magical, fuzzy places of waiting and longing. For Bloch, the vague awareness of a liberated life that blurrily takes shape in our daydreams is a stimulus for the real-world political action that seeks to fix the wishes. In his revolutionary eschatology, the clouds themselves are to be brought back down to earth. Our new, improved selves, lives, and political arrangements will roll in from the clouds and lodge on our ground—and not as Hitler's airplane does, as spectacle. Animation is the medium that allows for a dramatization of a skirmish with nature. This skirmish is not the fascistic one of subjugation. It is rather a wrestling with what is natural about nature, and what is historical, which is to say, changeable, about it. In the cartoon world, people, buildings, cars, and other inanimate objects swell suddenly, or run away, talk and leap, fly and fall without pain. Cartoons and trick films produced to entertain the city hoards were experimental and crazy from the start, using cinematic tricks and visual gags that defied logic. It was all these aspects of transformation, transmutation, alogicality, antiphysics, and nonrealism that appealed to the many intellectuals and artists—Dadaists and revolutionaries in Europe foremost among them—who fell in love with cartoon product and the outputs of American popular modernity in the first half of the twentieth century. Early comic strips and young animation processes broke open the self-understanding of the image, fracturing it into absurdism. In the cartoon world, all the laws of physics are defied or mocked. Even physics—the science of physical experience in the world—is made provisional. In animated nature, technology and magic are one.

The animated world is one in which nature is remolded, made different. Cartoons, modernized versions of folk and fairy tales, mobilize this nature in their presentation of overlively objects, or cows that turn into musical boxes, skirts that become parachutes when needed, or church steeples that crunch themselves up so that the crazy plane can avoid crashing into it with Mickey and Minnie Mouse on board. Animation reminds us of the life in other things that is like and unlike the life in

us. Taken as a document of utopian thinking, animation shows a nature that is reformulated according to imagination and social prompts from a world that could one day and in some form become ours. This animated nature may assume any form and usually does in its presentation of hybrids of human and animal, coagulations of machineries and bodies, scenarios in which natural law is overturned or maliciously asserted. As the expressionist director Paul Wegener put it in 1916 in a lecture attended by Reiniger, the aim for “absolute cinema,” an exploratory cinema beyond the subtheatrical version that threatened to dominate, was “a kind of cinema which would use nothing but moving surfaces, against which there would impinge events that would still participate in the natural world but transcend the lines and volumes of the natural.”<sup>11</sup> Animation appeared to fulfill this cultured wish.

Animation depicts a nature that is hybridized: speaking animals, flowers that blush, fruits that ripen in the blink of an eye, people who shrink and twist and deform and swell. Animation’s nature does not obey the laws of physics. Rain may fall upward. The sun may smile. But sometimes it is also just nature—redrawn and conceptualized, but mediated, with just a heightened element of drama, a potential that borders on the animistic. A shorthand version of such a definition of animation claims that animation is, in the phrases coined by Benjamin to describe the reproduced and constructed worlds of photography and film, “eine andere Natur” (different nature), an other nature.<sup>12</sup> Animation is “different nature” because its nature is of a different kind to the one we inhabit, and yet it is not distinct from it. Animation presents a parallel world. It presents a nature recognizable to us processed through concept, imagination, and technology. It is our nature returned back to us through mediations. Animated nature’s otherness is, by and large, not one of absolute difference. Instead it is an alternativity. Animation’s objects and images, drawn or modeled, are motile, flexible, open to possibility, and able to extend in any direction and undertake any action or none. Animation does not depict antinature, but “other nature,” which might indeed be the noninstrumentalized nature that we would commune with, were we not so far along the route to ecological disaster. Animation’s animistic approach to its objects awakens life and voice in stilled and silenced objects. It reinvents not only nature but our relationship with nature. It is therapeutic and utterly necessary. In “Experience and Poverty,” from 1933, Benjamin indicates Mickey Mouse’s ability to embody utopian aspiration for a technology-ravaged, yet technology-dependent, populace.<sup>13</sup> The existence of Mickey Mouse is labeled by

Benjamin a dream for today's people. Mickey Mouse's existence is full of miracles, and these miracles outdo technical wonders, and satirize them too. In Benjamin's view, Mickey Mouse enacts the wish for a harmonious reconciliation of technology and nature. The wish is born of an age in which technological change threatens to destabilize the existence of nature, including humans, and destroy all in spectacular acts of annihilation. But the compassionate union of technology and nature must be banished to the dreamtime world of comics and cinema, where machinery entertains and consoles humans, just as it dissects and recomposes images of humans, and the rest of the object and natural world. In the noncinematic world of industrial capitalism, technology and nature (in other words, machinery and humans) pursue different ends, are vectors of abuse and exploitation.

Sergei Eisenstein devised a category of "plasmaticness" that he evoked in order to stress the originary shape-shifting potential of the animated, the way in which an object or image, drawn or modeled, strains beyond itself, and can potentially adopt any form, thereby proposing an expansion beyond current constraints.<sup>14</sup> Where Benjamin observed the antiphysical, antinaturalist aspects of animation, Eisenstein focused on its renditions of the physical world. For Eisenstein, it was animated fire, which, he observes, "is capable of most fully conveying the dream of a flowing diversity of forms."<sup>15</sup> For Eisenstein, fire is formless. Fire is pure transformation. Fire is restless. It was the fire behind the mirror's mask in Disney's *Snow White and the Seven Dwarfs* (1937) that evoked these thoughts. Eisenstein's name for this mutability, echoing but altering Walter Benjamin's, is "non-indifferent nature."<sup>16</sup> Animation is for Eisenstein an ecstatic form. Its objects are ecstatic (which is to say, displaced or unstable), and it induces ecstasy in its viewers. It makes the viewers be besides themselves. Animation forces transition, a difference in quality. As Eisenstein puts it in *Non-indifferent Nature: Film and the Structure of Things* (1945): "To be beside oneself is unavoidably also a transition to something else, to something different in quality[,] . . . to be out of the usual balance and state, to move to a new state."<sup>17</sup> Such movement to a new state is made analogous to a physical process. If fire is a transformation, formless form, so too is water. Water may be steam, ice, liquid, and water is always passing between any of these states, when subjected to processes of heating, cooling, agitation, pressure, and so on. In *Non-indifferent Nature* Eisenstein states that "if water, steam, ice, and steel could psychologically register their own feelings at these critical *moments*—moments of achieving the leap, they would say

they are speaking with *pathos*, that they are in ecstasy.”<sup>18</sup> Animation is compelling because it is the “if” of water, steam, ice, and steel registering their own feelings at critical moments. The artist, at the same time, notes Eisenstein, creates “the necessary conditions”—specifically the construction of *pathos*—for the transformation of the spectator into an ecstatic state. It makes the viewer restless. This thought came from a man who had proposed “Kino-Fist,” an assault on the viewer, as the appropriate mode of a new political cinema.

Animated nature appeals to us pathetically, by inviting us into its particular world. Animated nature’s appeal is mediated via technology and is a shuttle between the image world of a new or second nature and us, who may be addressed as nature or as nature’s other. We are invited in for the duration of the show and the rattled and super-lively objects are to make us rattled and super-lively in turn. Animation’s small worlds propose certain stances on the part of viewers, encouraging them to be at least minimally alert to the ways of the image world unrolling before them, especially as it compares to the world in which they sit. They are aware too, on some, if only subliminal, level, of the differences within the image world, that is to say, the gaps between the cels or poses. These gaps, key to animation’s structure, enable the excessive or implausible movements that characterize animation and mark it as seemingly unlimited and full of infinite potential. The animated form presents a dynamic image world in which, in much the same way as Eisenstein describes the dialectical cinema that he hoped to develop as his contribution to postrevolutionary culture, there is manifested a condensation of tensions that appeals, or may appeal, in a particular and cognitive way to its viewers. This is because, in propelling the viewer from image to thought, from percept to concept, the animated form models the motion of thinking itself—such that viewers are invited to complete the film through an act of appropriation of its new, and subverted, nature.

## **Animation and Capital**

But it is not all mountains, clouds, flickering fires, and fairy tales. Animation—as Reiniger’s work intimated with its flat, dark figures—has its negative face. In fact, this account would all be fairy tale were there not something else that animation as form could absorb. Animation may not readily expose its links in a progressive history of unfolding forms, but it can absorb and retransmit the motive energies of its moment. Indeed, along with the trick in film, or special effects (e.g., montage,

superimposition, and negative printing), which is always in some way or another an introduction of animating principle into film, animation was the realm in which all sorts of experimenting artists found that they could develop a film language that communicated with and took hold of modernity. Through photographic media's barrage of special effects, Reiniger and Ruttman alike developed an animated language that spoke to modernity, to its objectifications, its abstractions, and its flattening out of everything to fit into the industrial template. In this they mapped out the parameters of a system that was experienced as abstract and rationalized. They also made the system dance and overturn itself. They stretched out its time and probed its space and logic. But this work was not limited to the art experimenters—and this is another appeal of the animated. Value is less of a paranoid concern for it. It is *animation*. Or it is *cartoon*. Or it is eye music, “living pictures,” “kinetische Lyrik,” “optical poetry,” or cinematic lyricism. At a premiere of Oskar Fischinger's *Study No. 12* in Berlin, the critic Bernhard Diebold gave a speech titled “The Future of Mickey Mouse.” If cinema was to be an art form, he argued, it needed animation, because that made possible a cinema that had broken free of a naturalistic template and conventional storylines. Animated film defied the inherited artistic genres. Animation was proposed as the medium to translate into movement Wassily Kandinsky's restful points and dynamic lines in tension. Animation is—or was—always outside the frame of bourgeoisified art, though oftentimes special pleading is made for it to be let in. And yet early critics and makers certainly sensed that more united than divided were the popular works of Disney or Max Fleischer and the absolute films, or artworks, of Hans Richter or Lotte Reiniger or Walter Ruttman or Oskar Fischinger, or indeed the many advertisements they all made.

Winsor McCay, from 1911 onward, tried his hand at animation. His comic strip *Little Nemo: Adventures in Slumberland* had thematically set the city in motion. His first animation transferred Little Nemo to the screen, tentatively. First we see live action, and we see the animators and the backers of the industry in its moment of formation inside the new structures of the supercity. Inside the boxes of offices in New York, men conspire to give flat shapes life and color. There is little narrative in this animation, which consists of an unmotivated, illogical squashing and stretching, enacting the very principle of cartooning. This animation could be described as an example of the optical illusion of movement, though it is honest about its source and does not seek to deceive. It might better be described as a rumination on the passage between

living and drawing, between lifelessness and life, identity and nonidentity. This animation is an image of the origin of animation itself. It is not the illusion of movement but, rather, presents movement itself, as a feat, rushing through the projector, the result here, as the film makes clear, of thousands of drawings and gallons of ink.

The motion generated in these first studio offices of mass cultural production could also be seen as a modeling of the dynamic, ever-changing forms of modernity, translated here into as lithe and as wild a form as the innovations of the prized treasures of high modernism. More specifically, the motion is a modeling of modern capital's motive force, the commodity economy, whose endless replications and innovations and commodity fetishism are analogously evident in the animated objects' push beyond their own static objectivity. Every week a new comic strip. Every month a new cartoon. The capitalist machine needs its supplies.

Animation's animatedness can be seen as a rendition of the apparent liveliness of commodity-fetishized objects. This is why advertisers loved cartoons from the start—that illusory hyperliveliness of objects, a topsy-turvy negation of the value that stems from labor. What is animation but objects coming seemingly to life, without human intervention, so it appears (but only appears—just as in commodity fetishism, the real source of value is obscured from usual view and knowledge). In the same way that commodities are correlated to exchange values, so too are those who make the commodities. Their energy, all that makes them alive, is directed toward making useful things, but it is also calibrated as abstract labor, as quantities of labor— $x$  amount of labor hours at  $y$  amount of cost carried out by  $z$ . Indeed it is significant that, stuck on his lonely desert island, Robinson Crusoe is much concerned with saving a ledger, a pen and ink, and a watch. To be the perfect capitalist he must keep a stock book of items, a record of their mode of manufacture, and, crucially, a note of “the labour-time that definite quantities of those objects have, on an average, cost him.”<sup>19</sup> But think what an animator does with the same equipment. Animation can be the realm in which such graphic rendition might make social forms available to knowledge, by redrawing or reshaping the rules, erasing the lines, twitching that which has become static, reconstructing or just constructing the movement, as a conscious afterimage of what we do and what the world does and what nature does daily and forever. Animation absorbs, digests, and reconfigures something of its moment of making.

## Cartoon Manifesto

Animation is subversive of nature, which has so often been mobilized as ideology. Animation is subversive of order, of logic, of stasis, of everything that would insist that things are so and must be so—the reactionary mode that has more latterly been labeled by politicians as *neorealism* and is partnered with neoliberalism. Animation is an art of metamorphosis, of transformation, and it is as if the ways in which the animated form shifts from one state to another proffers an inkling of a transformation that could be undergone by all—politically, socially. Therein lies the utopian axis of animation—motility and mobility is its propulsive force, its opening onto an infinite, antigravitational other-space. Animation is subversive of progress as understood in its ahuman, limited sense—as in the idea of endless perfectability in techniques and technologies. Animation does not necessarily eschew the low-tech. Animation is subversive of tastefulness—though it must be said that it has truly wormed its way into art galleries these days. Animation is subversive of itself—ever changing, ever shifting. Animation is subversive of separation. It is made and seen collectively. It unites the artisanal, the artistic, and the mechanical.

Animation has a history, naturally. Everything has a history, but, unlike film, animation, with its multiple forms (stop frame, puppet, drawn, CGI), with its low-tech and commercial practices, and with its multiple origins in zoetropes, zoopraxiscopes, shadow theater, flip-books, and the like, evokes a history that is as crowded and indistinct as a phantasmagoria. Animation does to history what it does to nature. Animation evokes history, plays with it, undermines it, subverts it, but it does not have it, just as it does not have nature. It has second nature. Or different nature. It has different history. It models the possibility of possibility.

## Notes

1. Benjamin, *The Work of Art in the Age of Its Technological Reproducibility, and Other Writings on Media*, 35.
2. “Disney Re-releasing Films in 3D: ‘Beauty & The Beast,’ ‘The Little Mermaid,’ Others Coming Back,” *Huffington Post*, October 4, 2011, accessed July 1, 2013, [www.huffingtonpost.com/2011/10/04/disney-re-releasing-films-3d\\_n\\_994701.html](http://www.huffingtonpost.com/2011/10/04/disney-re-releasing-films-3d_n_994701.html).
3. Ruttman quoted by Reiniger in Bendazzi, *Cartoons*, 33.
4. Benjamin, from a draft of “Imperial Panorama,” in *Gesammelte Schriften*, vol. IV.2, 934.

5. Simmel, "The Metropolis and Mental Life," 14.
6. Simmel, "The Metropolis and Mental Life," 14.
7. Marcuse, *One-Dimensional Man* (1964).
8. For example, see the nineteenth-century Romantic scientist Gotthilf Heinrich von Schubert's *Ansichten von der Nachtseite der Naturwissenschaft* (Views on the Night-Side of Natural Science) (Dresden: Arnold, 1808).
9. This is Maxim Gorky's description upon experiencing the Lumière Cinematographe in July 1896. Richard Taylor and Ian Christie, eds., *The Film Factory: Russian and Soviet Cinema in Documents, 1896–1939* (London: Routledge, 1994), 25–26.
10. Bloch, *The Utopian Function of Art and Literature*, 175.
11. Paul Wegener, from a lecture given on April 24, 1916, at an Easter Monday conference, and printed in Kai Möller, *Paul Wegener* (Hamburg: Rowohlt Verlag, 1954). Quoted in Eisner, *The Haunted Screen*, 33.
12. Benjamin, "Little History of Photography," in *Selected Writings, Volume 2*, 510, 512.
13. Benjamin, "Experience and Poverty," in *Selected Writings, Volume 2*, 734–35.
14. Eisenstein, *Eisenstein on Disney* (1988), 11.
15. Eisenstein, *Eisenstein on Disney* (1988), 24.
16. The phrase *non-indifferent nature* is to be found where Eisenstein found it: in Hegel, in his discussion of chemism in the *Science of Logic*, where it is crucial to a discussion of motion, transformation, and affinity in natural processes. G. W. F. Hegel, *Science of Logic* (Blackmask Online, 2001), 120–24.
17. Eisenstein, *Non-indifferent Nature*, 27.
18. Eisenstein, *Non-indifferent Nature*, 35–36.
19. See Marx, "The Fetishism of Commodities and the Secret Thereof," in *Capital* (Harmondsworth, UK: Penguin and New Left Review, 1976), 164–65.