

**THE CINEMATIC ANIMAL: ANIMAL LIFE, TECHNOLOGY, AND THE MOVING
IMAGE**

by

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Critical studies of animal life and the cinema tend toward the thematic and topical, in service of human themes. My dissertation, by contrast, addresses the absolute priority of animal subjects to the emergence of the cinema and the originary role of animal life in the technological development of the moving image. From Marey and Muybridge's pre-cinematic work to ethologists' early embrace of filmic technologies to contemporary digital and motion capture cinema, animal life continues to drive broad transformations in visual culture, technology, and bioethics. At the same time, I argue, the cinema and adjacent technologies have constitutively participated in a profound transformation of animal life, both materially and theoretically. As genetic and digital editing techniques converge, inherited conceptions of a natural animal displaced or endangered by industry have given way to one that passes not around but through capital. Popularly and scientifically, nonhuman life increasingly displays as artificial, engineered, and futuristic – a transformation I trace from Cold War cinema and its newfound ecological anxieties to contemporary biotech thrillers. In our era of CRISPR and transgenic therapeutics, life – animal, human, and otherwise – has never been more confused, and mediated, in both theory and practice. In this work, I aim to affirm the primacy of animal life to cinematic representation and the fundamental role of visual technologies in the definition of animal life.

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PREFACE

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INTRODUCTION: *ANIMAL LIFE, TECHNOLOGY, AND THE MOVING IMAGE*

Film, originally a scientific instrument, was born of the study of animal life. The first moving pictures were not incidentally *of* animals; animals *necessitated* film. The culmination of incremental advances in imaging, the camera and the projector emerged from the laboratory, not the theater – and its first subjects were animal, not human. Time-lapse films, microcinematographic studies, and short *curiosités* plucked from nature yielded scientific and popular films alike, though the one could not always be distinguished from the other. Trained to “trace the life of nature even in forms which no human observation really finds in the outer world,” as Hugo Münsterberg wrote in 1915, the camera, from the start, turned away from human affairs to embrace the problems animals posed for perception.¹ “Animals were not simply one photographic subject among many,” Matthew Brower reminds us. “They were one of the key subjects driving the technical development of photography. Human subjects adapted themselves to the technology of photography (e.g., wearing back braces for early portraits), whereas animal subjects necessitated the adaptation of photographic technology to their situation.”²

Though film and adjacent technologies were celebrated for giving access to nonhuman worlds and idealized for removing the “human hand,” as it was often put, from their mechanical expression, in traditional pre-histories of the cinema even Étienne-Jules Marey’s profound

¹ Hugo Münsterberg, *The Film: A Psychological Study* (New York: Dover Publications, 1970), 11.

² Matthew Brower, *Developing Animals: Wildlife and Early American Photography* (Minneapolis: University of Minnesota Press, 2011), 21.

preoccupation with animal life seems almost incidental to the instruments and techniques it furnished. Marey's work, however, was almost exclusively concerned with seeing *living* animals, and the technologies he devised were a means to that end. But from a pre-ethological rather than pre-cinematic perspective, Marey did not just capture phenomena invisible to human perception but synchronized the visual apparatus to animal bodies. An ethologist first, and filmmaker second, he surrounded himself with animal life. His lab was his home, an elaborate menagerie crammed with cages and aquariums, their inhabitants (frogs, turtles, insects) to be found roaming the property freely. "Everywhere," the photographer Nadar wrote after a visit, "in every corner, life."³

The first film theorists, too, marvelled over the camera's abandonment, rather than simulation, of human perspectives. Münsterberg, Epstein, Balázs, Kracauer wrote movingly of the cinema as a theater of life, in all its forms, and considered its technology ethological in spirit and report. "Democratic" in its treatment of objects on screen but "physiological" in its address to the spectator, the cinema was celebrated as a carnal, sensuous "biomedia," as Eugene Thacker might say, and the animal as "pre-mediated" – its body "*made for the process*," as one famous article on the X-ray put it.⁴ Given over completely to the apparatus, animal bodies became co-extensive with it, under a contract extant today and surely only augmented in our biotech era. Where Carl Jacoby's 1908 Pandidascope, an elaborate contrivance, once artificially sustained a frog's heart in order to project its image, today optogenetics illuminates living tissue genetically modified to irradiate. The animal on film has given way, quite literally, to film in the animal – its body '*made by the process*'.

³ Nadar, [Félix Tournachon], "Le Nouveau président de la Société Française de Photographie," *Paris-Photographe* 4 (1894): 4; quoted in Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830-1904)* (Chicago: University of Chicago Press, 1992), 4-5.

⁴ Alfred W. Porter, "The New Photography," *Strand Magazine* 67 (July 1896): 112. Emphasis in original.

Film's inaugural, material intervention in animal life, the subject of my first chapter, was far from peaceful, however. Medical, cinematic, and adjacent visual technologies operated freely and perniciously on their subjects, altering the calculus of life and introducing new forms of feeling and association. Film, in this era, as Kirsten Ostherr observes, treated "the animal's body as its own form of imaging device,"⁵ exacting through medicine *in situ* what the cinema otherwise manipulates as an image. Röntgen's X-rays, Jacoby's Pandidascope, Rudolph Janker's looped heartbeats, Pathé's cryogenic eel, and the French biologist Alexis Carrel's pioneering microcinematographic studies of chicken heart cells all contributed to what could be called the cinematization of animal life, "performing pathology through movements that become visible as organic special effects."⁶ Indeed, short scientific films, intended for clinical and popular audiences alike, submitted life to grisly acts, to furnish their recording, even as the psychological and physiological processes on display, and underlying the functioning of the filmic apparatus itself, could no longer be safely distinguished from those of the experimenters. Far from sublimating life to technology, however, each has absorbed the other, inviting us to rethink both. Troubling what is, or means, a body, the transportability and "repeatability" of media introduced by film, followed by the extension of animal bodies into the machine itself, reminds us that "what is extended, perhaps, is not the observer's senses but the living process of the body studied, and the epistemological domain of the apparatus in the generation of 'life'."⁷ This animal makes it hard to say where film ends and it begins.

*

⁵ Kirsten Ostherr, "The Entire Medical Profession is Becoming "Film Conscious": How Cinema Became Part of Medical Education," in *Medical Visions: Producing the Patient Through Film, Television, and Imaging Technologies* (New York, NY: Oxford University Press, 2013), 67.

⁶ Ibid.

⁷ Lisa Cartwright, *Screening the Body: Tracing Medicine's Visual Culture* (Minneapolis: University of Minnesota Press, 1995), 27.

Theories of spectatorship, perception, and embodiment present the obverse problem: how to preserve the distinction between not human and animal bodies but *experiences* – the very confusion of which, with the rise of the psychological sciences in the late nineteenth and early twentieth centuries, not only permitted the cinema to exist but dreamt of it through animal eyes. Indeed, this “new episteme and technology of vision” – of which “cinema is one important product,” Steven Shaviro notes – grounded the spectator *alongside* the animal of modernity: “in a materiality of the agitated flesh,” as a “lived body” or “sensate being.”⁸ What, then, was to become of the animal, who had long since suffered the vices that were now, suddenly, virtues? Where animal movement posed a problem for perception, animal perception presents a problem for phenomenology.

It is as if just when we had acquired the means to find ourselves proximate to animal life, confused with it, unable to distinguish our physiological processes, mental states, and behaviors from nonhuman ones, phenomenology intervened to determine which eyes and bodies make meaning, and which, as it were, merely receive or process sensation. Previously, the faculty of speech gave proof of subjectivity, interiority, and a rich mental life but now a physiological basis for the self would have to be culled from perceptual systems that could not be meaningfully distinguished from nonhuman ones. Moving image studies is one such adjudicator, I argue in my second chapter, permitting phenomenological principles to be ‘tested’, and their results linked to modes of recognition and subjectification that exceed, strictly speaking, the perception of forms on a screen. “Despite the old saying that suggests the democracy of vision,” Vivian Sobchack declares in *The Address of the Eye*, “a cat cannot look at a king for the very same reasons it

⁸ Steven Shaviro, *The Cinematic Body* (Minneapolis: University of Minnesota Press, 1993), 44.

cannot see a film.”⁹ Like the mythical naive first spectators of Lumière’s *L’Arrivée d’un train en gare de La Ciotat* (1896), who were rumored to dive out of its path, for Sobchack, “the screen exists for my cat like a pane of glass.”¹⁰ The consequences of an aversion to animal immersion, however, exceed internecine disciplinary squabbles. At this present moment, juridically no less than filmically, the legibility of visual representation to animal bodies is as indissociable from their political representation as the ‘dumb brute’ was to the Rights of Man.¹¹ Regulatory protections are now directly linked to species’ demonstration of what biopsychologist Gordon Gallup famously identified as a desire for “complete control over the behavior of the image,” and thus over oneself.¹²

Though Sobchack’s armchair observation that aesthetic and political representation are biologically indissociable, and as such unavailable to nonhuman animals, invites demonstration “that the animal is already political,”¹³ in my second chapter, rather, I examine the paramount role of the screen, the cinema, and visual technologies in staging their disavowal. In equating the screen, as a “place of representation,” with politics and power, Sobchack’s refusal might, then, also be seen as an invitation or opening: to reconsider – perhaps with what Eva Hayward called “fingeryeyes”¹⁴ – not only the biological nature of the “interpretive strategies” and modes of “self-consciousness” for which she finds animals lacking but also the political strategies of recognition and inclusion for which the perceptual performance of the spectator is decisive.

⁹ Vivian Sobchack, *The Address of the Eye: A Phenomenology of Film Experience* (Princeton: Princeton University Press, 1991), 53.

¹⁰ Ibid.

¹¹ Pierre Serna, “The Rights of Man and the Rights of Animality at the End of the Eighteenth Century,” in *Gorgeous Beasts: Animal Bodies in Historical Perspective*, ed. Joan B. Landes, Paula Young Lee, and Paul Youngquist (University Park: The Pennsylvania State University Press, 2012).

¹² Gordon G. Gallup, Jr., “Mirrors, minds, and cetaceans,” *Consciousness and Cognition* 4, no. 2 (June 1995): 226.

¹³ Jacques Derrida, *The Beast and the Sovereign: Volume 1*, tr. Geoffrey Bennington (Chicago: The University of Chicago Press, 2009), 18.

¹⁴ Eva Hayward, “Fingeryeyes: Impressions of Cup Corals,” *Cultural Anthropology* 25, no. 4 (November 2010): 577–599.

To that end, beginning with Konrad Lorenz and Niko Tinbergen's studies of animal perception in the 1930s, and concluding with contemporary digital constructions of moving images for nonhuman perceptual systems, I counterpose the use of film by ethologists, and their provisioning of cinematic concepts to articulate animal behavior, against the often crude or simplistic notions of animal vision invoked in theories of indexicality, representation, and immersion. Indeed, the origins of ethology and cinema here coincide acutely, forming a cineloop of their own: if the cinema was born of the study of animal movement, then ethology, the study of animal behavior, was born of the cinema.

Isolated against a black backdrop to better measure their gait, Marey's animals aspire to a solitary, repetitive, perpetual motion. For Lorenz and Tinbergen it is just the opposite. They want to make visible *behavior*, not movement; activities rather than anatomy; elicitation rather than locomotion. Thus, with Lorenz and Tinbergen, the animal movement that Marey had slowed to make visible, in a sense recedes – to further articulations and complex sequences of actions. Further, where Marey and Muybridge slowed animal movement to observe it, Lorenz and Tinbergen compared such results – across films, behaviors, species, anatomies – to isolate the mechanisms of animal perception itself. With Lorenz and Tinbergen, animals thus pass quietly from object to subject, from movement to perception: or rather, behavior subsumes movement as a function of the visual field, the structures of which filmic technologies were uniquely disposed to identify – and embody.

While the affective turn of film scholarship heralded by Sobchack's work otherwise invites the dismantling of consciousness, as a transcendental signifier of mastery, into a complex distribution of physiological, affective, and attentive processes, the question of an animal spectator, or the prospect of spectatorship collapsing animal and human bodies, would seem to

have inspired its limited recuperation. Indeed, if “a species cinema,” as Inga Pollmann remarks, “sounds like a crazy idea,”¹⁵ it’s in part because we forget that all cinema is *special*, and the psychophysiological signature of its apparatus necessarily self-effacing. Opposite Sobchack’s ontological formulation of the image as inherently and exclusively human, I trace an alternate tradition of theorizing the cinema as an affective machine that links the spectator to forms of immersion and embodiment common to broad iterations of life and implicit to diverse modes of perception. From Christian Metz’s concept of the cinematic apparatus as a *juxtastructure*, “in which are expressed, in the last analysis, certain characteristics of man as an animal,”¹⁶ to the Surrealist theorist Roger Caillois’ concept of *teleplasty*, in which the body itself is constituted by its environment as a “genuine photography” – that is, a “photography of shape and relief, on the order of objects and not of images”¹⁷ – I demonstrate how the screen, the mirror, and glass mark out a naturalized optics that serves to artificially delimit and obscure a more robust concept of a “film body.”

*

While recognizing that the identification of the animal with the material body risks further naturalizing the animal, in this work I wish to attend to animals as they have become, *after* nature, and not as they were, before industry or capital. In traditional accounts, the animal is either “placed in a receding past” – for John Berger, famously, the “widespread commercial diffusion of animal imagery [...] began as animals started to be withdrawn from daily life”¹⁸ – or

¹⁵ Inga Pollmann, “Invisible Worlds, Visible, Uexküll’s *Umwelt*, Film, and Film Theory,” *Critical Inquiry* 39, no. 4 (Summer 2013): 801.

¹⁶ Christian Metz, *The Imaginary Signifier: Psychoanalysis and the Cinema* (Bloomington: Indiana University Press, 1982), 20.

¹⁷ Roger Caillois, “Mimicry and Legendary Psychasthenia,” in *The Edge of Surrealism: A Roger Caillois Reader*, ed. Claudine Frank (Durham: Duke University Press, 2003), 96.

¹⁸ John Berger, “Why Look At Animals?” in *About Looking* (New York: Pantheon Books, 1980), 22, 26. “What man

else, as Akira Lippit writes in rejoinder, it is to be confined to “a state of *perpetual vanishing*.”¹⁹ A refugee from nature yet also absent from daily life, this animal, forever on its deathbed, is a “derealized figure of a *passing*,”²⁰ one paw always in the grave of history. The laboratory animal, the subject of my third chapter, traces a path altogether different: through, rather than beyond, capital. Bioengineered and quite unendangered, the lab animal is ahead of its time, not remembered. In the biotech lab, reversing a regime established over centuries, the animal exceeds its historic immutable nature – as an unchanging if vanishing denizen of the woods – and becomes futuristic and unmournable.

Between the domesticity of the pet and the industrial regimentation of the farm animal, creeps the lab creature, submitted to untold, creative violences yet also cared for, by law. For this animal, the postwar period marks an uncertain historical moment between two regimes of representation: after the collapse of an antivivisectionist iconography, but before the cinematic tableaux of bioengineering and genetics had been firmly established – the subject of my last chapter. The shift to big science – multinational pharmaceutical companies, industrial-scale factory farms, government-funded research-driven medical institutions – both popularized the laboratory animal and detached its image from what increasingly seemed an antiquated milieu: of solitary scientist and medical specimen, sadistic surgeon and helpless animal. After *King Kong* (1933) and *Godzilla* (1954), everything gets bigger and clunkier: the animals, the lab, the

has to do in order to transcend the animal, to transcend the mechanical within himself, and what his unique spirituality leads to, is often anguish. And so, by comparison and despite the model of the machine, the animal seems to enjoy a kind of innocence. The animal has been emptied of experience and secrets, and this new invented ‘innocence’ begins to provoke in man a kind of nostalgia. For the first time, animals are placed in a receding past.” (21–22)

¹⁹ Akira M. Lippit, *Electric Animal: Toward a Rhetoric of Wildlife* (Minneapolis: University of Minnesota Press, 2000), 1.

²⁰ Thangam Ravindranathan, “Unequal Metrics: Animals Passing in La Fontaine, Poe, and Chevillard,” *differences* 24, no. 3 (2014): 1. “Whether naively eavesdropping at the door, criminally entering an apartment, or tragically exiting the world, the animal is somehow always not yet or no longer in the place of accountable agency that a narrative might bear.”

science. Instead of the lone, sadistic scientist exiled for his transgressions, a state-sponsored military-industrial complex adopts his cause, institutionalizes his dream, and creates a monster. In a sense, these films express the obverse side of primitivist armchair anthropology: in the experimental laboratory, nature is to be improved upon, not arrested, and evolution artificially induced, not aborted.

Just as these films undermine the fantasy of an isolated lab protected from global and ecological effects, they also turn inward, exacting experiments on the mind and identity rather than the body and the flesh. Where Victorian era “butcher-surgeons” could once take refuge in an official refusal of animal subjectivity, now they must embrace and even employ it, leading to agonizing disavowals and difficult rationalizations on the part of the “animal technician” – a new figure, in film and law alike. Postwar films center on this character, infusing their visages with a tortured bewilderment that less resolves than expresses through suspension the impossible place furnished for animal life today: surrogate but savage, expensive but expendable, neither living nor dead.

Representing a vast share of the global economy, the regulation and representation of the medical animal is as such indissociable from the history of political economy. Over modernity broadly, and the post-Fordist era dramatically, biomedical and political economies have manifestly converged – such that today, in contrast to only a generation ago, we can speak with certainty of an “ecology without nature,” as Timothy Morton describes it, or else, to borrow Donna Haraway’s appropriately ugly neologism, *natureculture*, that irreducible entanglement of “embodied being and environing world.”²¹ Indeed, as “the realms of biological (re)production and capital accumulation move closer together,” Melinda Cooper observes, “it is becoming

²¹ Don Ihde, quoted in Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2008), 249.

difficult to think about the life sciences without invoking the traditional concepts of political economy – production, value, growth, crisis, resistance, and revolution.”²²

But if “the expansion of commercial processes into the sphere of ‘life itself’ has a troubling effect on the self-evidence of traditional economic categories, compelling us to rethink their scope in dialogue with the life sciences themselves,”²³ we need also to rethink the bodies through which this dialogue is announced and rehearsed. In my third chapter, I trace the ways in which this transformation of the animal depends upon the laboratory as a “theater” that has, like moving image mediums broadly, seen its fourth wall breached. In the way that the moviegoer’s dark theater forms a powerful figure for film theory – Jean-Louis Baudry’s *apparatus*, Christian Metz’s *voyeur*, and Laura Mulvey’s *gaze* each in some way relies upon it – we might consider the laboratory as something more than a space. As with the spectator or voyeur, the reconception of animal feeling as irreducible and authentic served to confirm not just animal pain but *pleasure*. Indeed, as “veterinary behavioral pharmacologists have pointed out,” Cary Wolfe reminds us, “because Prozac, Paxil, and other drugs were tested for efficacy in laboratory animals long before they were prescribed to humans, ‘You can plausibly argue ... that humans are in fact using animal drugs’ and not the other way around.”²⁴

Concerns with limitations in theories of biopolitics and traditional histories of biotechnology and the cinema converge in this chapter in readings of George Romero’s *Monkey Shines* (1988) and Rupert Wyatt’s *Rise of the Planet of the Apes* (2011), before turning to a consideration of animal sexuality and its cinematic expression. If the laboratory was once able to

²² Melinda Cooper, *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era* (Seattle: University of Washington Press, 2008), 3.

²³ Cooper, *Life as Surplus*, 3.

²⁴ Cary Wolfe, *Before the Law: Humans and Other Animals in a Biopolitical Frame* (Chicago: University of Chicago Press, 2013), 54.

function as an autonomous site relatively free from social and economic intervention, here it has become necessary to employ the family, the individual, and the social directly *as* the laboratory. These films, which bridge the cold war and contemporary eras, dramatically match the animal's promotion to *quintessential* subject status with an equal and opposite animalization of the home, where the family itself becomes a lab by other means. Subject to a total and intimate intervention in its life and sexuality, on the one hand, and a cold, regimented objectification of its body, on the other, the lab animal eludes traditional theories of power otherwise appropriate to human affairs. If "animals are missing in Foucault's landscape," for example, it is because, as Paola Cavalieri argues, his histories of sexuality and power tend to use animals as "merely a metaphor for, or as a parallel to, the condition of the 'other' – that is, human – beings."²⁵

Animals, then, to be more precise, are less missing from models of power and the subject than they articulate its figures and subtend their organization. Indeed, the animal construed by this discourse is less a pure figure of power than power *figured*. "It can hardly be debated, I think," Cary Wolfe says with some hesitation, "that 'the animal' is, today – and on a scale unprecedented in human history – the site of the very ur-form of that *dispositif* and the face of its most unchecked, nightmarish effects."²⁶ Represented as solitary, thoroughly corporeal, and meticulously controlled from the cage to the bolt gun, the animal of biopolitics theory appears *miraculously*, without sociality or kinship, and as if sprung directly from the forehead of *zoe* itself. However, to merely extend the umbrella of biopolitics to include animals as subjects when

²⁵ Paola Cavalieri, "A Missed Opportunity: Humanism, Anti-humanism and the Animal Question," in *Animal Subjects: An Ethical Reader in a Posthuman World*, ed. Jodey Castricano (Waterloo: Wilfrid Laurier University Press, 2008), 100.

²⁶ Cary Wolfe, *Before the Law: Humans and Other Animals in a Biopolitical Frame* (Chicago: University of Chicago Press, 2013), 46.

they are not, an animal biopolitics *within* animal social structures risks becoming invisible or, worse, unthinkable. The lab animal melodrama, I argue, offers an alternative *animal* biopolitics.

*

Digital renderings of the animal, profligate in the popular imaginary, here converge, I argue in my fourth and final chapter, with the genetic logics they at once express and inspire, smashing open the cages of the western bestiary and giving rise to new forms that no longer need to hide on the island laboratories of exiled Dr. Moreaus or John Hammonds but are rather the rule and future of life itself, sanctioned by science and decorated as art. This animal is not the natural animal mourned but the one we find waking from that dream without nostalgia or yearning. Confronted with this creature, whose body eludes nature and whose image converges with its means of production, we rightly struggle to render it legible.

Indeed, ‘reading for animals’ too often involves little more than reading for faces, or rather for “defacement,” as when Nancy Anderson combs French physiologist Louis-Antoine Ranvier’s texts for missing visages,²⁷ or when Una Chaudhuri asks, with mock facility, “How to perform animals out of facelessness?”²⁸ The notion that the face and its representation, or absence therefrom, allegorizes power relations in such a doggedly literal fashion presents, it seems to me, a highly limiting model of the politics of animal representation – especially when we consider that the animal does not emote or express primarily through its face. From Jacques de Sève, the great French illustrator of Buffon’s *Histoire naturelle*, to Darwin to Marey & Muybridge to contemporary digital studios like Weta and Rhythm & Hues, the problem of

²⁷ Nancy Anderson, “Facing Animals in the Laboratory: Lessons of Nineteenth-Century Medical School Microscopy Manuals,” in *The Educated Eye: Visual Culture and Pedagogy in the Life Sciences*, ed. Nancy Anderson and Michael R. Dietrich (Lebanon, NH: Dartmouth College Press, 2012), 48.

²⁸ Una Chaudhuri, “(De)Facing the Animals: Zooësis and Performance,” *TDR/The Drama Review* 51, no. 1 (Spring 2007): 12.

animal expression is a problem of its body and movement – not the face but fur, not gaze but figure. For a representational regime that takes “the face to be the figure of *appearance*, the appearance of appearance, the figure of figuration,”²⁹ animal *embodiment* will be mistaken for defacement. We need to resist this notion and ask what a regime of images faithful to animal expression, rather than to the human form, looks like.

In conclusion, looking back, these three moments, I argue, belong together, refer implicitly to each other, and describe a trajectory united by their essential if not inaugural role in three origins: cinema, ethology, and the digital. While it is commonplace to regard chronophotography as a precursor to motion capture – “Motion capture is Marey brought to the digital,”³⁰ as Stephen Mamber puts it – the development and orientation of both technologies around almost exclusively animal subjects remains conspicuously overlooked in digital cinema scholarship. Like Marey’s Paris workshop, Weta and R&H, the two leading studios for VFX “creatures,” are also laboratories for applied ethology. Zoologists, then and now, work on set, shape the production, and prevail upon its story.

What, then, does it mean for cinema that its origin and future – chronophotography and motion capture – depend on visual technologies devised to capture not just movement but animal movement? Just as, for Marey, chronophotography was a *means* for seeing and isolating the anatomy of animal movement, for Weta and R&H, modeling is driven and advanced by almost exclusively animal problems: how to render animal movement, muscles, skin, eyes, fur – in short, the physiological events of animal bodies that escape human vision. Indeed, for visual effects departments, the animal’s body *is* its performance. Joe Letteri, supervisor of the digital

²⁹ Michael Taussig, *Defacement: Public Secrecy and the Labor of the Negative* (Stanford: Stanford University Press, 1999), 3.

³⁰ Stephen Mamber, “Marey, the analytic, and the digital,” in *Allegories of Communication: Intermedial Concerns from Cinema to the Digital*, ed. John Fullerton and Jan Olsson (Rome: John Libbey, 2004), 89.

creation of the apes for Weta, describes the production of Caesar as a physiological performance: or rather, a performance *of* physiology. “We have a model for how the fat layer combines with the muscles. We talk about how the skin slides over muscles, the combination of skin and muscles moving together, counter to each other.”³¹

Following Laura Marks’ study of *The Skin of the Film*, I propose in this chapter a corresponding *fur of the film*, and examine its purchase on the representation of animal emotiveness and embodiment – a possibility Jennifer Barker seizes upon, in passing, in *The Tactile Eye*. “If we take ‘skin’ to mean the literal fleshy covering of a human or animal body,” she writes, “then a film couldn’t possibly have a skin. But if, as Merleau-Ponty said of touch, ‘skin’ also denotes a general style of being in the world, and if skin is not merely a biological or material entity but also a mode of perception and expression that forms the surface of a body, then film can indeed be said to have a skin.”³² Just as the countenance of the animal is the body not the face, the skin of the film, in this context, is fur – and its ‘style of being in the world’, nonhuman.

Like Marey’s chronophotographic studies and Lorenz’s analyses of behavioral components, VFX creatures make visible animal movements otherwise inaccessible to the camera. Far from effacing animal bodies or rendering them virtually immaterial, however, visual effects permits animals to be performed with a commitment unavailable to live action production. From a strict Bazinian perspective, it could scarcely be imagined that inroads to animal authenticity would pass not around but through such attractions. Indeed, for the same reasons, described in my first chapter, that render animal labor ineligible for scientific

³¹ “VFX Supe Joe Letteri on *Rise of the Planet of the Apes*,” StudioDaily, February 17, 2012.

³² Jennifer M. Barker, *The Tactile Eye: Touch and the Cinematic Experience* (Berkeley: University of California Press, 2009), 26.

management, animal actors can only be filmed within rather specific, and limiting, conditions – conditions they hence auto-naturalize, rendering the fictive non-fictive and the theatrical real.

From montagist constructions of animal behavior to digitally rendered chimeras, the animal, I argue, tracks a dissolution or decomposition, not into an anthropological economy but into an ecological order that exceeds it, swallowing the screen and animating its elements. Both Dren (Delphine Chaneac) of *Splice* and Caesar (Andy Serkis) of *Rise of the Planet of the Apes* explicitly, and in a sense finally, confuse the human and the animal. Do these films then signal a new kind of animal, one that is molecularly unstable, genetically modified, and more allied with the virus and contagion – which is to say, death itself – than the human? The more recent *genetic* lab animal films are perhaps defined by this alliance, between the animal and a molecular, or otherwise invisible, interiority or composition that overtakes it. Is the animal disappearing into the folds of an increasingly autonomous simulation that no longer even requires the animal, much less animal actors, or do these procedures represent a stunning convergence of human and animal identities – the final collapse of the great chain of being?

*

Cinema broadly and digital cinema dramatically have upended the representation of animals, and restored their agency to the means of their production. For millennia, animal typologies expressed through crude and capricious symbols – the fox is sly, the snake sneaky – have figured, as such, limitation itself: indeed, the very creatures excluded by models of behavior, truth, consciousness also represent its doctrines. From philosophical axioms (e.g. Buridan's ass) to psychological principles (e.g. Jungian archetypes) to even filmic terms for camera movement (e.g. swooping), the history of representing human personae, physiques, and behaviors as animal species is an ocean so deep, and out of which nearly all tributaries of thought

yet spring, it scarcely seems possible to probe its floor without drowning. Before even the question of animal performance can be raised, cats in Jean Vigo's films, birds in Hitchcock's, dogs in Aki Kaurismäki, the vast menagerie of Yorgos Lanthimos's corpus all express, however deftly, a long, crude accumulation of *special* affects that draw their power not from animal behavior or psychology, strictly speaking, but from form and aesthetic. *L'Atalante's* (1934) "unpredictable cats,"³³ as Dudley Andrew calls them, occupy every position in the film – and not least of which erotic ones, as when the blood drawn from Jean's (Jean Dasté) cheek by two cats who scratch him stirs Juliette, who caresses his wound before leading him to bed.

If you look closely, as Brian Thill does, at the flocks of "instrumental birds" sprinkled over sweeping, digital shots of tumultuous vistas, their purpose eludes determination. A "set-dressing in cackling, aggregate form," they attest less to the "sublime scale and power of the geologic world" than to an "emaciated natural world, a minor nature, beautifully and even lovingly rendered, but always subordinated to the comings and goings of man, the living object who matters."³⁴ Critics rightly struggle to find decisive meaning in such animal apparitions. Stranded between ornament and character, symbol and plot, cinematic animals that serve no definite narrative purpose demand explanation – which can always in the last resort be secured in biography, as when Graham Fuller speculates, across wild ellipses, that "the cats were a personal touch – Vigo's memory of the pets beloved by his anarchist father, Miguel Almereyda, who died in prison in 1917 – probably murdered – when his son was 12."³⁵

Everywhere, the inventory of animals fails to add up, or else is perpetually undermined

³³ Dudley Andrew, *Mists of Regret: Culture and Sensibility in Classic French Film* (Princeton: Princeton University Press, 1995), 72.

³⁴ Brian Thill, "Fake Birds on Film: The nature of unspecial effects, an Object Lesson," *The Atlantic*, August 5, 2013.

³⁵ Graham Fuller, "Jean Vigo: Artist of the Floating World," *Sight and Sound* (February 2012). See also: Mike D'Angelo, "The cats, not the cast, draw viewers' eyes in Jean Vigo's classic *L'Atalante*," *A/V Club*, April 8, 2013.

by the prospect of an unbalanced sheet. Thus, Girish Shambu writes of Aki Kaurismäki's films: "A cat', Chris Marker once said, 'is never on the side of power'; we could say the same for dogs in Kaurismäki," which appear in all of his films – although, he admits, "their appearances are, in fact, extraordinarily brief."³⁶ Citing Luc Sante, Shambu is certain that dogs are "never there for merely decorative purposes," but even so, "in early Kaurismäki, dogs are not individuated — they appear briefly, and purely for symbolic import." The difficulty in determining the level at which animals function in a film remains undiminished when they fill the screen. Even in an oeuvre ostensibly populated by and dedicated to animals, discovering any way in which their figuration also figures animality proves elusive. Of Yorgos Lanthimos's films, and the recent wave of Greek cinema generally, Rosalind Galt observes the paradox that "animality is a key way in which these films articulate subjectivity, power, and social relations, and yet it is not at all clear that they speak directly about animals."³⁷ Nor, then, might they speak 'directly' of power?

Still, recognition of the perplexing indifference to animal life that haunts animal symbolism is no more an implicitly pejorative act of criticism than is the cinematic deployment of animal symbols as a shorthand for human affects and situations. On the contrary, the sheer ubiquity – and persistence – of animal symbols across all art, and across surely every culture, forms the clearest proof of animals' indispensability to the stories we tell of ourselves. When placed, Deleuze writes, in a generic, and often artificial, milieu – "a comic opera kingdom, a studio forest, or marsh" – "here the characters are like animals: the fashionable gentleman a bird of prey, the lover a goat, the poor man a hyena. This is not because they have their form or behaviour, but because their acts are prior to all differentiation between the human and the

³⁶ Girish Shambu, "Aki Kaurismäki's films always go to the dogs," *The Review (TIFF)*, December 9, 2017.

³⁷ Rosalind Galt, "The Animal Logic of Contemporary Greek Cinema," *Framework: The Journal of Cinema and Media* 47, No. 1–2 (Spring/Fall 2017): 7.

animal. These are human animals. And this indeed is the impulse: the energy which seizes fragments in the originary world.”³⁸ In this work, over four chapters, I will trace this energy, from the laboratory to the theater, across the screen and behind it.

³⁸ Gilles Deleuze, *Cinema 1: The Movement-Image*, tr. Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1986), 128.

1.0 REMORSELESS MOVEMENT: ANIMAL MATTER AND MOTION AT THE ORIGIN OF THE CINEMA

“The animal in its box is sure of its secrets, it has become a monster of impenetrable physiognomy.”³⁹

Gaston Bachelard, *Poetics of Space*

Either a “history of animals” is, as Erica Fudge insists, “impossible,”⁴⁰ insofar as all records, all documents, all writing, are human; or else, as Linda Williams submits, the animal’s “deep genealogies in Western thought” belong to a “longue durée that exceeds the limits of modernity,”⁴¹ rendering their story a shimmer on the surface of otherwise human affairs. Without past or future, “without boredom and dissimulation,” this “animal, which is quite unhistorical, and dwells within a horizon reduced almost to a point,”⁴² flits across the pages of history, asleep to itself and protected, in body and being, from our fables and fantasies.

Wolves out in nature [*dans la nature*] as we say, real wolves are the same on this side or the other side of the Pyrenees or the Alps; but the figures of the wolf belong to cultures, nations, languages, myths, fables, fantasies, histories.

³⁹ Gaston Bachelard, *Poetics of Space*, tr. Maria Jolas (Boston: Beacon Press, 1994), 134.

⁴⁰ Erica Fudge, “A Left-handed Blow: Writing the History of Animals,” in *Representing Animals: Theories of Contemporary Culture*, ed. Nigel Rothfels (Bloomington: Indiana University Press, 2002), 6: “but it is not the history of animals; such a thing is impossible.”

⁴¹ Linda Williams, “Modernity and the *Other* Body: The Human Contract with Mute Animality,” in *The Future of Flesh: A Cultural Survey of the Body*, ed. Zoe Detsi-Diamanti, Katerina Kitsi-Mitakou, and Effie Yiannopoulou (New York: Palgrave MacMillan, 2009), 221.

⁴² Friedrich Nietzsche, “On the Uses and Disadvantages of History for Life,” in *Untimely Meditations*, ed. Daniel Breazeale, tr. R. J. Hollingdale (Cambridge: Cambridge University Press, 1997), 63.

Though they still may, “without asking permission,” Derrida recognizes, “cross humankind’s national and institutional frontiers, and his sovereign nation-states,” we do not, it would seem, cross theirs.⁴³ For the modern animal – diminished in number, unaffected in being – only “technological media, exemplified by photography and cinema, provide a destination for the animal trajectory.”⁴⁴ Cut off from the very histories, cultures, and institutions that “disperse” them, the animal and its image belong in the end to “the same remorseless movement.”⁴⁵

How could it be otherwise when, as Mary Henninger-Voss intones, the “very inability of animals to participate in their own representation makes their activities and uses a matter of human interpretation and will”?⁴⁶ The rats of Kim Jones’ infamous *Rat Piece*, doused with lighter fluid and set ablaze before an audience on February 17, 1976, might have felt differently – as did, no doubt, the late Bart the Bear, perhaps the greatest of animal actors. If a theory of the representation of animals is to do more than preclude their participation, we need a historiography of the animal committed to recognizing their agency across all mediums – film, above all. “For there to be an animal-made mark, the animal has to be present, and has to participate actively (if unwittingly),” Steve Baker observes. “What is performed through its presence and recorded in its marks is precisely that animal’s reality.”⁴⁷ And if ever the body and performance of nonhuman life is preserved as a *trace*, it is on the screen. Indeed, film itself was

⁴³ Jacques Derrida, *The Beast and the Sovereign: Volume 1*, ed. Michel Lisse, Marie-Louise Mallet, and Ginette Michaud, tr. Geoffrey Bennington (Chicago: The University of Chicago Press, 2009), 4–5.

⁴⁴ Akira Mizuta Lippit, *Electric Animal: Toward a Rhetoric of Wildlife* (Minneapolis: University of Minnesota Press, 2000), 161.

⁴⁵ John Berger, “Why Look At Animals?,” in *About Looking* (New York: Pantheon Books, 1980), 26. “Zoos, realistic animal toys and the widespread commercial diffusion of animal imagery, all began as animals started to be withdrawn from daily life. One could suppose that such innovations were compensatory. Yet in reality the innovations themselves belonged to the same remorseless movement as was dispersing animals.”

⁴⁶ Mary J. Henninger-Voss, introduction to *Animals in Human Histories: The Mirror of Nature and Culture*, ed. Mary J. Henninger-Voss (Rochester: University of Rochester Press, 2002), xxi. “The human imagination, equipped with a lexicon of words, pictures, and practices provided by individual cultures,” she continues, “meets the brute animal in ways almost as multitudinous as the varieties of animal life.”

⁴⁷ Steve Baker, “What Does Becoming-Animal Look Like?,” in *Representing Animals: Theories of Contemporary Culture*, ed. Nigel Rothfels (Bloomington: Indiana University Press, 2002), 88–89.

conceived to study, record, understand, and see animal life, specifically – their secret movements, temporalities, and elusive ‘outer life’. The first films were not incidentally *of* animals; animals *necessitated* film, required its invention to disclose their secrets, and were its first subjects.

Early and pre-cinematic technologies privileged nonhuman subjects, spaces, and temporalities; just as early film theorists hailed animal movement – internal and external, biological and “mechanical” – as epitomizing cinematic logic. Manipulations of *duration* – Julius Ries’ 1907 time-lapse films of sea urchin fertilization and development, for instance – and *scale* – Robert Watkins’ microcinematographic renderings of blood corpuscles – were celebrated as the essence and future of cinema precisely for their freeing of perception from a strictly anthropocentric perspective. Writing in 1915, Hugo Münsterberg described the camera not as a device to “write in light” human drama but to “trace the life of nature even in forms which no human observation really finds in the outer world.”⁴⁸ For the first film theorists, the indexical nature of film was deepened by an abandonment, rather than simulation, of human perspective. Such was what set film apart from the classical arts: the removal of the “human hand,” as it was often put, from expression.

However, the automatism and indexicality of cinema meant not just a freedom from human agency but the radical expansion of authorship to a broad array of material agencies, processes, and bodies, animal and otherwise. Film permits nonhuman bodies to write, and be written. Film *is* nonhuman. Conceived through and for animal bodies, the emergence of the cinema was persistently related to a zoological hermeneutic, in three interrelated senses that bear

⁴⁸ Hugo Münsterberg, *The Film: A Psychological Study* (New York: Dover Publications, 1970), 11. Münsterberg may be referring to Robert Watkins’ famous microcinematographic renderings of blood corpuscles. See: Timothy Boon, *Films of Fact: A History of Science in Documentary Films and Television* (New York: Wallflower Press, 2008), 8.

their trace: (1) *clinically*, as a medical instrument of visualization; (2) *taxidermically*, as a technique of sacrificial preservation; and (3) *formally*, as an idealized object of movement, or “locomotion.” In this chapter, then, I will trace this configuration, originary to cinema, of animal traces: medically, morbidly, formally.

1.1 ANIMAL BODIES, MEDICAL VISUAL TECHNOLOGIES, AND THE EARLY CINEMATIC APPARATUS

Reviewing scientific films produced by Kodak in the 1920s, Kirsten Ostherr observed that they “treat the animal’s body as its own form of imaging device.”⁴⁹ Though her subject is instructional medical films, her remarks could describe the relationship between the cinema and the modern animal broadly. “The body,” she goes on, “performs pathology through movements that become visible as organic special effects.” What does it mean for a body, much less an *animal* body, to be (treated as) its own imaging device? How can bodily movements become, through cinema, “organic special effects”?

In truth, we find this same, enigmatic figure everywhere in early cinema and its theorization. The animal as cinema, the cinema as animal; the cinema does what the animal is, the animal is as cinema does. For Kracauer, cinema is epitomized by movement, the chase, and animals its ideal vehicle.⁵⁰ For Balázs, it is their naturalness before the camera and inability to

⁴⁹ Kirsten Ostherr, ““The Entire Medical Profession is Becoming “Film Conscious””: How Cinema Became Part of Medical Education,” in *Medical Visions: Producing the Patient Through Film, Television, and Imaging Technologies* (New York, NY: Oxford University Press, 2013), 67.

⁵⁰ Siegfried Kracauer, *Theory of Film: The Redemption of Physical Reality* (Princeton: Princeton University Press, 1997), 42. Notably, each of the examples Kracauer gives, of the chase at its earliest and purest, includes or features animals. “Hence the fascination the chase has held since the beginning of the century. Gendarmes pursued a dog

perform. For Münsterberg, cinema is first a scientific one, given over to nonhuman forms and phenomena. Surely nowhere else did the cinema and its technologies more directly touch life than through animal bodies – and few regulations existed to restrict its advance. Cinema was oriented to animal physiology first, and often in a grisly fashion: to see a dog’s blood succumb to infection, the effects of electrocution on a corpse, a cryogenically frozen eel revived, an exposed heart beating in its cage.

Animals, in this sense, perform cinema through redoubling. The reversibility of time and deformation of matter effectuated by the latter is practiced *in situ* on the former. What the cinema manipulates as an image, medicine exacts directly. Thus, as Anat Pick puts it, “the animal’s inability to die is reflected in cinema’s essential feature, its *reanimating* function: cinema as ‘spectral loop’ whose central figure is animal.”⁵¹ For Bazin, the scandal of death on film lies precisely in its reversibility and replay. “I imagine the supreme cinematic perversion would be the projection of an execution backward,” he writes, “like those comic newsreels in which the diver jumps up from the water back onto his diving board.”⁵² The cinematic animal performs this perversion directly, on and through its body. In *L’Air Liquide*, a 1913 popular science film from Pathé that Oliver Gaycken discusses, two live eels are subjected to its effects by a scientist, who in the manner of a magician shatters the one in his hands and warms to

who eventually turned the tables on them (*Course des sergents de ville*); pumpkins gliding from a cart were chased by the grocer, his donkey, and passers-by through sewers and over roofs (*Le Course des potions*, 1907; English title: The Pumpkin Race). For any Keystone comedy to forgo the chase would have been an unpardonable crime. It was the climax of the whole, its orgiastic finale – a pandemonium, with onrushing trains telescoping into automobiles and narrow escapes down ropes that dangled above a lion’s den.” (42)

⁵¹ Anat Pick, *Creaturely Poetics: Animality and Vulnerability in Literature and Film* (New York: Columbia University Press, 2011), 108.

⁵² André Bazin, “Death Every Afternoon,” tr. Mark A. Cohen, in *Rites of Realism: Essays on Corporeal Cinema*, ed. Ivone Margulies (Durham: Duke University Press, 2003), 31.

reanimate the other. The catalogue entry describes the eel's exposure to liquid air as 'suspending life without stopping it'⁵³ – like film itself.

What must be inferred of human mortality, and felt as its effect – Chaplin in the cage with the lion – is demonstrated manifestly with animals: the countless safari hunt shorts, for example, in which true death is produced, quite authentically, for a copy. In the absence of taboos, there can be neither displacement nor suggestion: animals in early, and early scientific, films suffer from both a lack and a surplus of meaning, an overdetermination of what would otherwise remain an organizing principle of cinema, and not be itself visible. It is one thing to rewind a film or bring figures to life on the screen, and quite another to suspend, kill, or reanimate a body in order to film it. There would be no sense in playing *L'Air Liquide* backwards; it plays forward the “supreme cinematic perversion.” In a perverse sense indeed, the divergent fates of the eels make the film the same backwards and forwards, death passing back and forth between them in an endless, grisly loop.

The electric fish is the spirit animal of early film. An incarnation of the “fleshly photograph” to which Akira Lippit likens the animal of modernity, electric eels and rays is metaphor realized, a cinematic animal without the cinema. Though Alessandro Volta was in fact inspired by the torpedo fish to devise the first battery – or “artificial electric organ,” as he preferred to call it – the relationship between electricity and life proposed by biologists commuted to cinema, as both apparatus and showcase of electric animations, through avenues deeper than invention and discovery. Like Volta, Giovanni Aldini, a professor at the University of Bologna and a popular showman, was inspired by his uncle Luigi Galvani's discovery of

⁵³ Oliver Gaycken, “‘A Drama Unites Them in a Fight to the Death’: Some remarks on the flourishing of a cinema of scientific vernacularization in France, 1909–1914,” *Historical Journal of Film, Radio and Television* 22, no. 3 (August 2002): 357.

“animal electricity”; only, instead of displaying a frog’s leg twitching on a metal rod, Aldini appeared onstage with a severed sheep’s head attached to electrodes. “As the current flowed, the dead animal’s eyelids moved, the tongue shot out of its mouth, and it seemed to viewers that electricity had revived the animal’s vital force. More shocking still, Aldini brought to the stage the bodies of recently executed murderers fresh from the scaffold, or their heads snatched from the guillotine. By exposing and electrifying the brain, Aldini managed to contort facial muscles into a grimace, to move the jaw, and to open and shut the eyes.”⁵⁴

Like death filmed and played in reverse, animals, a fluid category, permitted spectacular demonstrations of death unhinged from body. Harold Browne’s “canine execution show,”⁵⁵ which traveled around New York State electrocuting up to a dozen dogs in an evening, like Edison’s experiments at his West Orange laboratory, conceived of animals as, in Lippit’s words, “reducible to pure force, *animus*, electricity.”⁵⁶ Death by electrocution is simply the obverse of theatrical, scientific reanimations by the same, natural force. As a manifestation of life itself, Jussi Parikka reminds us, the “phenomenon of electricity had represented a spectacle long before the famous, cruel cinematic exhibition of the electrocution of Topsy the elephant in 1903.”⁵⁷ It was in this context that the electric eel formed a natural curiosity and object of fascination for biologists like Aldini and, later, Pathé. How was this animal able to generate at will the force of life itself? Literally surging with electricity, the electric eel was a living example of what could

⁵⁴ Linda Simon, *Dark Light: Electricity and Anxiety from the Telegraph to the X-ray* (Orlando: Harcourt Books, 2004), 13.

⁵⁵ Jonathan Burt, “The Illumination of the Animal Kingdom: The Role of Light and Electricity in Animal Representation,” *Society & Animals* 9, no. 3 (2001): 216.

⁵⁶ Akira Mizuta Lippit, “...From Wild Technology to Electric Animal,” in *Representing Animals: Theories of Contemporary Culture*, ed. Nigel Rothfels (Bloomington: Indiana University Press, 2002), 132.

⁵⁷ Jussi Parikka, *What is Media Archaeology?* (Cambridge: Polity Press, 2012), 56.

otherwise only be isolated postmortem. Like Kodak's films, here too the animal body is treated as its own imaging device.

The power of cinema and its sciences to 'penetrate deeply into the tissue' of reality, as Walter Benjamin put it, was unevenly applied. Animal bodies permitted not only an uncensored glimpse of physiological processes but also a technical convergence of cinematic and medical technologies. In physiology, the apparatus itself was incorporated into animal bodies. In medical schools, for example, projection apparatuses were developed to project live operations to an increasing number of students. Not only did a biological function have to be made visible, it had to be illuminated, magnified, and projected across a vast space. As early as 1872, the physiologist Johann Czermak was experimenting with projecting the beating heart of a frog to his students, but it was not until German physiologist and pharmacologist Carl Jacoby's 1908 Pandiascope that the design achieved a kind of perfection. The theater, which separated off the the preparation or projection room from the auditorium, was distinguished by its incorporation of animal handling into the exhibition design.⁵⁸ In order to project the beating heart of a frog, the Pandiascope had to artificially sustain it: within the projector itself, a tube carried a flow of neutral salt solution to the frog's heart to prevent its tissue from being injured by the strong heat generated by the light. Though the goal of Jacoby's device was ostensibly only to project a live operation on a beating heart, the device demonstrated a willingness to not just observe biological processes but actively intervene in them, for the purpose of their visibility.

⁵⁸ Jacoby's theater was inspired by the Institute of Pharmacology in Strassburg, constructed between 1883 and 1887 by the architect Otto Warth. This preparation room, according to a contemporary description, served to store the "animals meant for demonstration" and was connected to the auditorium by a door so that "tables with the animals prepared for experiment [...] can be transferred to the lecture hall." (Jendrassik quoted in Henning Schmidgen, "Cinematography without Film: Architectures and Technologies of Visual Instruction in Biology around 1900," in *The Educated Eye: Visual Culture and Pedagogy in the Life Sciences*, ed. Nancy Anderson and Michael R. Dietrich (Hanover, New Hampshire: Dartmouth College Press, 2012), 105.)

Though animals formed the material basis for optical and biological experiments, they also deformed the concepts of materiality and life to which their imaging testified. Cinematic interventions into animal biology altered animal biology, materially and conceptually. The pervasive early cinematic fascination with the beating heart makes this plain. Exposed for the eye to see, the heart seemed to give access to both life itself and time's most fundamental measure. "The change between systole and diastole that this organ displays marks duration for the eye just as the ticking of a clock marks it for the ear."⁵⁹ And what gives the tick of the clock its measure if not the beat of the heart? From the opened chest of an animal, not just life but time was laid bare, and its production no less theatrical than scientific. That the organ sustaining the very life of a body could be exposed and seen functioning betrayed, and delighted, commonsensical notions of life and its biological 'location'. In 1898, echoing the first, theatrical vivisection operations conducted by William Harvey in the 1620s, the Viennese researcher Ludwig Braun filmed the contractions of a dog's heart to make the first of many educational and instructional films to follow. The apparent cruelty of the operation, however, was subtended by a distinctly cinematic virtualization or dematerialization of the animal, flesh, and even the heart, the most ineluctable of organs.

Contemporaneous with Braun, other scientists, led by the German radiologist Rudolph Janker, were experimenting with such "cine loops," which by looping a heartbeat cycle perform the heart by mapping the cut onto the pulse itself. In this sense, if the "loop *acts* 'real'," as Scott Curtis quips, so does the animal, who now appears only as an off-screen effect of a cinematic operation.⁶⁰ Curtis links the cineloop to the first moving pictures, which too began with the

⁵⁹ Hannah Landecker, "Microcinematography and the History of Science and Film," *Isis* 97 (2006): 114.

⁶⁰ Scott Curtis, "Still/Moving. Digital Images and Medical Hermeneutics," in *Memory Bytes. History, Technology, and Digital Culture*, ed. Lauren Rabinovitz and Abraham Geil (Durham: Duke University Press, 2004), 240.

animation of a still, and often featured repetitive actions. However, while Curtis attributes these technical developments to a medical hermeneutics of the human body, it is worth noting that Janker was working with animal, not human, hearts, a disclaimer made prominent across all medical instructional films. A cineloop heart is thus subject to several displacements and substitutions: from one beat, a whole, looped; from animal to human; from singular organism to general principle, of life and its measure. On the one hand, in order to see it functioning, the heart was exposed and sustained artificially, as means to an end; but on the other hand, it was this procedure itself, and what it revealed, that would suggest all manner of artificial arrangements. The cineloop effected cinema more than it did cardiology.

The cineloop, like the Pandidascope, exemplifies not only the broad adaptation of visual technologies to animal bodies, but also the inscription of nonhuman life as prototypically cinematic. If the cinema grew out of an interest in seeing animals properly, it was in part because the animal represented a general problem for perception – in terms of both movement, or anatomy, and biology. Medicine does not simply provide an elaborate excuse for punishing animals, nor film a means for taking pleasure in their pain; on the contrary, other forms of visualization that did not require, and in some cases prevented, the need to operate on animals permitted alternative, affirmative conceptions of life. For instance, the vast majority of X-rays published in the press were of animals, and much of the wonder they inspired was of the physiology of animal species whose interiors remained more mysterious and varied than our own. With the exception of a few X-rays of human hands, the famous 1896 *Strand Magazine* article on what was being called the New Photography devoted its prose to appreciating diverse animal anatomy – of which, it remarked,

for magnificence nothing can compare with the common frog. *He was made for the process.* His skeleton is strong but graceful: built up of innumerable small bones, each of which is so fine that the radiation partly penetrating it reveals its internal structure, and yet it stands boldly out in the midst of its almost spiritual covering of flesh.⁶¹

The X-ray was welcomed as more than a means of animal appreciation, however. What made Röntgen's device "sensational" was that with it, according to Alfred Porter, the author of the *Strand* article, "it is possible to photograph the skeleton of an animal while it is still alive."⁶² Further, the article notes, the X-ray permits veterinarians – as with a cat who swallowed a hat pin – to treat, rather than euthanize, animals with elusive ailments. For the modern animal, the X-ray was decisive: it permitted, for the first time, seeing into, without killing, an animal. The X-ray separated image from life just as the Pandidascope bound them together. Both, however, conceived of that life as made to be seen and, as such, incorporeal, spiritual, more a cross-section of a boundless living process than an autonomous iteration of it.

Early imaging technologies nonetheless disturbed more than they reinforced the 'sacrificial scene' of the nineteenth century animal of science, the forms of which cinema has struggled to relinquish. Once medical technicians could look inside animals without having to first open them up, a new calculus – of suffering and care vs. speculative experimentation – began to organize animals both real and theoretical. The nineteenth century animal was all flesh, corporeal, and suffering; the man of science was a sadistic vivisector, a butcher, who took pleasure in cruelty. H. G. Wells' *The Island of Dr. Moreau*, Mary Shelley's *Frankenstein*, Wilkie Collins' *Heart and Science*, and the media circulated by the powerful antivivisection movement popularized this tableaux. The X-ray and the camera, by contrast, permit the animal to appear and become fragile, delicate, and alive. Film, in this sense, permitted the *desire* to sustain and

⁶¹ Alfred W. Porter, "The New Photography," *Strand Magazine* 67 (July 1896): 112. Emphasis in original. Figure 4.

⁶² Porter, 107.

capture, not arrest, living processes. After observing the frog's "almost spiritual covering of flesh," and a "result that would be obtained optically from a glass rat with translucent porcelain bones," Porter presents his own loving X-ray of a bat who "had not awakened from his winter sleep when he was transported from the country and subjected to the radiographic ordeal."⁶³

Like Röntgen's X-rays, Jacobj's Pandidascope, Janker's looped heartbeats, and Pathé's cryogenic eel, the French biologist Alexis Carrel's pioneering microcinematographic studies of chicken heart cells contributed, perhaps the most dramatically, to what could be called the cinematization of animal life. In a certain sense, microcinematography exemplifies what the cinema introduced to biology: the substitution of image for body. In permitting the production of portable, reproducible moving images, film displaced the scene of experimentation, and thus the animal, from the laboratory to the screen. Contravening the brutal, sacrificial logic frequently imposed on this period, "antivivisectionists," Gaycken notes, "were enthusiastic about this aspect of the medium."⁶⁴ Microcinematography took this aspect to its conclusion by not requiring a sacrifice.

In 1913, Carrel and Jean Comandon grew embryonic chicken spleen and heart cells in culture, which they then filmed, sped up, and screened to a delighted public. A year earlier, Carrel had famously claimed "permanent life" for tissues grown outside the body.⁶⁵ These embryonic chicken heart cell cultures became known as the 'immortal chicken heart', whose 'birthdays' an amused press celebrated.⁶⁶ In his *Biological Time* (for which Carrel wrote the

⁶³ Porter, 115.

⁶⁴ Oliver Gaycken, "'The Swarming of Life': Moving Images, Education, and View through the Microscope," *Science in Context* 24, no. 3 (September 2011): 362n4. "Moving images made time-based phenomena portable and repeatable, allowing investigators to circulate a record of an observation." (362)

⁶⁵ Alexis Carrel, "On the Permanent Life of Tissues Outside of the Organism," *Journal of Experimental Medicine* 15 (1912): 516–528.

⁶⁶ See, for instance: "Heart Tissue Beats Long After Death," *New York Times*, May 2, 1912, 8; "Immortal Chicken Cells Attain 20th. Anniversary," *New York Times*, January 18, 1932, 5; "Living Tissue Endowed by Carrel With

foreword), Pierre Lecomte du Noüy went so far as to declare a “biology without death, an artificial ‘immortal experimental animal’ that one could experiment on indefinitely.”⁶⁷ In this sense, Carrel’s experiments complete what Czermak’s initiated: an animal without body. As Hannah Landecker puts it, “in Carrel’s studies, the camera was not brought to the inside of the animal to visualize the life within it, but cells were extracted from the body and fit into the apparatus.”⁶⁸

It was this extraction that permitted the emergence of a conception of ‘life itself’: an overflow – or “swarming,” as Gaycken puts it – of life, which timelapse dramatized through the production of “frenetic” activity at the microscopic level. Perhaps it is this glimpse into a teeming continuity of life that has made this moment eligible for recovery today. Where Lisa Cartwright tends to see a disciplining of life, Landecker, Gaycken, and Curtis prefer to see its messy affirmation: in response to scientific films explicitly asking the audience to “see *their* constitutive elements on screen and to understand themselves as continuous with other beings made of cells and protoplasm,” Landecker reflects no less than Münsterberg on how film provides access to “the concept of life as such,” a concept that resembles the latter’s own call, a century before, to “trace the life of nature,” or Kracauer’s praising of the cinema’s implicit closeness to “the flow of life.”⁶⁹

Between the human and ‘life itself’, however, lies a beleaguered middle term: the animal, whose body secured the animism hailed by Münsterberg, Epstein, and Balázs as the future of film. Two years after Carrel’s death in 1944, the immortal chicken heart culture was thrown out,

‘Eternal Youth’ Has Birthday,” *New York Times*, January 16, 1942; Albert H. Ebeling, “Dr. Carrel’s Immortal Chicken Heart,” *Scientific American* 166 (1942): 22–24.

⁶⁷ Quoted in Hannah Landecker, “Cellular Features: Microcinematography and Film Theory,” *Critical Inquiry* 31, no. 4 (Summer 2005): 928.

⁶⁸ Landecker, “Cellular Features,” 926.

⁶⁹ Landecker, “Cellular Features,” 920, 905; Münsterberg, 11; Kracauer, 71–73.

as no one was willing to maintain it. If “materiality [is to mean] something more than ‘mere’ matter,”⁷⁰ as the editors of a volume on *New Materialisms* insist, then the heart culture was perhaps just as much an extension of Carrel’s life as the chicken’s – only in this case the animal dissolves into a nominalism to be celebrated cheekily by the press and the ‘life itself’ it once exposed must be cultivated anew elsewhere. To the fantasy of “mechanical objectivity” – which, in Daston and Galison’s history, promised “images uncontaminated by interpretation”⁷¹ – the general transportability and extension of animal bodies into the machine itself reminds us that “what is extended, perhaps, is not the observer’s senses but the living process of the body studied, and the epistemological domain of the apparatus in the generation of ‘life’.”⁷²

There is a commensurate danger in appealing to the animal as a “material unconscious”⁷³ of film or science: like the clinical animal object upon which modern medicine is established, *animality*, in contemporary critical literature, can function as a transcendental signifier – of an absolute exteriority or pure heterogeneity. Less an unknowable creature or forgotten foundation, the animal at this early moment served more as a computer, or black box, whose secrets could be solicited endlessly through ever more complicated commands. For early filmmakers, film theorists, and scientists experimenting with film, the animal was neither disavowed nor rendered

⁷⁰ Diana Coole and Samantha Frost, “Introducing the New Materialisms,” in *New Materialisms: Ontology, Agency, and Politics*, ed. Diana Coole and Samantha Frost (Durham: Duke University Press, 2010), 9.

⁷¹ Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 139. “But certain kinds of images were nonetheless central to mechanical objectivity, because they seemed to promise direct access to nature, unmediated by language or theory. Camera obscura tracings, photographs, and the inscriptions of self-registering instruments were all, at one time or another, touted as nature’s own utterances.” (256)

⁷² Lisa Cartwright, *Screening the Body: Tracing Medicine’s Visual Culture* (Minneapolis: University of Minnesota Press, 1995), 27.

⁷³ Nicole Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis: University of Minnesota Press, 2009), 92. “Against an understanding of animals as ‘perpetual motion machines’ that ‘live *unhistorically*,’ I develop the material unconscious of capitalist modernity as the denied, disavowed historicity of animals and of animal rendering.”

invisible, but affirmed and made legible through film and its sciences. The *same* animal could be made to produce, if given the proper commands, new and startling discoveries.

The early cinematic animal is neither the silent truth of cinema's origins nor the broken back upon which it was built, but frustratingly lies somewhere in between. Such approaches, however well-intentioned, quickly import what they seek to expunge: a metaphysical concept of materiality and life that regards the animal only as a lost origin for vast cultural practices, and its secured identification an endpoint for analysis. The early animal of film and science was less an abject subject than the site of an unstable "limitless weave of forces,"⁷⁴ the very conglomeration of which troubled what is, or means, a body. This animal makes it hard to say where film ends and it begins. Even the *word* film, when it was first put into commercial circulation, in 1884, by George Eastman, "referred only to the gelatin coating upon the paper,"⁷⁵ produced industrially from animal bones and byproduct. In 1925, using techniques not unlike Carrel's, Dr. Samuel Sheppard, an emulsion scientist working for Kodak, traced impurities in photographic gelatin back to the cows' diet, where he discovered that cattle who had eaten mustard seed yielded better film speeds. "If cows didn't like mustard," he declared, "there wouldn't be any movies at all."⁷⁶

1.2 TAXIDERMY, PHOTOGRAPHY, AND IMAGING ANIMAL MOVEMENT.

Like cinema, taxidermy treats "the animal's body as its own form of imaging device." Both stage the life it sacrifices to simulate. Both are indexical. In ontologies of the photographic image, the

⁷⁴ Pheng Cheah, "Non-Dialectical Materialism," in *New Materialisms: Ontology, Agency, and Politics*, ed. Diana Coole and Samantha Frost (Durham: Duke University Press, 2010), 73.

⁷⁵ Douglas Collins, *The Story of Kodak* (New York: Harry N. Abrams, 1990), 49, quoted in Shukin, 105.

⁷⁶ Kenneth Mees quoted in Collins, 200, in Shukin 109.

former is continually likened to the latter, as a “skin” of things. Pierce, Bazin, Kracauer each form this analogy, which persists in contemporary accounts. “The photograph, like the mounted skin of an animal,” Hanna Rose Shell writes, “both materially derives from the live organism with which it is associated (a relationship described as ‘indexical’), and resembles that organism, possessing some of its qualities (a relationship described as ‘iconic’).”⁷⁷ While a photograph and a taxidermic work do both derive from the live organism, in the latter case death is a structuring pretense of that derivation – the animal body itself is the work – and in this regard is antithetical to the photographic record. It is on this account that taxidermy is not just materially but aesthetically distinguished from cinematic priorities: life, movement, activity. Their philosophies and interests differ. Cinema traces life, taxidermy arrests it: not just in practice, but in theory. Photography did not challenge taxidermy’s representation of movement; it introduced movement to it – and was met, we shall see, with fervent resistance.

Indeed, with the advent of the “snapshot,” taxidermic aesthetic turned *away* from the kinds of active poses that Muybridge’s intervention clarified – such that, to this day, as a recent study found, nearly half of all quadruped walking depictions in both natural history museums and taxidermy catalogs are incorrect.⁷⁸ The American school of taxidermy, in particular, whose installations dominated natural history museums at the turn of the century, rejected the representation of movement entirely, preferring peaceful, placid “life groups” posed within a detailed, picturesque environment. Indeed, William T. Hornaday, the reputed father of modern taxidermy, contended that one should only “represent every-day, peaceful home scenes in the

⁷⁷ Hanna Rose Shell, *Hide and Seek: Camouflage, Photography, and the Media of Reconnaissance* (New York: Zone Books, 2012), 10-11.

⁷⁸ Gábor Horváth et al., “Erroneous quadruped walking depictions in natural history museums,” *Current Biology* 19, no. 2 (January 2009): R61–R62.

lives of your animals”: “anything but fighting, leaping and running.”⁷⁹ If Muybridge’s studies served to correct artists’ representations of animals in movement – under Ernest Meissonier’s encouragement, they became his intended audience – for American taxidermists they were perceived as inapposite if threatening, insofar as the active poses they articulated expressed the kinds of motion aesthetically forbidden. For an art form critically regarded as simulating animal life through death, its programmatic refusal to represent movement, and distrust of the medium to which it is often likened, deserves further scrutiny.

Muybridge’s work found an early champion in the ornithologist and curator for the United States National Museum R. W. Shufeldt, who in his 1892 survey of *Scientific Taxidermy for Museums* recommended that, as evidenced by “the superb series of photographs obtained through the indefatigable Eadward Muybridge,” with the “use of the camera the taxidermist can secure subjects that the unaided eye and pencil can never give him, and these are all kinds of animals in rapid motion.”⁸⁰ For the American school, however, “rapid motion” had no place in their model, and Shufeldt was quickly reprimanded. Responding in his 1896 manual, Montagu Browne chided Shufeldt and mocked the camera’s ability to capture animal behavior, if only for the reason that it frightened the subject, producing images of birds, as he put it, “whose strained and inartistic attitudes are, if natural, at least those resulting from fright.”⁸¹ For Browne, the “snap shot” was not only of no use for modeling animal motion but through its taking disfigured it. Though Shufeldt would at least twice return to the issue in print, the taxidermic

⁷⁹ William T. Hornaday, *Taxidermy and Zoological Collecting: A Complete Handbook for the Amateur Taxidermist, Collector, Osteologist, Museum-Builder, Sportsman, and Traveller* (New York: Charles Scribner’s Sons, 1891), 244.

⁸⁰ R. W. Shufeldt, *Scientific Taxidermy for Museums, Based on a Study of the United States Government Collections*, prepared for the Smithsonian Institution, United States National Museum (Washington: Government Printing Office, 1892), 383.

⁸¹ Montagu Browne, *Artistic and Scientific Taxidermy and Modelling* (London: Adam and Charles Black, 1896): 10-11.

representation of “rapid motion” would not be addressed in even his 1899 article, “Photography and Taxidermy,” which begins defensively with the assertion that taxidermists “have not been backward in their use of the photographic camera in their professional work.”⁸² The main benefit of photography, according to Shufeldt in his later texts, would be to document accurately the “natural location” of the specimen: “the more intricate the natural location is, that it is intended to reproduce,” he wrote, “the more valuable is the camera.”⁸³

The American school did not reject the use of photographic technology, strictly speaking, only its orientation toward capturing action. The one is often confused for the other. According to Hanna Rose Shell, “Hornaday vehemently rejected the use of photography.”⁸⁴ This was not the case. In his 1891 manual he advised, more pragmatically, that “in the absence of sketches, photographs are the next best thing. It is an excellent thing to be able to photograph animals, both living and dead; but the trouble is, one cannot always get the game and the camera together.”⁸⁵ In any case, cameras were not being used by taxidermists to document otherwise invisible animal motion but to record details of natural environments for simulation in the installation.⁸⁶ Indeed, the taxidermists who did welcome photography sublimated it to the same aesthetic demands as those who did not: namely, placidity over action, the picturesque over animation. Carl Akeley, for example, the other “father” of American taxidermy, used

⁸² R. W. Shufeldt, “Photography and Taxidermy,” in *The Annual of Photography and Photographic Times Almanac for 1899*, ed. Walter E. Woodbury (New York: Scovill & Adams Co., 1899), 71.

⁸³ Shufeldt, “Photography and Taxidermy,” 73.

⁸⁴ Hanna Rose Shell, “Skin Deep: Taxidermy, Embodiment, and Extinction in W. T. Hornaday’s Buffalo Group,” *Proceedings of the California Academy of Sciences* 55, Supplement 1/5 (2004): 99.

⁸⁵ Hornaday, *Taxidermy and Zoological Collecting*, 21–22.

⁸⁶ Disagreements over the use of photography did not concern the representation of movement (which was discouraged altogether), only the environment. For example, Hornaday was critical of fellow AMNH taxidermist Jenness Richardson’s method of selecting a “given spot of ground of precisely the same area” as the installation and “[reproducing] only such materials as are found on that particular square of mother earth.” (Hornaday, *Taxidermy and Zoological Collecting*, 238) Such slavish reproductions of a natural environment felt to Hornaday dogmatically literal in their use of photographic technology.

photography extensively “to record the essential features of his subjects, including their posture and other biomechanical features in life, and their musculature and textures in death”; but his dioramas were no less “ideal,” picturesque, and determined by a romantic conception of the landscape.⁸⁷ Akeley was also a student of the Rochester school, a little younger than Hornaday, and like him constructed “life groups,” as in his celebrated “Four Seasons of the Virginia Deer,” an installation comprising four separate dioramas showing white-tailed deer in spring, summer, fall and winter, started in 1893, and purchased by the Field Museum in Chicago in 1902.⁸⁸

The problem Muybridge posed for taxidermy was not technological but aesthetic. Though the American school was opposed to what might be seen as an instantaneous photographic logic, it would be more accurate to say it maintained allegiance to the relationship to animal photography established in the 1840s, which instantaneous photography was perceived as threatening. Early animal photography, as Matthew Brower explains in his excellent *Developing Animals*, often featured clearly (and crudely) stuffed animals inserted into natural settings, as in John Dillwyn Llewelyn’s 1852 photograph *Deer Parking*. The artifice of these images, according to Brower, was unmistakable. “The stuffed deer,” he writes, “appears to be masquerading as a live deer – and failing. This failure is double. There is a taxidermic failure to achieve likeness, and there is the failure of the photographed deer to merge with its surroundings.”⁸⁹ The animal in these images, as in American installations, is almost exclusively “still,” and in some cases quite literally organized as a “still life.” Indeed, in 1869 at San Francisco’s Woodward’s Gardens, Muybridge himself photographed similar arrangements of taxidermied animals, including a

⁸⁷ Mark Alvey, “The Cinema as Taxidermy: Carl Akeley and the Preservative Obsession,” *Framework* 48, no. 1 (Spring 2007): 30.

⁸⁸ Alvey, “The Cinema as Taxidermy,” 26.

⁸⁹ Matthew Brower, *Developing Animals: Wildlife and Early American Photography* (Minneapolis: University of Minnesota Press, 2011), 10-11.

group of monkeys, a flock of aquatic birds, and at least three pictures that include his future wife Flora: in one amongst a deer and kangaroo, in another kneeling to caress a tiger, in a third with a fawn on her lap.⁹⁰

Regarded as a corrective tool, instantaneous photography exposed errors in established passive attitudes rather than introduced new active ones. Though “animals have a perverse and unhappy habit of assuming impossible attitudes,” the American taxidermist Frederic Lucas remarked, “and doing exactly those things which theory tells us they can *not* do,”⁹¹ the revisions inevitably provoked by photographic records of animal movement were confined to minor technical incongruities. For example, after the First Annual Exhibition at Rochester it was discovered that the most “beautiful and skillfully prepared piece of taxidermy ... was rejected,” on account of a perceived defect in the position of a bird’s foot, and the gold medal erroneously awarded. However, belated “reference to the attitude of the living bird showed the artist to have been a close observer; he was correct,” wrote J. B. Holder in an embarrassed redress. “An instantaneous photograph of a similar bird plainly indicates this feature – the feet placed flatwise upon the ground, while the legs are considerably extended.”⁹²

Rachel Poliquin writes that taxidermied “animals are almost always positioned in the action of life, with sparkling eyes to enhance the realism of the refashioned liveliness and – crucially – to camouflage the death.”⁹³ But for the American school, if not for their European rivals (to whom we will now turn), no such “action of life” is discernible. Here, life too is

⁹⁰ Marta Braun, *Eadweard Muybridge* (London: Reaktion Books, 2010), 62.

⁹¹ Frederic A. Lucas, “The Scope and Needs of Taxidermy,” *Annual Report of the Society of American Taxidermists, March 24, 1882–July 1, 1883* (Washington, DC: Gibson Brothers, 1884), 56. Lucas was co-founder of the Society of American Taxidermists, a student of the Rochester school, and Director of the American Museum of Natural History in the 1910s and 1920s.

⁹² “Address of Dr. J. B. Holder,” in *Annual Report of the Society of American Taxidermists, March 24, 1882–July 1, 1883* (Washington, DC: Gibson Brothers, 1884), 46.

⁹³ Rachel Poliquin, “Balto the Dog,” in *The Afterlives of Animals: A Museum Menagerie*, ed. Samuel J. M. M. Alberti (Charlottesville: University of Virginia Press, 2011), 95.

“camouflaged,” rendered inert, and reduced to a stirring. Akeley’s and Hornaday’s animals are less living and “sparkling” than they are zombied and subdued. For the American school, whose writings often equate action with violence, life and death surreptitiously converge. Hornaday’s buffalo group and Akeley’s deer appear as if in a dream, or caught in a state of “perpetual vanishing,” as Akira Lippit would say: neither living nor dead, moving nor still, but as if paused in life and time.

If ‘death camouflaged as life’ fails to capture the American school’s philosophy, it is no more adequate to the Europeans’ approach, which often featured staged simulations *of* death. Indeed, the Americans were for a moment beholden to precisely the modes of violence and “rapid motion” they would soon disown and which the Europeans promoted. That it was two different Henry Wards – one in the United States, one in England – that founded the respective taxidermic schools has only served to confirm a more fundamental confusion, and one furthered by the fact that it was the *British* Henry Ward who had traveled with Audubon collecting and preparing specimens before returning in 1857 to start the family business that his son Rowland would turn into the world’s leading taxidermy studio. Meanwhile, it was the younger, *American* Henry Ward who founded “Ward’s Natural Science Establishment” in 1862, trained Hornaday and Akeley, and promoted what is generally if confusingly called “Wardian” taxidermy, insofar as both Wards were simultaneously renowned for introducing both the “life group” diorama model and the “manikin” technique of using artificial materials rather than the skeleton of the animal to support the skins.

Adding to this confusion is their inevitable philosophical and institutional intersections, culminating in the 1867 Exposition Universelle in Paris, at which the French naturalist Jules Verreaux won a gold medal for excellence for his work *Arab Courier Attacked by Lions*. This

competition served as a turning point, in two senses: it would ultimately distinguish the European and American traditions, which were yet to reify, and it would, well before the advent of instantaneous photography, distinguish animal “attitudes” from “actions.” So underappreciated is the significance of this work that even scholars like Brower have been led to suggest that, as he writes, “it was not until the 1890s that what contemporary viewers would think of as lifelike large animals were created.”⁹⁴ On the contrary, as Hornaday recounts it, “between the years 1860 and 1876 a few of the more ambitious taxidermists of Europe produced various groups of mammals, large and small. Of these, one of the most noteworthy was the ‘Lion and Tiger Struggle,’ by Edwin Ward, of London [brother to Rowland], and another was Jules Verreaux’s ‘Arab Courier attacked by Lions.’ The most of these groups represented animals in theatrical attitudes, usually fighting.”⁹⁵

The relationship between Verreaux’s work and Hornaday’s first diorama is direct, if also confused. Hornaday was still unsure of the place of violence and action in the diorama, though he would soon go on to insist, following his mentor, that “in a museum group” it is best to “suppress all tendency to the development of violent action on the part of your specimens.”⁹⁶ Following the 1867 Exposition, however, his (and supposedly *the*) first diorama, “A Fight in the Treetops,” featured, as he put it, “a pair of immense and hideously ugly male orangutans fighting furiously while they hung suspended in the tree-tops,” the one having bitten off the middle finger of the other. In retrospect, he admitted, “this design was highly suggestive of the methods adopted by my European rivals to secure attention to their work, or, in other words, a trifle sensational.” However, his uncertainty over the place of motion and violence in the diorama was

⁹⁴ Brower, *Developing Animals*, 18.

⁹⁵ Hornaday, *Taxidermy and Zoological Collecting*, 229.

⁹⁶ Hornaday, *Taxidermy and Zoological Collecting*, 244.

such that, after completing the group in 1879 and presenting it to the American Association for the Advancement of Science, he created a duplicate for the American Natural History Museum: “another group of orangutans, similar in composition but of a very different design,” this one featuring, as he described it, “the orang at home – a perfectly peaceful scene in the top of a Bornean forest.”⁹⁷

The hesitation was not Hornaday’s alone: museums were increasingly seen as educational sites, for which it was not yet clear if the representation of violence and action was sufficiently “scientific.” The circulation of *Arab Courier* describes this ambivalence. It was purchased with the entire Verreaux collection by the AMNH in 1869 and subsequently exhibited to wide acclaim at the Philadelphia Centennial Exposition in 1876. “And yet, despite its public appeal,” Poliquin observes, “the museum’s directors decided to dispose of *Arab Courier*. The taxidermic skill of the piece was incontestable, but its overt and deadly theatricality was too emotional and distracting for educational purposes.”⁹⁸ In 1899 it was acquired by the Carnegie Museum of Natural History in Pittsburgh, where it is still on display – a short walk from my home.⁹⁹

Following Verreaux, the place of action in taxidermy splits: in the United States, it is excised from scientific models and so the museum, or else submitted to more prestigious impulses – while in Europe and the UK it persists under the house of Ward, culminating perhaps in “The Trophy of Kooch Behar” at the Colonial and Indian Exhibition of 1886: “the largest group ever attempted,” according to Browne, and featuring a hunting elephant in combat with two tigers, one of which, according to a review, “has sprung upon the elephant’s trunk and seized

⁹⁷ Quotations from: Hornaday, *Taxidermy and Zoological Collecting*, 244, 230, 230, 231.

⁹⁸ Rachel Poliquin, *The Breathless Zoo: Taxidermy and the Cultures of Longing* (University Park: The Pennsylvania State University Press, 2012), 97.

⁹⁹ To my wife Molly, who maintains a grisly and incomprehensible love for taxidermy, I owe this chapter-changing discovery. While working on an early draft, unaware of *Arab Courier*, and still certain of the absence of violence and action in taxidermy, I was corrected by her observation – and rewrote this piece.

it with a desperate grip, and sent its sharp pointed tusks deep into the yielding flesh, from which, of course, flows the orthodox stream of blood.”¹⁰⁰ Meanwhile, in Rochester, Verreaux’s student and co-founder with Hornaday and Lucas of the Society of American Taxidermists Jules Bailly maintained a decidedly European talent for the disturbing. A collector of “Novelties in Taxidermy” and serial medalist in but one category, “Grotesque Groups and Animals Grotesquely Mounted,” Bailly stands out in the pages of the Society newsletter.

An ornithologist, naturalist, and contemporary of Marey, Verreaux continued the family business, Maisson Verreaux, established in 1803 in Paris by his father, the earliest known trader of objects of natural history. One wonders if Verreaux and Marey ever crossed paths, at the Muséum National d’Histoire Naturelle where he worked as a taxidermist, or in the vast ornithological literature to which he less contributed than supplied nearly every specimen for research.

Thus, while American taxidermy was moved by the camera to censor animal movement, redirecting its lens to the habitat, cinema and photography, as we have seen, embraced its most finite palpitations. If the cinema embraced the subject of animal movement, it was only able to by first rejecting less technical than conceptual limitations – not of what could be seen, but of what you might want to see. Cinema ripped the animal from its habitat, and put it on a stage – first, by Etienne-Jules Marey.

¹⁰⁰ “The Colonial and Indian Exhibition,” *New Zealand Herald*, June 29, 1886, 6.

1.3 ETIENNE-JULES MAREY, ANIMAL “WRITING,” AND LIVING MOVEMENT.

Marey was stridently anti-taxidermic and anti-vivisectionist in method and philosophy. “While dissection teaches us certain details of the organization,” he wrote in an 1867 article, “it would nevertheless deceive us by destroying the normal disposition of the parts, had we not the means of studying the living apparatus *in situ*.”¹⁰¹ From this perspective, Marey’s later photographic studies of animal movement merely extended to external movement a cardinal determination to preserve, even in the study of physiology and life processes, the *living* body as the medical object. Like vivisection, taxidermy was antithetical to Mareyism. If the “biological death of the living beast,” as Samuel Alberti puts it, “is the birth of the specimen,” for Marey it could only mean the *end* of inquiry.¹⁰² After successfully testing his chronophotographic gun, Marey wrote excitedly to his mother, saying, “I have a photographic gun that has nothing murderous about it and that takes a picture of a flying bird ... in less than 1/500 of a second. I don’t know if you can picture such speed, but it is something astonishing.”¹⁰³ His kinetic sculptures even seemed positioned against taxidermy, in both method and model of movement. Enough viewers of an early rendition of his *Flight Stop* – a three-dimensional model of a bird in flight – believed the geese to be taxidermied that it drew conservationist outcry.¹⁰⁴

In traditional pre-histories of the cinema, Marey’s profound preoccupation with animal life seems almost incidental to the instruments and techniques it furnished. His work, however,

¹⁰¹ Etienne-Jules Marey, “Natural History of Organized Bodies,” in *Annual Report of the Board of Regents of the Smithsonian Institution for 1867* (Washington: Government Printing Office, 1868), 288.

¹⁰² Samuel J. M. M. Alberti, “Introduction: The Dead Ark,” in *The Afterlives of Animals: A Museum Menagerie*, ed. Samuel J. M. M. Alberti (Charlottesville: University of Virginia Press, 2011), 6.

¹⁰³ Quoted in Christian Keathley, *Cinephilia and History, or The Wind in the Trees* (Bloomington: Indiana University Press, 2006), 159.

¹⁰⁴ Allen S. Weiss, *Perverse Desire and the Ambiguous Icon* (Albany: State University of New York Press, 1994), 134.

was almost exclusively concerned with seeing animals – and the technologies he devised were a means to that end. The trajectory of his career traces their movements from the inside-out: first, his work on the circulation of the blood, the heart, the pulse, followed by a shift, around 1870, to animal locomotion, the gait of the horse, the flight of the bird, and finally, a turn to their *milieu*: air, water, space – “the animal without the animal,” as François Dagognet puts it.¹⁰⁵ Nor were Marey’s interests in animals strictly academic, so to speak. He lived amongst them in his laboratory home, a partitioned menagerie crammed with cages and aquariums – their inhabitants (frogs, turtles, insects) often found roaming his attic “beehive,” as the photographer Nadar described it in 1864. “Everywhere,” he wrote, “in every corner, life.”¹⁰⁶

“Animals were not simply one photographic subject among many,” Matthew Brower reminds us. “They were one of the key subjects driving the technical development of photography. Human subjects adapted themselves to the technology of photography (e.g., wearing back braces for early portraits), whereas animal subjects necessitated the adaptation of photographic technology to their situation.”¹⁰⁷ Marey and Muybridge were ethologists first, photographers second. They conformed the apparatus to the animal, not the animal to it. If we reverse their priorities, their achievement is straightforward: making legible movements too slow or too fast for human perception. But from a pre-ethological rather than pre-cinematic perspective, Marey did not just capture phenomena invisible to human perception but synchronized the visual apparatus to animal bodies. In a certain sense, Marey’s chronophotographic gun and Muybridge’s battery of cameras are simply animal *film bodies*, to

¹⁰⁵ François Dagognet, *Etienne-Jules Marey: A Passion for the Trace*, trans. Robert Galeta with Jeanine Herman (New York: Zone Books, 1992), 125.

¹⁰⁶ Nadar, [Félix Tournachon], “Le Nouveau président de la Société Française de Photographie,” *Paris-Photographe* 4 (1894): 4; quoted in Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830-1904)* (Chicago: University of Chicago Press, 1992), 4-5.

¹⁰⁷ Brower, *Developing Animals*, 21.

borrow Sobchack's term, and demonstration that "the mechanisms and technological instrumentation of the cinema" can also be oriented to *nonhuman* bodies and were so first. Such was Marey's discovery, in July 1882, when he synchronized "the aperture-disc's revolutions and those of the wing"¹⁰⁸ to make the movement of the bird's wings and that of the parallel fluttering images coincide.

Sobchack writes that while we as spectators "discover the film's body as 'inhuman'" its body is ultimately "the human body it pretends to appropriate."¹⁰⁹ But for Marey, the film body was only sensible as a nonhuman one that could see otherwise. In the same way that his *schémas*, as he called his synthetic models, simulated the phenomena they explained – a practice identified with the Weber brothers – the filmic apparatus simulated or embodied the animal itself, its temporality and movement. Indeed, the German tradition to which Marey was beholden – he was more closely allied to Johannes Müller (1801–1858) and his pupils (the Weber brothers, especially) than to Claude Bernard and his – would soon give rise to ethology, the study of animal behavior.¹¹⁰ One wonders whether the zoologist Friedrich Dahl's call for a "comparative ethology" in the 1890s, followed by Oskar Heinroth's four-volume ornithological study (1924–1933) – which laid the methodological foundations that his student Konrad Lorenz developed into a recognized science over the decade – would have been possible without Marey, who in some respects was the first to study *living* animals. Until the late nineteenth century, the study of animal life was based primarily on the comparative anatomy of dead specimens.¹¹¹ "Not

¹⁰⁸ Etienne-Jules Marey, "La Vol des oiseaux," *La Nature* 11 (June 16, 1883), 37; quoted in Dagognet, 98.

¹⁰⁹ Vivian Sobchack, *The Address of the Eye: A Phenomenology of Film Experience* (Princeton: Princeton University Press, 1992), 220, 242.

¹¹⁰ Ernst Heinrich Weber (1795-1878) and Eduard Friedrich Weber (1806-1871).

¹¹¹ Mary Henninger-Voss, "Introduction," xvi. The illustrators working at the Paris menagerie were unique for their visitations.

meadows, forests, or tidal pools, but instead cabinet drawers, display cases, and dissecting tables were the immediate habitats of the animals of the golden age of French zoology.”¹¹²

Early animal photographers also required their subjects to be dead – or sleeping. Keeping the animal in focus was difficult, due to the long exposure times of photographic plates, making studies of movement impossible. Nor could animals be photographed from long distances, much less in movement, until the introduction of the telephoto lens in 1898, previous to which a wildlife photographer would typically take a hundred exposures for every one successful picture.¹¹³ Before Marey, both photography and medicine required a trading of the animal’s life for its study – and even when simulated *as* alive, the animal was almost invariably rendered “still” or posed in “animal attitudes.”

That Marey’s chronophotographic gun has become an emblem of a violence implicit to cinematic ‘capture’ is in this regard ironic, and symptomatic of a general neutralization of Marey’s object and priority: the *living* animal. “With the chronophotographic gun,” according to Friedrich Kittler, “mechanized death was perfected. The history of the movie camera thus coincides with the history of automatic weapons. The transport of pictures only repeats the transport of bullets.”¹¹⁴ While the relation between Marey’s camera and a gun is striking and suggestive of a deeper connection between the two forms of shooting, its appropriation by a mythology of film as death, and capture as violence, can obscure its significance for *animal* representation. After all, accounts like Kittler’s overlook the essential fact that Marey’s chronophotographic gun specifically did *not* kill its subject, and did not require the customary

¹¹² Richard W. Burkhardt, Jr., *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology* (Chicago: University of Chicago Press, 2005), 2.

¹¹³ Brower, *Developing Animals*, 68.

¹¹⁴ Friedrich A. Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999), 124.

trade of an animal's life for its representation. For Marey, this distinction was paramount – the object of the “gun that has nothing murderous about it” was the ‘hard to picture’ momentum of animal life. Marey did not render the cinema “murderous” through the gun, but the gun life-affirming through cinema: instead of staying life and ‘stuffing’ it, the chronophotograph froze movement *without* freezing life.

Marey's later photographic studies of animal movement extended to anatomy a cardinal determination to preserve, even in the study of physiology and life processes, the living body as the medical object. His method, at its earliest, was established in direct and dramatic opposition to vivisection. Not for ethical reasons but for scientific ones. How could the very processes the vivisection was so violently disturbing be measured objectively? In an age dominated by Claude Bernard and his invasive techniques, Marey's dissent was unorthodox and controversial. Thus he “entered a field of his own,” as François Dagognet put it, “finding sampling methods as sensitive as they were nonviolent.”¹¹⁵ Nor, for Marey, were the limitations of vivisection strictly a matter of physiological disturbance: “of itself alone,” he observed, “vivisection ... can do no more, so to say, than lay bare the phenomenon simultaneously with the organ which is the seat of it; it reveals to our senses only what they are capable of perceiving.”¹¹⁶ Human perception was but vivisection by other means, and he often likened the two to each other as obverse forms of the same interruption. “When one has seen unprejudiced men, long used to physiological experiments, observing a bared heart and disagreeing over the order of the successive movements, one has to admit that the eye is not suitable for catching these complex movements that follow each other so rapidly.”¹¹⁷

¹¹⁵ Dagognet, 27.

¹¹⁶ Marey, “Natural History of Organized Bodies,” 288.

¹¹⁷ Etienne-Jules Marey, *Physiologie médicale de la circulation du sang*, 44; quoted in Dagognet, 23.

Instead of extending the senses, he wished to circumvent them entirely, so that the animal might “speak” the more directly, without *human* intermediary. Often overlooked in Marey’s prose is the way in which the *trace* becomes not “automatic” or “mechanical” when freed from the human hand or eye but rather the signature of the *animal*, which the graphical method permits to be “read” through a kind of eliminative neutrality, a self-effacing subtraction of everything human and material. The trace, for Marey, is the isolation of the animal, cleared of all interference. In the 1870s – after having moved on from internal movements but before having discovered photography – Marey devised an instrument for recording the leg positions of a trotting horse. Marey described the bar drawings, or “synoptical notations,” he created from this data as “written by the horse himself.”¹¹⁸ His findings, that all four hooves of a horse are in fact momentarily suspended, would move Stanford to enlist Muybridge to provide photographic evidence.

For illustrators and artists, Marey’s and Muybridge’s studies solved, instantaneously and dramatically, the mystery of animal posture and movement. The drawings the artist Emile Duhousset made from Marey’s graphic notations of the gaits of the horse populated his treatises on animal locomotion – and these were intended for artists. Quickly incorporated into preparatory studies by academic artists, the graphic notations, wrote Marey, “have no other pretensions than to be correct as regards the position of the members.”¹¹⁹ Ernest Meissonier, a pivotal figure in this regard, assisted Marey and Muybridge in illustrating their lectures on equine locomotion with traditional artworks throughout history – and after 1881, drawing such

¹¹⁸ Etienne-Jules Marey, “A Study in Locomotion,” *Nature* 19 (1879): 465; quoted in Braun, *Picturing Time*, 28. As the leg moved, the device, which consisted of rubber tubes attached directly to the horse’s cannon bone with a leather bracelet, permitted the air forced through the tubes by the pressure of the bracelet to be recorded by a mechanism held in the rider’s hand.

¹¹⁹ Braun, *Picturing Time*, 265.

comparisons became the exclusive problematic of Muybridge's work.¹²⁰ "Juxtaposing his photographs of animals in motion with equivalents in the world of painting and sculpture, he judged the extent to which these artworks were true to life or true to nature."¹²¹

Until Marey, birds in flight were thought to use "their wings as one rows a boat, pushing backward and downward and returning forward and upward."¹²² In altering theories of anatomy, Marey redrew the relationship *between* animals, discovering homologies of form and movement that challenged aesthetic as much as scientific conceptions of animal life: now, suddenly, horses seemed to fly, and birds to gallop! As an illustrator of living movement, Marey interrupts traditional metanarratives of the modern animal. Beginning with William Harvey – the experimental anatomist, author of the revolutionary essay *Motion of the Heart and Blood in Animals* (1628), and contemporary of Buffon – these histories tend to commit the early modern animal to a nascent disciplinary regime that will find its late perfection in behavioral analysis and industrial regimentation. Marey and Muybridge, according to this narrative, complete or perfect this long arc of objectification and instrumentalization. For Linda Williams, for instance, the "early modern consolidation of the animal as an *instrument* of human knowledge," which she traces to Harvey, is answered by Muybridge's battery and Marey's chronophotographic gun, which reduce the body to "an image of the body as a repeatable mechanism."¹²³ "This body

¹²⁰ "The drawings were also published to great acclaim in the *Gazette des Beaux Arts* between 1882 and 1883 and incorporated into preparatory studies by academic artists such as Meissonier." (Braun, *Picturing Time*, 265.)

¹²¹ Charles Musser, "A Cornucopia of Images: Comparison and Judgment across Theater, Film, and the Visual Arts during the Late Nineteenth Century," in *Moving Pictures: American Art and Early Film, 1880–1910*, ed. Nancy Mowll Mathews (Manchester, VT: Hudson Hills Press, 2005), 20.

¹²² Braun, *Picturing Time*, 35. "The tracings showed that the wings swept *forward* and *downward*, then on the upbeat traveled *upward* and *backward* until they began to make the next downbeat."

¹²³ Williams, "Modernity and the *Other Body*," 227. For Williams, whose history is representative of a vast literature that relates the early modern animal to a contemporary one, the Enlightenment introduced forms of discipline currently in crisis – a subject I return to in depth in a later chapter. "While instrumentalist regimes of technology may be as old as human history itself, there is no doubt that they have also been subject to condensed points of escalation. *One of these escalations occurred in the seventeenth century, and another is occurring now.* While the instrumentalist approach to animal flesh in early modernity serves as a metaphor for the idealist approach

mechanism,” she writes, “is controlled in the published work by a whole battery of machines (Muybridge employed 48 cameras in a normal set up) capable of arresting movement for further scrutiny; and it is controlled in the zoopraxiscope by a mechanism capable of reconstructing this movement as illusion.”¹²⁴ Marey and Muybridge, however, were interested in learning to *see* animals, and not primarily as clinical material, commodity, or machine. The techniques and technologies they developed were designed specifically to embody animal rhythms, invisible to ours.

If animals were not strictly represented as objects of violence in this period, nor were their bodies eligible for the sort of mechanization of which Marey is continually accused, and Foucault’s *dispositif* demands. While Marey’s work later inspired factory efficiency experts,¹²⁵ it had little use for regimenting animal bodies – for the same reasons that animals cannot stay still for a picture. In 1878, Marey published a long article in the popular Parisian scientific magazine *La Nature* that raised the broader question of the efficient use of the body. “Whether we employ the horse, the donkey, the camel, or the deer, the same problem is always posed: how to gain the greatest possible advantage from the animal and to spare it the most fatigue and suffering.”¹²⁶ Intended to ease suffering but with no clear application for animal labor, the portable *odograph* that Marey devised, to measure the gait of a man or an animal, found little practical use,¹²⁷ least

to the materiality of all flesh, it is also a crucial stage of development in the genealogy of instrumentalist techniques in general.” (229; my emphasis)

¹²⁴ Linda Williams, “Film Body: An Implantation of Perversions,” in *Narrative, Apparatus, Ideology*, ed. Philip Rosen (New York: Columbia University Press, 1986), 511–512.

¹²⁵ For an insightful analysis of Marey’s influence on the efficiency experts Frank and Lillian Gilbreth, see Elspeth H. Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884–1929* (Baltimore: The Johns Hopkins University Press, 2005), 84–106. For a broader discussion of Marey, modernism, and the “mechanics of the body,” see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: University of California Press, 1992), 84–119.

¹²⁶ Etienne-Jules Marey, “Moteurs animés: Expériences de physiologie graphique,” *La Nature* 279 (5 October 1878), quoted in Rabinbach, 100.

¹²⁷ Rabinbach, 100.

of all with regimenting animal movement. His modest recommendation? Replace the tether between horse and carriage with an elastic one. One can not, after all, instruct or train an animal in efficiency the way the Gilbreths would factory workers or Olympic coaches athletes. For the animal, the illustration and analysis of movement did not open on to the disciplinary techniques with which Marey's graphical notations are otherwise associated.

While biologists were taking bonesaws to rib cages to catch a glimpse of a beating heart and taxidermists were staging "life groups" with corpses, Marey was developing techniques for studying animal life that would in turn produce the cinema. For Marey, the study of animals' movements suggested less their discipline or destruction than their expression; less the means for their utility than the divulgence of their secrets. Quietly, at the origin of cinema, the animal was becoming a subject.

2.0 IMAGE CONTROL: ANIMAL SPECTATORSHIP, PHENOMENOLOGY, AND *POLITICAL ETHOLOGY*

“The animal confronting its own reflection in a mirror has complete control over the behavior of the image, and therefore the image is always attentive and ready to reciprocate when the animal is.”¹²⁸

Gordon G. Gallup, Jr.

In the 1930s Konrad Lorenz and Niko Tinbergen, the reputed founders of ethology, took Marey’s project one step further – from the analysis of anatomical movement to its discrete components. Though their projects, broadly construed, share certain analytic techniques, the animal imagined and represented by Marey – and Muybridge – belongs to another era and scientific paradigm. Even if, as we have seen, Marey returned the study of animal movement to the living, his animal is still *La Machine animale* – the titular concept of his 1873 work – and bears the stamp of a fading, nineteenth-century mechanicism. Isolated against a black backdrop to better measure their gait, Marey’s animals aspire to a solitary, repetitive, perpetual motion. “Predestined to serve as a symbol of movement itself,”¹²⁹ they are models for their own representation, illustrations of themselves, their likeness destined for art manuals and static tableaux. For Lorenz and Tinbergen

¹²⁸ Gordon G. Gallup, Jr. and Stuart A. Capper, “Preference for mirror-image stimulation in finches (*Passer domesticus domesticus*) and parakeets (*Melopsittacus undulatus*),” *Animal Behaviour* 18, Part 4 (November 1970): 624.

¹²⁹ Akira Mizuta Lippit, “...From Wild Technology to Electric Animal,” in *Representing Animals: Theories of Contemporary Culture*, ed. Nigel Rothfels (Bloomington: Indiana University Press, 2002), 124. “What is remarkable in Muybridge’s work, what immediately seizes the viewer’s attention, is the relentless and obsessive manner in which the themes of animal and motion are brought into contact – as if the figure of the animal were predestined to serve as a symbol of movement itself.” (123–124)

it is just the opposite. They want to make visible *behavior*, not movement; activities rather than anatomy; elicitation rather than locomotion. Thus, with Lorenz and Tinbergen, the animal movement that Marey had slowed to make visible, in a sense recedes – to further articulations and complex sequences of actions, instead of one, locomotive motion stuck on cinelooop, as Scott Curtis calls this early mode of enhanced repetition.

The origins of ethology and cinema in this way coincide acutely, forming a loop of their own: if the cinema was born of the study of animal movement, then ethology, the study of animal behavior, was born of the cinema. The first ethologists did not just use film as an instrument to study behavior; the behaviors themselves were unidentifiable without it, and the concepts they furnished indelibly marked by a cinematic logic and terminology. When the British ethologist C. Lloyd Morgan wrote to Eliot Howard “describing ‘instinctive modes of behavior’ as the kinds of behavior patterns that could be ‘described or pictured cinematographically,’” their description was identical to their discovery.¹³⁰ Long before genetic and digital concepts of sequencing and splicing converged – the subject of a later chapter – behavior was conceived of as sequential, like a reel, and elicited visually, for a spectator.

For example, in their perhaps most influential study, Lorenz and Tinbergen used ‘egg dummies’ of various shapes and sizes – a light wooden cube, a plaster of paris cylinder – to determine the thresholds at which birds would identify and respond to eggs and display instinctive ‘egg-rolling behavior’.¹³¹ “The rough innate mechanism of the egg depends on relatively very few sign stimuli,” they observed; “dummies of very different size and shape can

¹³⁰ Richard W. Burkhardt, Jr., *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology* (Chicago: University of Chicago Press, 2005), 117. For the cinematographer’s account of filming the “private lives” of gannets without zoom lenses and speed cameras, see Osmond Borradaile, *Life Through a Lens: Memoirs of a Cinematographer* (Quebec: McGill-Queen’s University Press, 2001), 51–53.

¹³¹ Konrad Lorenz and Nicholas Tinbergen, “Taxis and Instinctive Action in the Egg-Retrieving Behavior of the Greylag Goose,” in *Instinctive Behavior: The Development of a Modern Concept*, ed. Claire H. Schiller (New York: International Universities Press, 1957), 198, 201.

activate it. Consequently, by presenting suitable objects of specific form and size, we were able to create situations which made it easier to break up the total behavior pattern into its directed and released components.”¹³²

The *repeatability* of film – a term I take from Oliver Gaycken – served as both the control and means for identifying these components.¹³³ By analyzing the “motor sequence” frame by frame, Lorenz and Tinbergen were able to show that the greylag goose’s motor actions consist of precisely two, conjoined components: an instinctive behavior pattern elicited by the visual stimulus of an egg or egg-like object, and a “taxis,” which consisted of lateral-balancing movements that maintained the egg’s rolling in the direction of the nest. Together, they argued, the two components combined to produce a “functional unit of behavior with survival value”: the form of the instinctive motor pattern was moreover unlearned, invariable, and even “sometimes performed as a vacuum activity,”¹³⁴ in which cases “the reaction, as it were, announces itself spontaneously” from a “restlessness” that “makes the animal *seek* these key stimuli actively.”¹³⁵ Where Marey and Muybridge slowed to observe animal movement, Lorenz and Tinbergen compared such results: across films, behaviors, species, anatomies.

¹³² Lorenz and Tinbergen, “Taxis and Instinctive Action,” 198.

¹³³ “‘The Swarming of Life’: Moving Images, Education, and View through the Microscope,” *Science in Context* 24, no. 3 (2011): 361–380. “Moving images made time-based phenomena portable and repeatable, allowing investigators to circulate a record of an observation.” (362)

¹³⁴ Lorenz and Tinbergen, “Taxis and Instinctive Action,” 206.

¹³⁵ Konrad Lorenz, “The Nature of Instinct: The Conception of Instinctive Behavior” [1937], in *Instinctive Behavior: The Development of a Modern Concept*, ed. Claire H. Schiller (New York: International Universities Press, 1957), 171. Though I return to ethological interventions in discourses of psychology and psychoanalysis more fully in a later chapter, suffice it to say for now, the stimuli-response mechanism integral to instinctive motor patterns, and executed by filmic analysis, experiences a formal disjointment, behaviorally and filmically, in ‘purposive’ animal behavior. “The process that spurs the animal on to search, directly or at random, for a specific stimulus situation (the only one in which the innate releasing mechanism of the craved reaction will respond),” Lorenz writes, “is what I should like to call ‘drive’ (*Trieb*). I am full aware that this drive concept is even more remote from the conventional than my notion of instinctive action.” (Lorenz, “The Nature of Instinct,” 171–172) If Lorenz had brought a certain order to animal behavior and a welcomed clarity to vague, antiquated notions of instinct, his appeal to concepts of *drive* threatened to reintroduce to animal behavior an interiority unaccountable to calculation and unobservable to filmic record.

In September 1938, Lorenz presented his findings on the greylag goose to the German Society for Animal Psychology and the German Ornithological Society. The accompanying film, which he had been working on for two years, was distinguished by its technique of comparing film sequences of the behavior of closely related species. This method alone, Lorenz was confident, permitted the kind of “comparative ethology” Friedrich Dahl had envisioned in the 1890s, and that its irrefutable powers of documentation would silence his critics. “There is only one way out of this quandary, of course,” he wrote in an accompanying essay: “photography and, whenever possible, motion pictures. I am just now planning to study and film the very similar courting ceremonies of distantly related species of ducks of the genus *Anas*, as well as of crossbreeds between them, so as to gain support for my much-attacked claims concerning the homology of instinctive activities.”¹³⁶ Film was not only useful for identifying subvisible components of behavioral sequences, but also for comparing them – across anatomies and species, geographies and environments – and persuading critics. After concluding a long tour in the United States, Lorenz told William H. Thorpe, in a letter dated 11 March 1955, “The best means to convince people that there is such a thing as instinctive movements is film. I played duck films to [American ethologist] Frank Beach until he nearly fainted, he got seriouser and seriouser and in the end he said in a small voice: ‘You know I did not believe a word of it and now I believe everything.’”¹³⁷

For Lorenz and Tinbergen animal movement was less locomotive than cinematic: not an engine but a reel. For Marey, movement was cyclical, repetitive; for Lorenz and Tinbergen, it was composed of strips, sequences, series. Instinctive behaviors were conceived of not simply as filmable but as filmic – composed of discrete units in an immutable sequence – and visually

¹³⁶ Lorenz, “The Nature of Instinct:,” 151.

¹³⁷ Burkhardt, *Patterns of Behavior*., 401–402.

elicited, like a projector animated by a camera to which it is attached. Just as Marey slowed time to make visible animal movement, Lorenz slowed behaviors to make visible their elicitation.

With Lorenz and Tinbergen, animals pass quietly from object to subject, from movement to perception: or rather, behavior subsumes movement as a function of the visual field, the structures of which filmic technologies were uniquely disposed to identify – and embody. Like Marey, who claimed of his graphic notations to “have no other pretensions than to be correct as regards the position of the members,”¹³⁸ the force of Lorenz and Tinbergen’s methods was descriptive. Explaining the mechanisms underlying their accomplishment, or discerning the evolutionary history of their development, was secondary to establishing the richness and complexity of perception they furnished. After Lorenz, animal movement could no longer be described in isolation. However flawed his conclusions, Lorenz’s animal opened outward, onto a vast, enigmatic network of lifeforms and their uneven development. Muybridge’s horse ran in circles, Marey’s in place; but Lorenz’s geese flew through evolutionary time, across continents and ecologies.

The most prominent criticisms of their methods, and later devastatingly articulated by Daniel Lehrman in a 1953 paper, were concerned primarily with the descriptive register and explanatory deficit of the fixed action pattern (FAP) concept. While certain behaviors, such as pecking, do appear innate and stereotypical, Lehrman argued, the “systematic stability of a characteristic does not indicate anything about its mode of development”: thus “limited by preconceptions of isomorphic resemblances between neural and behavioral phenomena,” Lorenz and Tinbergen’s “category of ‘innate’ therefore includes very different kinds of behavior, which

¹³⁸ Marta Braun, *Picturing Time: The Work of Etienne-Jules Marey (1830-1904)* (Chicago: University of Chicago Press, 1992), 265.

involve learning in many different ways.”¹³⁹ On account of their biological ambiguity, Lorenz’s terminology would hence undergo a series of modifications to confine their description to the surface of actions and refuse speculation as to their cause. Indeed, the term fixed action pattern had itself replaced Lorenz’s preferred “innate motor pattern.”¹⁴⁰ This “term was unfortunate,” George Barlow reported in a 1968 paper, before successfully suggesting “modal action pattern” (MAP) replace FAP, “because it contains an explanation that extends beyond the appearance of the behavior.”¹⁴¹

Barlow’s paper on “Ethological Units of Behavior” marks a final transformation of the cinematic logic of visibility and surface appearance that Lorenz introduced to ethology. Though Barlow, like Lorenz, makes an “appeal for the use of film analyses in studying the nature of the fixed action pattern” – indeed, he describes the fixed action pattern itself *as* a “film strip containing the complete performance, which must be started at the beginning each time it is run through”¹⁴² – Barlow’s confusion of object and method is ultimately neutralized, or rendered discursive, by his insistence on a modality to, rather than fixity of, behavioral patterns, on account of recent film analyses having shown that action patterns can be modified mid-performance, thus dispensing with the identification of behavior with a strictly sequential, cinematic logic.¹⁴³ Animals, it turned out, can improvise.

¹³⁹ Daniel S. Lehrman, “A Critique of Konrad Lorenz’s Theory of Instinctive Behavior,” *The Quarterly Review of Biology* 28, no. 4 (December 1953): 346, 358–359, 347.

¹⁴⁰ The still-nascent field perhaps experienced its first fissures at the Society for Experimental Biology’s symposium “Physiological Mechanisms in Animal Behavior,” held in Cambridge (July 18–22, 1949). The symposium featured a series of roundtable discussions organized by William H. Thorpe to address increased confusion over the precise meaning of a number of Lorenz’s terms: “instinct,” of course, but also “action-specific energy,” to which Lorenz “agreed, at least in principle, with the suggestion that the more neutral phrase ‘specific action potential’ (SAP) be used as a simple description of the potentiality of an animal to display a certain type of behavior at a given time.” (Burkhardt, 320)

¹⁴¹ George W. Barlow, “Ethological Units of Behavior,” in *Foundations of Animal Behavior: Classic Papers with Commentaries*, ed. Lynne D. Houck and Lee C. Drickamer (Chicago: University of Chicago Press, 1996), 229.

¹⁴² Barlow, 223, 220.

¹⁴³ Barlow for examples notes that in “some films by [T. H.] Frazzetta, which he was kind enough to show me, a

Lehrman's critique in this way less discredited than freed Lorenz and Tinbergen's observational techniques from the burden of explanatory frameworks. After Lehrman presented his paper, which was followed by the "Group Processes" conference (September 26–30, 1954) in Ithaca, Tinbergen was much more circumspect than Lorenz. In response to Lehrman's objection to the term 'innate releasing mechanism' for describing the "behavior of animals vastly different from one another, Tinbergen denied that ethologists believed that 'the physiological must be the same in all cases.' This, he declared, was something he and his colleagues had never believed and never implied. They had used the term provisionally and functionally. They had not prejudiced their thinking with respect to how the behavior was actually achieved. They did not suppose that IRMs in greatly different animals were in fact homologous structures. 'Here,' Tinbergen protested, 'I honestly feel that our critics merely show a lack of zoological training.'"¹⁴⁴

If Tinbergen's conclusions have largely been overturned, his techniques of observation have not. While Lorenz felt at home in the lab – like Marey, his home *was* his lab – Tinbergen preferred the field. Both, however, conceived of movement as behavior, and its singular, coherent effect a sequence that could be made to divulge, to the camera, its constitutive forms. Marey's animals are big, broad, extensive in space; Lorenz and Tinbergen's collapse inward, their movements virtually invisible, divisible, and only able to be made visible by an apparatus of extraperception. In this way, Lorenz and Tinbergen made animal movement a function of

python is able to slow the strike in mid-flight when the rat moves, to compensate, to take fresh aim, and to continue the strike. This all occurs in just a few frames taken at a high speed, undetected by the eye of the observer. Without the use of film analysis one would have assumed this is a fixed action pattern running its course, immune from further environmental modulation." (223) Film, as Frazzetta's study indicates, would increasingly be concerned with dynamic and responsive, rather than 'fixed', modes of perception. Barlow is referring to T. H. Frazzetta, "Studies on the Morphology and Function of the Skull in the Boidae (Serpentes). Part II. Morphology and function of the jaw apparatus in *Python sebae* and *Python molurus*," *Journal of Morphology* 118 (1966): 217–296.

¹⁴⁴ Burkhardt, 401.

animal perception; understanding the latter would explain the former. Their work made the phenomenology of animal experience a cinematic object.

2.1 ANIMAL PERCEPTION, PHENOMENOLOGY, AND “OPTICAL MACHINES”

In *The Address of the Eye*, a text that revived phenomenological approaches to film and affirmed the “sensate body” of the spectator, Vivian Sobchack concludes a short meditation on watching her cat look behind the television for the bird pictured on it with a remark that at once raises the question of an animal spectator – and withdraws it. “In short,” she writes, “despite the old saying that suggests the democracy of vision, a cat cannot look at a king for the very same reasons it cannot see a film.”¹⁴⁵

Though Sobchack’s armchair observation that aesthetic and political representation are biologically indissociable, and as such unavailable to nonhuman animals, no doubt invites demonstration “that the animal is already political,”¹⁴⁶ in this chapter I want to instead attend to the role of the screen, the cinema, and visual technologies in facilitating the discursive and theoretical perseverance (but actual and practical imbrication) of human and nonhuman spectatorship; the broad ontological crisis animal perception represents to scientific and

¹⁴⁵ Vivian Sobchack, *The Address of the Eye: A Phenomenology of Film Experience* (Princeton: Princeton University Press, 1991), 53. “Both king and film are visible objects perceived in an interpretive strategy that perceptually constitutes their particular meaning on a ground of prior reflexive knowledge. That knowledge is of the lived-body as both the *subject of seeing* and an *object for seeing*.”

¹⁴⁶ Jacques Derrida, *The Beast and the Sovereign: Volume 1*, tr. Geoffrey Bennington (Chicago: The University of Chicago Press, 2009), 18. Derrida goes on to say he could “exhibit, as is easy to do, in many examples of what are called animal societies, the appearance of refined, complicated organizations, with hierarchical structures, attributes of authority and power, phenomena of symbolic credit, so many things that are so often attributed to and so naively reserved for human *culture*, in opposition to *nature*.” (14–15) Indeed, Derrida’s two volume work is devoted to exploring the mutual determination of “these two beings-outside-the-law or ‘without laws’ or ‘above the laws’ that beast and sovereign both are when viewed from a certain angle.” (18)

philosophical inquiry; and its absolute priority to the perceptual strategies on which various biopolitical techniques depend. In equating the screen, as a “place of representation,” with politics and power, Sobchack’s refusal might, then, also be seen as an invitation or opening: to reconsider, with fresh eyes, not only the biological nature of the “interpretive strategies” and modes of “self-consciousness” for which she finds animals lacking but also the political strategies of recognition and inclusion for which the perceptual performance of the spectator is decisive.

Though for Sobchack the embodied spectator is a “kinesthetic subject/body” living a “corporeal-somatic existence,” as Christiane Voss puts it, the language and identification of “surrogate corporeality”¹⁴⁷ avoids any commitment to a comparative ethology, this despite a reliance on vaguely physiological or biological concepts traditionally reserved, in their crudity, for animal cognition. While the affective turn of film scholarship heralded by Sobchack’s work otherwise invites or affirms the dismantling of consciousness, as a transcendental signifier of mastery, into a complex distribution of physiological, affective, and attentive processes, the question of an animal spectator, or the prospect of spectatorship collapsing animal and human bodies, would seem to have inspired its limited recuperation. “Seeing the world with eyes is a condition of incarnate being available to an animal or a newborn infant,” Sobchack notes, “but seeing the world with one’s own eyes – as an I, a viewing subject – is a condition not only of incarnate being but also of reflexive and reflective consciousness, a consciousness aware of its embodiment and situation and its own activity of seeing.”¹⁴⁸

Animals’ relative *immersion* in visual representation, or rather their failure to distinguish

¹⁴⁷ Christiane Voss, “Film Experience and the Formation of Illusion: The Spectator as ‘Surrogate Body’ for the Cinema,” *Cinema Journal* 50, no. 4 (Summer 2011): 149.

¹⁴⁸ Sobchack, *The Address of the Eye*, 51.

between reality and mediation, is however precisely what, in practice, eludes ethological experiments. When her “cat purposefully walks *behind* the screen to look for another mode of access to that object,” its misapprehension becomes, for Sobchack, evidence that the screen “mediates my cat’s direct and immediate access to what it sees, but it does not become for my cat a place of representation.”¹⁴⁹ The relationship between animal perceptual systems and moving images is, however, more complex. Indeed, the remark by Richard Dyer that Sobchack devotes an essay to unpacking – the “celebration of sensational movement, that we respond to in *some still unclear sense* ‘as if real’, for many people *is* the movies”¹⁵⁰ – cannot be easily distinguished from those of ethologists, for whom the affective responses of animals to video playback are equally intermediary and scandalous to ontological assumptions of perception and an extramental reality. In a broad review of video playback experiments, Richard D’Eath notes that “animals *mostly* seem to respond to video images in a *similar* way to the real stimuli they depict,”¹⁵¹ just as Innes C. Cuthill et al., in a review of avian video playback experiments, conclude that, contrary to initial expectations, “video playback will be most powerful not where it is necessary to fool the bird into believing an image is the real thing, but where it is used for psychophysical experiments, or as a tool for dissecting responses to stimulus elements.”¹⁵² “After all,” they note, “this is how computer and video technology is used in human psychology, without requiring that a human subject perceive an image as ‘the real thing’.”¹⁵³ Animals, in other words, experience that “transfer of reality from the thing to its reproduction” that for André

¹⁴⁹ Sobchack, *The Address of the Eye*, 53.

¹⁵⁰ Richard Dyer, “Action!,” *Sight and Sound*, 4, no. 10 (October 1994), 8; quoted in Vivian Sobchack, “What My Fingers Knew: The Cinesthetic Subject, or Vision in the Flesh,” *Senses of Cinema* 5 (April 2000). Emphasis is Sobchack’s, not Dyer’s.

¹⁵¹ Richard B. D’Eath, “Can video images imitate real stimuli in animal behaviour experiments?” *Biological Reviews* 73, no. 3 (August 1998): 271, my emphasis.

¹⁵² Innes C. Cuthill et al., “Avian colour vision and avian video playback experiments,” *acta ethologica* 3, no. 1 (August 2000): 36.

¹⁵³ Cuthill et al., “Avian colour vision and avian video playback experiments,” 36.

Bazin renders their ontologies “identical.”¹⁵⁴ That this feeling of muted presence “gives us the thing/event itself”¹⁵⁵ – it’s not as strong as the presence of the actual object but still powerful enough to aspire to it – is an effect that cannot easily be confined to human receptions of moving images.¹⁵⁶

In this regard, it’s not that animals can’t see images properly, but that the concept and production of the *image*, as a sentry of *being*, must refuse access to the one in order to refuse access to the other. “Thus, the mediation of *being* that *is* vision will forever elude its consciousness of experience,” Sobchack writes. “The screen exists for my cat like a pane of glass.”¹⁵⁷ In this sense, where screens become interfaces for *being*, it’s not just that, to use Giorgio Agamben’s well-known formulation, the “anthropological machine” is an “optical machine” for “producing the recognition of the human” but that optical machines participate in the production of the anthropological.¹⁵⁸ Indeed, that ‘self-recognition’ and ‘self-awareness’ tests are conducted on animals using mirrors, despite the given species’ varying physiological ability to match motor to visual information in a particular way, merely externalizes the mirror *figure* implicit to a “reflexive and reflective consciousness,” or rather to consciousness as self-reflexivity. In the most influential of these studies, Gordon Gallup used mirrors to test various species’ capacities to identify in a mirror marks drawn on their foreheads, the successful

¹⁵⁴ André Bazin, “The Ontology of the Photographic Image,” in *What is Cinema?, Volume 1*, tr. Hugh Gray (Berkeley: University of California Press, 2005), 14. In Daniel Morgan’s reading, “Bazin seems to say that our desire to speak of the content of a photograph as if we were present to it — ‘She’s in front of the building,’ ‘He’s wearing a red shirt,’ ‘See?’ — registers not a temptation but an ontological fact.” (Daniel Morgan, “Rethinking Bazin: Ontology and Realist Aesthetics,” *Critical Inquiry* 32, no. 3 (Spring 2006): 450–451.)

¹⁵⁵ Morgan cites Bazin as observing that “In the [non-fiction] film about Manolete...we are present at the actual death of the famous matador and while our emotion may not be as deep as if we were actually present in the arena at that historic moment, its nature is the same” (André Bazin, “Theater and Cinema—Part Two,” in *What Is Cinema?, Volume 1*, 98). “Bazin here draws a contrast between emotional presence — which can occur with a representation — and real, physical presence: the film gives us the thing/event itself.” (Morgan 450n26)

¹⁵⁶ Or if it can be, it’s not clear that it would commute into the sharp ontological distinction between human and animal that it is traditionally credited as indicating.

¹⁵⁷ Sobchack, *The Address of the Eye*, 53.

¹⁵⁸ Giorgio Agamben, *The Open: Man and Animal*, tr. Kevin Attell (Stanford: Stanford University Press, 2004), 26.

recognition of which was taken to indicate not only rudimentary “self-awareness” but also a biological “ability to infer the existence of mental states in others (known as theory of mind, or mental state attribution).”¹⁵⁹ As an unassuming cinema of sorts (where camera, screen, and spectator converge), the mirror aspires to a transparency and universality of vision that link sense and self, representation and consciousness, technology and nature.

The mirror, like glass – two figures that mark out a naturalized optics – embodies the dream of an immaterial materiality, an object without substance, image without medium. That Sobchack appeals to both – *because* the animal “cannot see *that* they see,” the screen can only be a “pane of glass” – to render the animal oblivious is to not only overlook glass and mirrors *as* screens but to employ them, as optical machines, *to* screen – animals from humans, of course, but also, just as importantly, the screens themselves from the conditions they require to be identified as such. Indeed, when certain experimental results pertaining to the mate selection of zebra finches could not be replicated across ostensibly identical laboratory conditions, Sarah Hunt et al. traced the discrepancies to the artificial illumination fixtures with which modern research facilities are equipped! Because “standard laboratory lighting is weak in emission of UV wavelengths compared with natural daylight” and “choice trials sometimes involve the use of mirrored or one-way glass, which often absorbs UV light,” the finches’ sexual preferences

¹⁵⁹ Gordon G. Gallup, Jr., James R. Anderson, and Daniel J. Shillito, “The Mirror Test,” in *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition*, ed. Marc Bekoff, Colin Allen, and Gordon M. Burghardt (Cambridge: The MIT Press, 2002), 329. Using chimpanzees with significant prior familiarity with mirrors, Gallup anesthetized his subjects and marked their foreheads to see if, upon waking, they could identify the mark when looking in a mirror. The marked chimps who were given a mirror touched their foreheads more frequently than those who were not. In the forty years since the experiment, however, the conclusions Gallup drew have either been largely discredited or radically reinterpreted. Though the literature on the subject is extensive, for comprehensive methodological reviews, see: Swartz & Evans (1991), who found that, in actuality, only about ten percent of chimps pass the test, which suggests that Gallup’s conclusions cannot be used to describe the species *in toto* much less an evolutionary breakage point; Schilhab (2004), for a more systematic analysis of mirror test literature and their methodologies; and Bard et al. (2006) for a discussion of the various inappropriate uses of this data to compare chimpanzees to human infants.

were altered though they were the no less consistent.¹⁶⁰ After all, the conditions that make possible an “affective entanglement” with images must exceed the ability to “situate” ourselves “uniquely in it as the ‘Here, where I am,’ as the place and origin of access to the visible.”¹⁶¹ If “vision *is* the mediation *of* being,” what reflexive mode *of* vision could be adequate to the *being* of vision?

While invocations of mirrors, both real and figural, in the construction and screening of animal consciousness draw tacitly on theories of the mirror stage in human psychology, the mode of ‘ego formation’ it describes was actually originally an ethological observation. Indeed, Jacques Lacan’s general theory of the formation of the self through external phenomena was directly inspired by Roger Caillois’ theory of “legendary psychasthenia,” which for the Surrealist social theorist refers to the ability of some animal species to alter their appearance in response to their physical environment. “We have only to recall how Roger Caillois,” Lacan writes in “The Mirror Stage,” “illuminated the subject by using the term ‘*legendary psychasthenia*’ to classify morphological mimicry as an obsession with space in its derealizing effect.”¹⁶² The mirror stage not only extends to animals but indicates a grounding in broad biological processes.

That a *Gestalt* should be capable of formative effects in the organism is attested by a piece of biological experimentation that is itself so alien to the idea of psychical causality that it cannot bring itself to formulate its results in these terms. It nevertheless recognizes that it is a necessary condition for the maturation of the gonad of the female pigeon that it should see another member of its species, of either sex; so sufficient in itself is this condition that the desired effect may be obtained merely by placing the

¹⁶⁰ Sarah Hunt et al., “Ultraviolet vision and band-colour preferences in female zebra finches, *Taeniopygia guttata*,” *Animal Behaviour* 54, no. 6 (December 1997): 1384.

¹⁶¹ Sobchack, *The Address of the Eye*, 51.

¹⁶² Jacques Lacan, “The Mirror Stage as Formative of the Function of the I,” in *Ecrits*, tr. Jacques Alain Miller (New York: Routledge, 2001), 3.

individual within reach of the field of reflection of a mirror.¹⁶³

For Lacan, opposite Sobchack, the real and the fictive could not be properly distinguished through a visual discrimination test because life, broadly writ, “situates the agency of the ego, before its social determination, in a fictional direction” that is first assumed through perception.¹⁶⁴ In this view, Sobchack’s identification of self-consciousness with the capacity to “situate” one’s self as a seeing subject neglects the subject’s formation by what is seen. For Caillois, however, morphological mimicry refers to a more fundamental process of “depersonalization through assimilation into space”¹⁶⁵ that not only exceeds its usefulness, as a form of defense for example, but precludes its self-conscious apprehension. The body itself is formed through and by its environment, with which it is thus indissociable – and always threatened by a more permanent assimilation. “The case of the Phyllidae [*sic*] is even more wretched,” Caillois notes. “They graze on each other, literally mistaking other Phyllidae [*sic*] for real leaves.”¹⁶⁶ In her essay on Sobchack’s film body and “surrogate corporeality,” Christiane Voss borrows Robert Musil’s concept of a “loan body” to describe the relationship between spectator and film as one where the former “‘loans’ a three-dimensional body to the screen”; but for Caillois the opposite must first be true: the body itself is loaned by its environment, of which *it* constitutes a “genuine photography” – that is, a “photography of shape and relief, on the order of objects and not of images; a three-dimensional reproduction with volume and depth: sculpture-photography, or better yet *teleplasty*, if the word is shorn of all psychic content.”¹⁶⁷

¹⁶³ Lacan, 3.

¹⁶⁴ Lacan, 3.

¹⁶⁵ Roger Caillois, “Mimicry and Legendary Psychasthenia,” in *The Edge of Surrealism: A Roger Caillois Reader*, ed. Claudine Frank (Durham: Duke University Press, 2003), 100.

¹⁶⁶ Caillois, 97. As if subject to the cryptic phenomenon described, the *word* Phyllidae is frequently misspelled as Phyllidae.

¹⁶⁷ Voss, 145; Caillois, 96.

Caillois' conception of the body as a three-dimensional image of its environment, and Lacan's conception of mirrors as productive rather than reflective of the self, warn us that in using the screening of images to screen bodies we too run the risk of mistaking the screen as existing "*external to and other than*" our being.¹⁶⁸ Not only do we, like a chick rolling an egg, know things we did not learn, we show ourselves only what we can see. If for the mirror stage to be achieved the image need only be "sufficiently close," as Lacan notes of the migratory locust's maturation, it is because the affect of the image depends on an internal structure, or gestalt, of perception that the film body must "animate" rather than simulate. Thus, "the transition within a generation from the solitary to the gregarious form can be obtained by exposing the individual, at a certain stage, to the exclusively visual action of a similar image, provided it is animated by movements of a style sufficiently close to that characteristic of the species."¹⁶⁹

It is precisely these "movements of a style sufficiently close" that ethology, from the start, has been concerned with reproducing: from Lorenz and Tinbergen's early visual experiments eliciting instinctive "action patterns" to recent deconstructions of digital cameras to simulate color as birds see it, attempts to optimize the film body to nonhuman spectators and produce images, movements, colors, and affective responses that are either meaningful or natural, have challenged not only conceptions of what constitutes an object or event but also what it means to perceive or experience.

¹⁶⁸ Sobchack, *The Address of the Eye*, 51, 53.

¹⁶⁹ Lacan, 3.

2.2 NONHUMAN FILM BODIES, INDEXICALITY, AND COLOR SIMULATION

While the first simulation experiments resembling the one Sobchack describes were a failure, their *results* were a success and led to a fundamental reorganization of the field, in two senses. *First*, it was found that the more simple and formal, rather than verisimilar and realistic, the cue, the more affective and natural the response. In fact, videographic and psychophysical experiments have found the movement *of* moving images to bear an inverse relation to the verisimilar richness of phenomena. Because color vision compromises sensitivity and spatial resolution, directional motion detection is generally color blind.¹⁷⁰ Thus, in an influential study that ostensibly obviated the technological limitations of videographic equipment but in fact exploited them to isolate gestaltist forms, Evans et al. (1993) found that when chickens make appropriate responses to video playbacks of aerial predators, the size and speed of an approaching object are more important cues than color detail.¹⁷¹ *Second*, where it had been assumed that standard digital cameras and monitors were sufficiently indexical or representative of an objective environment, studies increasingly came to appreciate the radical difference amongst animal perceptual systems, especially with respect to color.

Difficulty relating movement to color for animal perception is not strictly a matter of technological limitation. The uncertain relation between the two shaped the discipline's origins,

¹⁷⁰ For an analysis of how the "spectral radiance of natural objects" is processed after "the surrounding world is first sampled spatially, temporally and spectrally by an array of pre-filters," see J. H. von Hateren, "Spatial, temporal and spectral pre-processing for colour vision," *Proceedings of the Royal Society of London B* 251, no. 1330 (January 1993): 61–68. In dim light, many vertebrates lack color vision, and directional motion vision is often based on signals from one spectral type of receptor.

¹⁷¹ C. S. Evans, J.M. Macedonia, and P. Marler, "Effects of apparent size and speed on the response of chickens, *Gallus gallus*, to computer-generated simulations of aerial predators," *Animal Behaviour* 46, no. 1 (July 1993): 1–11. Nor is the identify of the species essential for the elicitation of alarm calls, even when images of live conspecifics are used, as in: C. S. Evans and P. Marler, "On the use of video images as social stimuli in birds: audience effects on alarm calling," *Animal Behavior* 41, no. 1 (January 1991): 17–26.

as it did cinema's broadly: on one side, Lorenz and Tinbergen, on the other, Karl von Frisch who famously experimented with bees, their 'waggle dance', and their capacity for fine color discrimination.¹⁷² Not until 1973 would the three of them be awarded, retroactively, a shared Nobel prize for establishing the science of ethology. At this present juncture, increasingly sophisticated digital technologies aspire to an "animal cinema."

The use of digital technology to produce realistic or affective images for animals encounters obstacles familiar to film theorists. In the indexicality debates inspired by Bazin that helped establish film studies as a discipline, and which have been revived with intensity by digital film, color has always been a problem. If movement recorded on film is indexical, color certainly is not. In the earliest films, it was applied by hand to each frame, and later, with the introduction of Technicolor in the 1930s, involved aligning red and green prints with the film stock.¹⁷³ "More important than the question of whether or not color was verisimilar was the question of whether or not it was *perceived* as verisimilar."¹⁷⁴

Color, more so than movement, must be optimized to a specific visual system and then applied to the image. Which is to say, film does not index or simulate color but affirms all color as special effect. Indeed, the principle upon which (color) video depends – namely, that as long as two objects induce the same mixture of cone stimulations, they will be perceived as the same

¹⁷² That von Frisch's work did not, at the time, intersect with Lorenz and Tinbergen's is testament to the consolidation of once disparate ethologies in the postwar era.

¹⁷³ For a discussion of color in early film and how publicity debates "over which company had the more 'natural' coloring system" separated "color realism from photographic indexicality, making color an aspect of pictorial iconicity rather than an attribute of the world as it is," see: Joshua Yumibe, *Moving Color: Early Film, Mass Culture, Modernism* (New Brunswick: Rutgers University Press, 2012), 128. Though for Yumibe "emphasis on color's realistic function is too limiting to account fully for color's role in the cinema" (7), what I would like to suggest is that the concept of "indexical color" is itself constrained by the psychophysical orientation of the film body and is in that regard indexical not of an objective extramental world but of a particular visual system's relationship to it.

¹⁷⁴ Richard Misek, *Chromatic Cinema: A History of Screen Color* (Hoboken: Wiley-Blackwell, 2010), 46.

color even if the underlying radiance spectra differ – is simply the “principle of univariance”¹⁷⁵ underlying all color effects, *in vivo*: because individual photoreceptors are color blind, so to speak, the intensities of two visible spectra can always be adjusted to give equal responses.¹⁷⁶ In other words, though the “colour of a TV image is a simulation, not a reproduction, of the spectrum of the filmed object,”¹⁷⁷ the production of that image – its composition from triplets of dots that correspond to the three types of phosphors that stimulate each human cone in isolation – reproduces human color perception itself, as a visual system.¹⁷⁸ And not only do species sharing the same terrestrial environment perceive the color of the same objects differently, but color experiences are generally not easily confirmed with nonhuman spectators. As a result, animals – and especially birds, who see UV, and are the experimental subject of choice – can be expected to perceive representations on human standard equipment completely differently than they would in real life. Thus, after conducting an exhaustive review of avian playback experiments, Martin Stevens et al. set out to deconstruct and rebuild a digital camera to take images of and for avian spectators. The result was what must be the first genuine animal film body for an animal audience. Because cameras do not record UV (and televisions actually emit it), their efforts required designing an attachment that did, and then interpolating this data with that recorded by

¹⁷⁵ See W. A. H. Rushton, “The Ferrier Lecture, 1962: Visual Adaptation,” *Proceedings of the Royal Society of London B* 162, no. 986 (March 16, 1965): 20–46. Rushton’s elaboration of this now fundamental principle of color vision begins with an extended and subtle discrimination between the eye and the camera. Indeed, while concepts of the *lens* are routinely invoked, both metaphorically and physiologically, in filmic discourses of the “camera eye,” these approaches tend to overlook the obverse use of the camera as a model *for* principles of perception. “A careless beginner in photography will find that some of his pictures are under- and some overexposed unless he uses a camera with an automatic exposure device that avoids this trouble. The eye naturally must have such a device if we are to get good visual pictures over the enormous range of light intensity throughout which we can make fairly good discrimination – a range of about 10^{10} . This automatic mechanism is called ‘*adaptation*’ and is the subject of this Lecture.” (20)

¹⁷⁶ An object is only perceived as white, for example, when all cone classes are stimulated in similar proportions, making tetrachromatic species’ perception of white different from ours.

¹⁷⁷ Cuthill et al., “Avian colour vision and avian video playback experiments,” 31.

¹⁷⁸ It’s not just that, as D’Eath notes, the “reproduction of a realistic range of colours by televisions and video monitors therefore relies on certain features of human colour vision” (269) but that, ontologically, color itself is not clearly, or functionally, an objective feature.

the camera.

Even so, birds do not simply see more of the same spectrum; they process shared wavelengths differently, and determining that process requires not only an understanding of retinal spectral sensitivities but also the “spectral tuning” performed by the oil droplets that cover birds’ eyes, the neural processing that occurs post-retina, and the interferences introduced by laboratory lighting. Further, the identification of part, shape, pattern, or object can depend on its color, which is phenomenal and nonobjective. Stevens et al.’s “investigation of colour patterns on lepidopteran wings, and how these might be viewed by avian predators” demonstrates this difficulty succinctly.¹⁷⁹ While commonsense conceptions of camouflage and crypsis depend on assumptions of objective boundaries and their subjective “edge detection,” “regions of interest with complex boundaries may be only discernable by animals with a high enough spatial acuity,” Stevens et al. note. “Furthermore, there is a specific problem with gradual boundaries, particularly relating to defining where the actual edge of the colour region is.”¹⁸⁰ Although edge detection algorithms can be used to “determine edges in an image, corresponding to sharp changes in intensity (either luminance or in terms of individual colour channels),” they are not implicitly “linked to any specific visual system”¹⁸¹ – which is precisely what makes them useful for optimization to a species, but also, for that reason, indicative of the embodied nature of all

¹⁷⁹ Stevens et al., “Using digital photography to study animal coloration,” *Biological Journal of the Linnean Society* 90, no. 2 (February 2007): 212.

¹⁸⁰ Stevens et al., “Using digital photography to study animal coloration,” 229.

¹⁸¹ Stevens et al., “Using digital photography to study animal coloration,” 229. For an early computational edge detection technique informed by “several basic psychophysical findings” that argues that “intensity changes in images arise from surface discontinuities or from reflectance or illumination boundaries, and these all have the property that they are spatially localized,” see: D. Marr and E. Hildreth, “Theory of Edge Detection,” *Proceedings of the Royal Society of London B* 207, no. 1167 (February 1980): 187–217. For a recent, sophisticated technique for investigating “the mechanism by which disruptive patterns reduce detectability, using a computational vision model of edge detection applied to photographs of our experimental stimuli, calibrated for bird colour vision,” see Martin Stevens and Innes C. Cuthill, “Disruptive coloration, crypsis and edge detection in early visual processing,” *Proceedings of the Royal Society of London B* 272, no. 1598 (September 2006): 2141–2147.

boundaries and edges, objects and attention.

One need only compare Stevens et al.'s alternately rendered images of moths to the famous image demonstrating "industrial melanism" that Bernard Kettlewell took in the 1970s to see, in its starkest form, the passage between ethological paradigms. Kettlewell's image is possibly the most reproduced demonstration of evolution 'in action': scarcely an evolutionary science textbook fails to include it. In the 1950s, Kettlewell published a study that found that because soot blown downwind from industrial areas had blackened the trees, white moths otherwise camouflaged were rendered suddenly visible to bird predation, thereby rendering moths with a mutant black gene more fit for survival. As a presumably self-evident "visual argument" for evolution, the photographic "'image' of natural selection," and accompanying film Tinbergen produced to substantiate his colleague's findings, appeared irrefutable.¹⁸² The camera, however, had simply imposed a human-oriented film body upon avian subjects who neither perceived the contrast between moth patterns and background color in this way, nor even predated, as it turned out, on moths.¹⁸³ In other words, the photograph, as a mode *of* vision, assumed what it purported to document: a particular visual relationship between organism and environment.

In this way, for Tinbergen and the early ethologists film acted *as* an animal, or rather as

¹⁸² Douglas Kellogg Allchin, "Kettlewell's Missing Evidence, A Study of Black and White," *Journal of College Science Teaching* 31, no. 4 (December 2001): 240, 241.

¹⁸³ As a number of studies following Kettlewell's have demonstrated, most famously Finnish zoologist Kauri Mikkola's 1984 study, "the normal resting place of the Peppered Moth is beneath small, more or less horizontal branches (but not on narrow twigs), probably high up in the canopies, and the species probably only exceptionally rests on tree trunks." (Kauri Mikkola, "On the selective forces acting in the industrial melanism of *Biston* and *Oligia* moths (Lepidoptera: Geometridae and Noctuidae)," *Biological Journal of the Linnean Society* 21, no. 4 (April 1984): 409.) Kettlewell had, in fact, arranged the photograph; the moths are dead specimens pinned to a tree. Over twenty-five years of fieldwork, entomologists like Cyril Clarke have been unable to find more than one peppered moth naturally perched on a tree trunk. (Jonathan Wells, *Icons of Evolution: Science or Myth? Why Much of What We Teach About Evolution is Wrong* (Washington, DC: Regnery Publishing, 2000), 150.) See: C. A. Clarke and P. M. Shepard, "A local survey of the distribution of industrial melanic forms in the moth *Biston betularia* and estimates of the selective values of these in an industrial environment," *Proceedings of the Royal Society of London B* 165, no. 1001 (October 1966): 424–439.

all animals, unifying heterogeneous and impossible perceptions under a single, human perception. For Sobchack, by contrast (though to like effect), the “democracy of vision” simply excludes animals altogether from the network of visions that contemporary ethologists are busy modeling. In point of fact, the affective entanglement Sobchack finds impossible for animals is achieved in experiments like Stevens et al.’s. Not only do “animals mostly seem to respond in a similar way” to simulations, but “the stimuli sufficient to define the presence of a suitable audience are quite broad.”¹⁸⁴ Perhaps not unlike humans watching a horror movie, birds shown images of predators display *muted* fear responses, and perhaps not unlike humans watching porn, birds shown potential mates’ sexual signalling display mate preferences. In other words, the ontological and hierarchical distinction between representation and reality that we fail to conform to in our affective responses cannot be *precisely* distinguished from those of an animal audience. While Sobchack identifies spectatorship with a self-consciousness of our situation as spectators, ethological studies would seem to suggest that *either* an exhaustive self-consciousness of perception is never meaningfully complete *or* all perception involves a perception of perception.

2.3 METZ’S JUXTASTRUCTURE, MECHANICAL PRODUCTION, AND SPECIAL CINEMAS

Phenomenological accounts like Sobchack’s depend on a stable, objective indexical image in order to render the image *ontologically*, rather than perceptually, illegible to animals.

¹⁸⁴ D’Eath, 285.

Conversely, ontologies of the photographic image grounded in the automatic, material inscription of the image, rather than in the film body optimization required for a spectator to *experience* the image as a presence of the object itself, overlook the perceptual characteristics with which the image, indexical or otherwise, is always marked in advance. And yet, for this schema the index is originally and inescapably nonhuman – its *mechanical* production is its sole requirement – and so can only be humanized *post facto*: thus, the problem, ontologically and phenomenologically, is how, or where, to recover in the image the “human hand” unequivocally removed from its production.

While in traditional accounts the ontology of the photographic image proceeds from an apparatus that is necessarily automatic, the relationship between the camera and the human differs fundamentally from other technological interventions. From Vertov to Benjamin to Bazin, the camera was decisive not for its ability to record better or with greater efficiency than the human body but for eliminating it altogether. The distinction is crucial. Thus, for Stanley Cavell, whose position is representative: “Photography overcame subjectivity in a way undreamed of by painting, a way that could not satisfy painting, one which does not so much defeat the act of painting as escape it altogether: by *automatism*, by removing the human agent from the task of reproduction.”¹⁸⁵ If the ontology of the photographic image uniquely concerns the ontology of the objects represented, it is first by “escape” of the body and the “overcoming” of subjectivity, and not as it were by their prosthetic enhancement. The locomotive, by contrast, did not render travel more *authentic*, only faster, just as the electric light bulb less replaced the sun than extended the day; but the cinematograph, which of course permitted the projection by light of indices of locomotives, secured a truth that required, and was in some sense identical to, our own

¹⁸⁵ Stanley Cavell, *The World Viewed: Reflections on the Ontology of Film* (Boston: Harvard University Press, 1979), 23.

disintermediation from its production.

That with film, “for the first time, between the originating object and its reproduction there intervenes only the instrumentality of a nonliving agent”¹⁸⁶ means also that the psychophysical orientation its instrumentation assumes is in its potentiality no less machinic or animal than human. Because the production of the image is a nonhuman process, how or if its point of view might *become* human is neither clear nor certain. If its “mechanical imagination” is, as a result of its automatic production, to be “imbued with an automatic subjectivity,”¹⁸⁷ as Jean Mitry observed, the body of that subject is ontologically uncertain, contingent, and could always be otherwise. Thus the “impassive lens” of the camera is, for Vertov, an infallible “cine-eye” or “mechanical eye” that “shows you the world as only a [machine] can see it,” while for Bazin it is “a bit like the retina of the eye,” if an ambiguously animal one: “Color and the intensity of light are not registered by the same nerve endings,” he notes, as if the cinema could never quite be human. “The density of one is usually in inverse proportion to that of the other: animals which can make out their prey perfectly at night are almost color blind.”¹⁸⁸ The camera, in this sense, is only able to humanize, animalize, or objectify because it is first, and ontologically, nonliving and nonhuman, its images “formed automatically, without the creative intervention of man.”¹⁸⁹

Further, it is the non-human means by which the photographic image is produced that

¹⁸⁶ Bazin, “The Ontology of the Photographic Image,” 13.

¹⁸⁷ Jean Mitry, *The Aesthetics and Psychology of Cinema*, trans. Christopher King (Bloomington: Indiana University Press, 2000), 110.

¹⁸⁸ Bazin, “The Ontology of the Photographic Image,” 15; Dziga Vertov, “Kinoks: A Revolution,” in *Kino-Eye: The Writings of Dziga Vertov*, trans. Kevin O’Brien (Berkeley: University of California Press, 1984), 17; André Bazin, “An Aesthetic of Reality: Cinematic Realism and the Italian School of the Liberation,” in *What is Cinema?*, Volume 2, trans. Hugh Gray (Berkeley: University of California Press, 2005), 29.

¹⁸⁹ Bazin, “The Ontology of the Photographic Image,” 13.

ensures an “ontological equality,” as Cavell puts it, of the objects represented.¹⁹⁰ Insofar as the production of the image is automatic and mechanical, it is also “disinterested” and indiscriminating. Thus, for Cavell, “photographs are of the world, in which human beings are not ontologically favored over the rest of nature, in which objects are not props but natural allies (or enemies) of the human character”; just as, for Bazin, “the function of depth of field is not only to allow more liberty to the director and the actors. It confirms the unity of the actor and décor, the total interdependence of everything real, from the human to the mineral.”¹⁹¹ On account of its mechanical production *and* impassive representation, the cinema is not human, strictly speaking; only in its reception and orientation. Through film, in a sense, we experience, as bodies, our own objectification.

That for Kracauer “early film’s interest in material movement (‘for its own sake’) does not center on ‘the human’ but includes animals on an equal scale” was in this sense the obverse side of a general animalization of the spectator through its address to a “corporeal-material being,” a “human being with skin and hair.”¹⁹² “The material elements that present themselves in films,” he wrote in his Marseille notebooks, “directly stimulate the *material layers* of the human being: his nerves, his senses, his entire *physiological substance*.”¹⁹³ This corporeal-materiality of production, image, and spectator – that is, the nonhuman production but human report of the image – is what leads Christian Metz to observe that it is the apparatus’ psychophysical human orientation, rather than essence, that secures their integration and makes the cinema a “juxtastructure, in which are expressed, in the last analysis, certain characteristics of man as an

¹⁹⁰ Cavell, *The World Viewed*, 37.

¹⁹¹ Cavell, *The World Viewed*, 37; André Bazin, *Jean Renoir*, trans. W. W. Halsey II and William H. Simon (Cambridge, MA: Da Capo Press, 1992), 90.

¹⁹² Miriam Hansen, “‘With Skin and Hair’: Kracauer’s Theory of Film, Marseille 1940,” *Critical Inquiry* 19, no. 3 (Spring 1993): 448, 458.

¹⁹³ Quoted in Hansen, “‘With Skin and Hair,’” 458.

animal (and as an animal different from all other animals, i.e., as a nonanimal too).”¹⁹⁴

To press this remarkable passage, Martin Lefebvre turns to Metz’s accompanying notes, entitled “Vision binoculaire et vision monoculaire (idéologie et données psychophysiologiques),” written for his seminar of 1973–74, in which he “considers in detail depth perception in mono- and binocular vision, describing the inverse square law of distance, the law of consistency of size and shape and other principles that ensure a good *gestalt*.” However, Lefebvre notes, “the manuscript concludes by asking ‘in what measure and in what way is perspective ideological?’”¹⁹⁵ Thus Metz distinguishes between the discovery of perspective and its use, between its activity in natural perception and its simulation in “perspective imagery,” which by artificial, “ideological” means “functions on the basis of ‘hiding’ the very code it relies on.”¹⁹⁶ Although for Metz “part of the institution of cinema is dependent on technology (equipment, layout of film theatres) as a condition of society,” Lefebvre explains, “next to it, juxtaposed to it, are psycho-physical determinations,” and it is the “connection, the juxtastructure, between these two determinations that is of interest to Metz in studying the institution of cinema.”¹⁹⁷ To Merleau-Ponty’s notion that cinema is a “phenomenological art,” Metz responds:

But it can only be so because its objective determinations make it so. The ego’s position in the cinema does not derive from a miraculous resemblance between the cinema and the natural characteristics of all perception; on the contrary, it is foreseen and marked in advance by the institution (the equipment, the disposition of the auditorium, the mental system that internalizes the two), and also by more

¹⁹⁴ Christian Metz, *The Imaginary Signifier: Psychoanalysis and the Cinema* (Bloomington: Indiana University Press, 1982), 20.

¹⁹⁵ Martin Lefebvre and Annie van den Oever, “Revisiting Christian Metz’s ‘Apparatus Theory’ – A Dialogue,” in *Technē/Technology: Researching Cinema and Media Technologies – Their Development, Use and Impact*, ed. Annie van den Oever (Amsterdam: Amsterdam University Press, 2014), 248.

¹⁹⁶ Martin Lefebvre and Annie van den Oever, “Revisiting Christian Metz’s ‘Apparatus Theory,’” 249.

¹⁹⁷ Martin Lefebvre and Annie van den Oever, “Revisiting Christian Metz’s ‘Apparatus Theory,’” 251.

general characteristics of the psychical apparatus (such as projection, the mirror structure, etc.), which although they are less strictly dependent on a period of social history and a technology, do not therefore express the sovereignty of a 'human vocation', but inversely are themselves shaped by certain specific features of man as an animal (as the only animal that is not an animal).¹⁹⁸

It is this "miraculous resemblance" that phenomenology is at risk of naturalizing in the cinema, by obscuring its *specific* psychophysical orientation and universalizing the *special* modality of its index – by 'hiding' the modes of perception that pertain, literally, to a *species*.

However, insofar as film does not "express the sovereignty of a 'human vocation'" but is "shaped by certain specific features of man as an animal," the juxtastructure juxtaposes not only social and natural, but also human and animal, determinations. That Metz follows this remark with the enigmatic parenthetical qualification, "(as the only animal that is not an animal)," only reinforces the sense of a crisis in the concept of the animal, and one that Metz less resolves, as his contorted locution suggests, than reinscribes in the screen for us to consider.

2.4 POLITICAL ETHOLOGY, LANGUAGE, AND THE CARNAL OBSERVER

From Descartes to Dennett, as Jacques Derrida's late two-volume work expertly traces, the animal lacked language and could not, as a result, "respond."¹⁹⁹ Over this same period, however, with gaining intensity in the late nineteenth and early twentieth centuries, the investigation of *perceptual* systems provoked a crisis in the very conceptions of consciousness and agency to which this idea of language was in service. As studies of perception challenged language's

¹⁹⁸ Metz, *The Imaginary Signifier*, 54.

¹⁹⁹ See: Jacques Derrida, "And Say the Animal Responded?: to Jacques Lacan," in *The Animal That Therefore I Am*, tr. David Wills (New York: Fordham University Press, 2008).

monopoly on meaning-making, ontological distinction between human and animal became both more difficult, and urgent, to defend. From Hermann von Helmholtz's experiments with optics²⁰⁰ to Wilhelm Wundt's awareness tests²⁰¹ to modern neurological studies of mental states, perception is now broadly regarded not as the conduit for an intentional, commandeering consciousness but as a complex, heterogeneous field subject to all the techniques for the management of attention that we now associate with disciplinary and biopolitical regimes.²⁰² As a result, the distinction between animal and human perception, or experience, has eroded. Lorenz and Tinbergen announced this collapse with the first cinematic investigations of *animal* perception.

It would be difficult to overstate the phenomenological crisis engendered by the collapse of human and animal bodies. The techniques that permitted the emergence of a 'carnal observer'

²⁰⁰ For a discussion of Helmholtz's early experiments on 'animal heat', see: Kathryn M. Olesko and Frederic L. Holmes, "Experiment, Quantification, and Discovery: Helmholtz's Early Physiological Researches, 1843–50," in *Hermann von Helmholtz and the Foundations of Nineteenth-Century Science*, ed. David Cahan (Berkeley: University of California Press, 1993). For a discussion of Helmholtz's foundational experiments with the perception of space and color, see, in the same volume: R. Steven Turner, "Consensus and Controversy: Helmholtz on the Visual Perception of Space," and Richard L. Kremer, "Innovation through Synthesis: Helmholtz and Color Research."

²⁰¹ "Students in Wundt's laboratory worked for several decades quantifying the difference in the time it took a subject to perceive the entrance of a stimulus into the general vague field of awareness and the time it took for the same stimulus to become an object of active attention." (Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, MA: The MIT Press, 1999), 292.) For a comprehensive appreciation of Wundt's role in establishing modern comparative psychology, beginning with his *Lectures on the Human and Animal Mind* (1863–1864), see the edited volume: Robert W. Rieber and David K. Robinson, eds., *Wilhelm Wundt in History: The Making of a Scientific Psychology* (New York: Plenum Publishers, 2001). For a discussion of Wundt's introduction of the term *Trieb* to psychology and the study of 'animal movement', and his combining of metaphysical connotations from Johann Gottlieb Fichte with its original reference to 'animal instincts' by the German philosopher Hermann Samuel Reimarus (1694–1768), see, in that volume, Kurt Danziger, "The Unknown Wundt: Drive, Apperception, and Volition."

²⁰² Describing the transformation from the consciousness of the Cartesian subject to one of limited mental states "susceptible to fatigue, distraction, and external management," (285) Crary notes that: "Some of the most pervasive of these questions were the following: How did attention screen out some sensations and not others? What determined how attention operated as a narrowing and focusing of conscious awareness? What forces or conditions caused an individual to attend to some limited aspects of an external world and not others? How many events or objects could one attend to simultaneously and for how long (i.e., what were its quantitative and physiological limits)? To what extent was attention an automatic or voluntary act; to what extent did it involve motor effort or psychic energy? For most authors, attention implied some process of perceptual or mental organization in which a limited number of objects or stimuli are isolated from a larger background or possible attractions." (24)

in the nineteenth century were precisely those with which the modern animal was already well-acquainted: applied behaviorism, medical objectification, and a general biological management of health. In substituting behavioral response for a Cartesian mental privacy, as Steven Shaviro puts it, this “new episteme and technology of vision” – of which “cinema is one important product” – grounded the spectator *alongside* the animal of modernity, “in a materiality of the agitated flesh.”²⁰³

If we are all thoroughly animal now, the regulatory techniques with which the spectator was animalized continue to elude discussion of what is routinely if imprecisely referred to as the “corporeal-somatic” or “corporeal-material” *flesh* of the spectator, her “lived body” or “sensate being.” All terms, in short, that invoke, perhaps productively, a generalized physiological or biological body that might be found to include *nonhuman* ones. The spectator, of and after affect theory, has never been more animalized in practice and less in theory.

That said, the classical predication of agency on language capacity threatens return in the discrimination of animal perception: today, the legibility of *visual* representation to carnal observers is as indissociable from their *political* representation as the ‘dumb brute’ was to the Rights of Man.²⁰⁴ Only now, instead of semiotics, *biosemiotics*, and instead of speech, the screen

²⁰³ Steven Shaviro, *The Cinematic Body* (Minneapolis: University of Minnesota Press, 1993), 44.

²⁰⁴ For a discussion of “how the rights of animality – that is, rights shared by nonhuman as well as human animals – were addressed by the new citizens of revolutionary France in the newly declared French Republic, particularly those belonging to the new community of ‘republican’ science” (89), see: Pierre Serna, “The Rights of Man and the Rights of Animality at the End of the Eighteenth Century,” tr. Vito Caiati and Joan B. Landes, in *Gorgeous Beasts: Animal Bodies in Historical Perspective*, ed. Joan B. Landes, Paula Young Lee, and Paul Youngquist (University Park: The Pennsylvania State University Press, 2012). That animals ‘lack’ speech (rather than language, strictly speaking) was broadly invoked in their refusal of rights – not on biological grounds, as it were, but for their inability to enter into a contract with a shared cultural and linguistic community. For Jean-Baptiste Salaville, author of the 1805 text *De l’homme et des animaux* (Of man and animals), “it is the explicit absence of relations (at least those constituted by speech) between living beings of different natures that prevents animals from gaining entry into the circle of legal protection. Thus natural rights cannot be founded on an essence attached since birth to every living being. Rather, natural rights are the expression of a purely cultural act, a shared language, as they already mark entrance into the circle of human relations. As the expression of a human faculty constructed by education, language is not a birthright.” (Serna 102)

provide occasion for the securing of being and the assignment of access to it. In primate studies, for instance, the displacement of language by visual tests both drove this regime change and preserved its underlying principles. If primatologists like Sue Savage-Rumbaugh were able to dismiss the former as designed to “maintain the comfortable conception that all animals, apart from man, are simple, irrational creatures,”²⁰⁵ it was by appeal to videographic tests capable of reassigning the signification of enhanced mental capacity to an equally arbitrary class of actions. Instead of employing a learned sign spontaneously and appropriately, subject status is linked to the designation of a biosemiotic relationship between self and image. In a celebrated study designed to test chimpanzee consciousness, the experimenters split a live video image of the chimpanzee’s arm from the chimpanzee’s view of his arm.²⁰⁶ The subject thus, in observing his hand on the monitor, attempts to navigate it toward the prize located on the wall below the hole through which he is reaching. Success, presumably, would satisfy the conditions for intelligence that biopsychologist Gordon Gallup famously identified as a desire for “complete control over the behavior of the image,” and thus over oneself.²⁰⁷

Though a certain capacity for spatial reasoning is no doubt illuminated by Savage-Rumbaugh’s test, in the surreal image of a chimpanzee reaching through the screen a broader transformation in the relation between animals and representation is made jarringly apparent. No longer confined to the screen and its contents, this animal is a biosemiotician in its own right,

²⁰⁵ “Many scientists are not certain that they wish to share a sense of mental identity with apes. Consequently they tend to erect impossible standards that apes must meet before they can be considered ‘language users.’ Moreover, it is implicitly suggested that all behavior which does not meet these standards is to be explained by basic conditioning principles. Such views serve to maintain the comfortable conception that all animals, apart from man, are simple, irrational creatures.” (E. Sue Savage-Rumbaugh, *Ape Language: From Conditioned Response to Symbol* (New York: Columbia University Press, 1986), 6.)

²⁰⁶ E. W. Menzel, E Sue Savage-Rumbaugh, and Janet Lawson, “Chimpanzee (*Pan troglodytes*) spatial problem solving with the use of mirrors and televised equivalents of mirrors,” *Journal of Comparative Psychology* 99, no. 2 (June 1985): 211-217.

²⁰⁷ Gordon G. Gallup, Jr., “Mirrors, minds, and cetaceans,” *Consciousness and Cognition* 4, no. 2 (June 1995): 226.

and its success discriminating between phenomena increasingly inseparable from the rights and protections with which it is awarded.²⁰⁸ In this new “political ethology,” phenomenology, as the philosophy of perception, thus assumes a regulatory, biopolitical function, determining which eyes and which bodies make meaning, and which, as it were, merely receive or process sensation. From Edmund Husserl to Maurice Merleau-Ponty to recent theorists like Alva Noë and Marc Bekoff, distinguishing animal from human sensoria is both indispensable to the elucidation of a uniquely human experience and a cornerstone for the rationale subtending the assignment of rights and representation. Since Jeremy Bentham first asked – “The question is not, Can they *reason*? nor, Can they *talk*? but, Can they *suffer*?”²⁰⁹ – how, whether, and what an animal experiences – pain, above all – has come to express best the ‘truth’ of its being and the value of its life.

The phenomenological and affective turn of film studies crystallizes these concerns, binding broader concepts of experience to its controlled simulation for an “embodied” spectator. Film technology, in this sense, permits phenomenological principles to be tested, and results linked to modes of recognition and subjectification that exceed, strictly speaking, the perception of forms on a screen.

²⁰⁸ For modern animal welfare law, the ‘cognitive ability’ of a species is one of few determining factors of their rights, as US House Representative Roscoe Bartlett’s unironically-titled August 11, 2011 *New York Times* op-ed, “Stop Using Chimps as Guinea Pigs,” suggests.

²⁰⁹ Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation* (Oxford: The Clarendon Press, 1823), 312.

3.0 UNDER OBSERVATION: *BIOPOWER, ANIMAL PLEASURE, AND LABORATORY CINEMA*

“In an aversion to animals the predominant feeling is fear of being recognized by them through contact. The horror that stirs deep in man is an obscure awareness that in him something lives so akin to the animal that it might be recognized. All disgust is originally disgust at touching.”²¹⁰

Walter Benjamin

In 1967, the psychologist Martin Seligman made a surprising discovery: after years of “shock avoidance” tests, Pavlov’s dogs had developed what he would soon call in a book by the same name “learned helplessness,” a post-traumatic condition in which the subject no longer displays avoidance response behavior. Pavlov’s dogs, the very emblem of behaviorism, had been rendered unresponsive by Pavlovian tests. Seligman’s “helpless animal,” from this perspective, completes the retirement – initiated by Pavlov, in fact – of the ancient typology of animal “temperaments”: introduced by Galen, revived by Aquinas, “temperaments” informed the rich, animal tapestry of early modern aesthetics,²¹¹ was received as medicine, and helped form the

²¹⁰ Walter Benjamin, “Gloves,” in *One-Way Street, and Other Writings*, tr. Edmund Jephcott and Kingsley Shorter (London: New Left Books, 1997), 50–51.

²¹¹ A direct line may be traced from Albert Magnus, the great scholar of Aristotle and mentor to Thomas Aquinas, through early modern literary tropes to Pavlovian notions of animal melancholia. “Note that the lion is a choleric animal, namely, very hot and dry,” Magnus wrote, characteristically of the time, “but the burned bile [*cholera adusta*] is burned in it, and therefore it continuously suffers a quartan fever from the natural melancholy.” (174) (Albert the Great, *Questions Concerning Aristotle’s ‘On Animals’*, tr. Irven M. Resnick and Kenneth F. Kitchell, Jr. (Washington, D.C.: The Catholic University of America Press, 2008), 174.) The long history of dividing the animal kingdom by ‘temperaments’ associated with a dominant ‘humour’ is too vast a subject to consider at length here; but in the early modern period such tropes reified into forms extant today. Ben Jonson (1572–1637), to take one example, conventionally “used discourses of the humours as shorthand for delineating characters,” Aleksandra Hultquist reminds us: “thus his Volpone, the fox, is wily, choleric and greedy (*Volpone*, 1606).” (Aleksandra Hultquist, “The Passions,” in *Early Modern Emotions*, ed. Susan Broomhall (New York: Routledge, 2017), 73.)

foundations of psychology.

For his part, Pavlov, sensing an untenability in the temperaments model but unable to dispense with its terminology altogether, had adopted the taxonomy of the four humours to describe animal behavior, only to later interchange their definitions in a 1927 paper. Because the dog who bit back one day might the next day cower, Pavlov was moved, in a quiet reversal, to oppose the “choleric” animal (lively, aggressive, pugnacious) no longer to the “melancholic” (quiet, weak, restrained), as was traditionally done, but to the “sanguine”: “i.e. ones which are active at liberty but fall asleep in the stand.”²¹² Aggressive and submissive temperaments would now function more as different stages of the same subject than as different types of subject altogether. With Pavlov and Seligman’s discovery, passivity or docility in animals became for the first time inscrutable, the signature of an elusive animal mind: a character trait or a symptom, rest or fear, boredom or paralysis. For the first time, the laboratory animal *possesses*, rather than demonstrates, psychology.

The modern lab animal is not only permitted mental states, feelings, sadness – the otherwise human affects that animals otherwise only represent – but is specifically manipulated through them, *as* a subject, and as a result is able to enter into entirely new forms of relations, and develop as characters. The ‘helpless animal’ is the animal breaking free of its metonymic

Temperamental characteristics were further linked to behavioral and physiological features that less explained than prosaically expressed them. Thus, “choleric animals were easily identifiable through both physical and behavioural characteristics. These included the colour of their fur or hide and also its texture, which would be very dry, hard and/or rough. Melancholic animals, on the other hand, had a predominance of black bile which made them prone to nightmares and ‘ravings’ (similar to what would now be called ‘mania’). As with choleric animals, their constitution could be identified by a brown/earthy colour and cold, dry fur or hide.” (Louise Hill Curth, “Working Animals,” in *Early Modern Emotions*, ed. Susan Broomhall (New York: Routledge, 2017), 338.)

²¹² “This change of places between the sanguine and choleric types, which has passed almost unnoticed in the literature on higher nervous activity, shows that basically the Pavlovian classification had very little connection at any stage in its development with the traditional descriptions of the four temperaments. It was the terminology that Pavlov took from the traditional study of the four temperaments rather than the psychological or physiological content of the concepts involved.” (B. M. Teplov, “Problems in the Study of General Types of Higher Nervous Activity in Man and Animals,” in *Pavlov’s Typology: Recent Theoretical and Experimental Developments from the Laboratory of B. M. Teplov*, ed. J. A. Gray (New York: The MacMillan Company, 1964), 18.)

mold as figure-for and becoming a figure-in-itself. In some respects, after Pavlov, the lab animal becomes the *quintessential* subject: *its* laboratory and model. This animal not only feels and experiences but does so perfectly, without remainder, noise in the data, or need for rights. Nineteen sixty-seven, then, marks an important moment in animal history, and much of what we have come to think about nonhuman life proceeds from it. Legally, medically, socially, Pavlov's dogs put an end to the idea of the animal-machine, and Seligman's persona to the mad scientist, the sadistic vivisector, the butcher-surgeon – for a time, at least.²¹³

The laboratory that had once been a site of mastery and genius would become in the postwar era a zone of chaos and disorder, a crime scene or ground zero for horrific escapes and uncontrollable disseminations. Indeed, how many films end, like a trail, in a laboratory dark and ruined, or else begin there, to shatter the very notion of confinement and control? In this chapter, then, I want to attend to the ways in which this transformation of the animal depends upon the laboratory as a “theater” that has, like moving image mediums broadly, seen its fourth wall breached. In much the same way that the moviegoer's dark theater forms a powerful figure for film theory – Jean-Louis Baudry's *apparat*, Christian Metz's *voyeur*, Laura Mulvey's *gaze* each in some way relies upon it – we might consider the laboratory as something more than a space. In fact, for these theorists, the theater itself is described as an experimental apparatus of sorts, for inducing states, deforming drives, and creating illusive experiences. Baudry describes the spectator as an unwitting specimen placed in a “darkened room” where “projection and reflection take place in a closed space and those who remain there, whether they know it or not

²¹³ In the days after the September 11, 2001 attacks Seligman would be consulted by the CIA to design torture programs – to *produce* helplessness in so-called “enemy combatants.” For compelling accounts of Seligman's involvement in designing torture programs, see: Maria Konnikova, “Trying to Cure Depression, but Inspiring Torture,” *New Yorker*, January 14, 2015, and Tamsin Shaw, “The Psychologists Take Power,” *The New York Review of Books*, February 25, 2016. For Seligman's unconvincing denial, see: Martin Seligman, reply by Tamsin Shaw, “‘Learned Helplessness’ & Torture: An Exchange,” *The New York Review of Books*, April 21, 2016.

(but they do not), find themselves chained, captured, or captivated.”²¹⁴ Like an animal, perhaps? For Metz, too, the ‘scopic regime’ depends upon a carefully-constructed, psychophysical environment – for producing voyeurism by concealment. “In the spectator’s voyeurism,” he writes, “there is no need for him to be seen (it is dark in the cinema, the visible is entirely confined to the screen), no need for a knowing object, or rather an object that wants to know, an object-subject to share in the activity of the component drive.”²¹⁵ Like Gallup’s finch, isolated from other finches before given a mirror, this spectator’s immersion demands a certain social disseverance.

Just as the theater is a laboratory, the laboratory is a theater. In the postwar era, the two converge – as an experimental cinema, of sorts. The Victorian laboratory, organized around the vivisector’s encounter with a singular, suffering animal, gives way in the modern era to a sprawling, well-funded biotech facility that takes as its unit not the specimen or ‘conspecific’ but the species or population to be maintained, regulated, and cared for. As with the spectator or voyeur, the reconception of animal feeling as absolute and authentic served to confirm not just animal pain but pleasure. For Mulvey, after all, the theater is an illusion-machine for the induction, by environment, of visual *pleasure*, specifically: “the extreme contrast between the darkness in the auditorium (which also isolates the spectators from one another) and the brilliance of the shifting patterns of light and shade on the screen help,” she writes, “to promote the illusion of voyeuristic separation.”²¹⁶ The cinema, immersion, works on the nerves directly,

²¹⁴ Jean-Louis Baudry, “Ideological Effects of the Basic Cinematographic Apparatus,” in *The Screen Media Reader: Culture Theory Practice*, ed. Stephen Montiero (New York: Bloomsbury, 2017), 239.

²¹⁵ Christian Metz, *The Imaginary Signifier: Psychoanalysis and the Cinema* (Bloomington: Indiana University Press, 1982), 96.

²¹⁶ Laura Mulvey, “Visual Pleasure and Narrative Cinema,” in *Feminism and Film Theory*, ed. Constance Penley (New York: Routledge, 1988) 60. Later, Mulvey specifically withdraws from privileging this view of exhibition. “Once the consumption of movies is detached from the absolute isolation of absorbed viewing (in the dark, at 24 frames a second, in narrative order without exterior intrusions), the cohesion of narrative comes under pressure from

making animals of all of us.

To an extent, this trajectory – from pain to pleasure, from denial to affirmation – was itself a structural accommodation of the biological sciences precipitated by a broadening of interest beyond anatomy and internal medicine to mental states and the neurological. Under the unforgiving musculature, skin, and bone, a quieter web of nerves available for manipulation made of the writhing beast a humming computer. The pharmacological revolution of the 1950s silenced the cries of pain with chemical prescription. “Veterinary behavioral pharmacologists have pointed out,” Cary Wolfe reminds us, “that because Prozac, Paxil, and other drugs were tested for efficacy in laboratory animals long before they were prescribed to humans, ‘You can plausibly argue ... that humans are in fact using animal drugs’ and not the other way around.”²¹⁷ Experiments on cognition and feeling accordingly exceeded the regime of signs designed for an earlier era. Photographs to come, in the 1980s, of primates’ heads strip-mined like a mountain top, “overburden” flipped forward like a loose toupee, struck a nerve in the public no doubt, but a different one: less ghastly than cryptic. One’s gaze probes the image, and the strange, depicted apparatus into which the animal disappears, for a hook to hang its hat on. The modes of violence at work were indecipherable enough in leaked photos that the unsuspecting viewer often needed to be told what she was looking at first to form a proper judgment. The less legible the image, the more purposeful the activity appears.

Neutralizing the throes of the lab animal was the precondition for the sleeking – a term derived from the Middle English *slike*, for “healthy-looking animal hair” – of the architectonics of the laboratory, its long shift in design from butcher shop or dungeon lair to corporate lobby or

external discourses, that is, production, context, anecdote, history.” (Laura Mulvey, *Death 24x a Second: Stillness and the Moving Image* (London: Reaktion Books, 2007), 27.)

²¹⁷ Wolfe, 54.

Apple store. The medical theater of cruelty, made increasingly visible to a mass public, was hence made manageable with drugs – instead of screams, sadness – and made sufficiently tolerable to skeptical observation. Over the course of this chapter, then, I will trace – in broad strokes, at times – this vast transformation in animal life, centered on the lab and articulated through media. Concerns with limitations in theories of biopolitics and traditional histories of biotechnology will converge in readings of George Romero’s *Monkey Shines* (1988) and Rupert Wyatt’s *Rise of the Planet of the Apes* (2011) reboot, before turning to a consideration of animal sexuality and its cinematic expression.

3.1 THE LAB ANIMAL, THE PET, AND THE ANIMAL TECHNICIAN

Though the most dramatic shift in the legal status and regulation of animals over the course of the twentieth century belongs primarily to the research animal, its story is only obliquely addressed in the critical literature devoted to the popular representation of animals. The most prominent book-length studies of animals in film – Derek Bouse’s *Wildlife Films*, Jonathan Burt’s *Animals in Film*, and Gregg Mitman’s *Reel Nature: America’s Romance with Wildlife on Films* – focus on either nature programming or the visual animal in entirety.²¹⁸ For Steve Baker, this critical deficit can be attributed to a cultural one, insofar as “most people’s sympathy for [animals] and pleasurable experience of them is grounded entirely in these ‘inauthentic’

²¹⁸ Two, less prominent studies of animals and media similarly avoid attention to laboratory animal films: Belinda Smalls, *Regarding Life: Animals and the Documentary Moving Image* (Albany: SUNY Press, 2009); Randy Malamud, *An Introduction to Animals and Visual Culture* (New York: Palgrave Macmillan: 2012). However, I have recently become aware of Claire Molloy’s *Popular Media and Animals* (New York: Palgrave Macmillan: 2011), which includes two chapters on experimental animals: “Media and Animal Debates: Welfare, Rights, ‘Animal Lovers’ and Terrorists” (15–39) and “Experimental: The Visibility of Experimental Animals” (84–101).

representations” – “reading a Beatrix Potter story to their child, watching a wildlife documentary on television, or simply admiring the fine profile of their dog or cat” – and not in the more “irreverent *pleasures*” or “malicious pleasures” of the laboratory.²¹⁹ “The keen satisfaction experienced in learning of the success of a raid on an animal research laboratory,” he speculates, “is likely to remain marginal to the culture as a whole.”²²⁰ I hope to show how such satisfactions are central to the stories of the animal and cinema both.

For the laboratory animal, the postwar period marks an uncertain historical moment between two regimes of representation: after the collapse of an antivivisectionist iconography, but before the cinematic tableaux of bioengineering and genetics had been firmly established (the subject of the next chapter). The shift to big science – multinational pharmaceutical companies, industrial-scale factory farms, government-funded research-driven medical institutions – both popularized the laboratory animal and detached its image from what increasingly seemed an antiquated milieu: of solitary scientist and medical specimen, sadistic surgeon and helpless animal. In this sense, the postwar period collapses an originary fissure in western animality: the specimen, which was ineligible for empathy, and the pet who was bred for it. In the early modern era, the research animal and pet were conceived together, on parallel tracks. For Linda Williams, this “contradictory,” as she puts it, can be traced through William Harvey’s character: experimental anatomist and author of the revolutionary essay on the circulation of the blood *Motion of the Heart and Blood in Animals* (1628), on the one hand, and the domestic companion to a kept pet parrot, of whom he was fond and wrote movingly, on the other. “This pet then,” she observes, “seems to occupy an entirely separate space of gentle domesticity from the little

²¹⁹ Steve Baker, *Picturing the Beast: Animals, Identity, and Representation* (Manchester: Manchester University Press, 1993), 150–152.

²²⁰ Baker, *Picturing the Beast: Animals, Identity, and Representation*, 151.

theaters of sustained agony occurring in Harvey's study."²²¹

Williams is interested in not only the origin of the split in the social status of the animal but in the discursive and affective navigations that their irreconcilable difference demands. To Harvey's majestic report on vivisection Williams reminds us that despite "the unmistakably lofty, Aristotelian tone here, it may be salutary at this point to envisage Harvey in his everyday linen and frock-coat, frequently soaked in arterial blood, and indifferent to the screams that certainly accompanied his frequent operations."²²² The care practices introduced by postwar animal welfare law would render the need for such reminders moot. Tantamount to Harvey being professionally obliged to vivisect his pet parrot, care practices substitute disavowal and mourning for contradiction and hypocrisy. Where "butcher-surgeons" could once take refuge in an official refusal of animal subjectivity, now they must embrace and even employ it, leading to agonizing disavowals and difficult rationalizations on the part of the "animal technician" – a new figure, in film and law alike.

In retrospect, Seligman's experiments with Pavlov's dogs were part of a broader shift in public and scientific attention: from the pet to the research animal. Two exposé articles on their relationship – one by Coles Phinizy in the November 29, 1965 issue of *Sports Illustrated*, and the other, published by *Life Magazine* in their February 4, 1966 issue, entitled "Concentration Camp for Dogs"²²³ – led directly to the signing into law of the Animal Welfare Act (AWA) in August of 1966.²²⁴ Both were concerned with the trafficking of animals between the lab and the home. That research animals, who were considered expendable, and pets, who were not, were often

²²¹ Linda Williams, "Modernity and the *Other* Body: The Human Contract with Mute Animality," in *The Future of the Flesh: A Cultural Survey of the Body*, ed. Zoe Detsi-Diamanti, Katerina Kitsi-Mitakou, and Effie Yiannopoulou (New York: Palgrave MacMillan, 2009), 234.

²²² Williams, "Modernity and the *Other* Body," 234.

²²³ Coles Phinizy, "The Lost Pets That Stray To The Labs," *Sports Illustrated*, November 29, 1965; Stan Wayman, "Concentration Camps for Dogs," *Life Magazine*, February 4, 1966.

²²⁴ Also known as the Laboratory Animal Welfare Act.

drawn from the same lot was in itself a source of embarrassment – to the “pet farmer” and research laboratory as much as to popular conceptions of which animals were sacrificeable.

Though the bill did introduce the first substantive regulations on the treatment of research animals, it was more concerned with segregating the pet and research animal populations. The *Sports Illustrated* and *Life Magazine* articles were after all written in sympathy with, primarily, the pet and pet owner; and the public was by and large less interested in the treatment of research animals than in the practice of stealing pets to sell to research facilities (which Phinizy’s article documented) and the housing conditions of the dog farms from which pet stores bought the dogs they sold to consumers (which Stan Wayman’s photo essay for *Life* exposed through images of skeletal dogs that referred in no uncertain terms to the Holocaust).²²⁵ But if the regulation of laboratory animals would not for two decades experience the profound revisions promised, the modes of representation that had governed its image for nearly a century no longer seemed sufficient.

It is precisely this transformation in the representation of animals provoked by the rediscovery of the laboratory animal that is expertly probed by George A. Romero’s films, or rather, a particular moment of them: the movement from the “trilogy of the dead” to his next (if critically-panned) masterpiece, *Monkey Shines* (1988). While there is no shortage of critical attention to Romero’s zombie films – indeed, they originated a genre unto itself that, at this

²²⁵ While the passing of the Animal Welfare Act marks the reintroduction of the research animal to public consideration, it was largely in the form of an aside to the welfare of the pet: in an attempt to withdraw the research animal even further from view, the new stringent regulations on the procurement of research animals and the licensing of pet farms prioritized the disassociation of the two populations. For a detailed consideration of the Laboratory Animal Welfare Act and its amendments, see Christian E. Newcomer, “Laws, Regulations, and Policies Pertaining to the Welfare of Laboratory Animals,” in *The Experimental Animal in Biomedical Research, Volume 1: A Survey of Scientific and Ethical Issues for Investigators*, eds. Bernard E. Rollin and M. Lynne Kesel, 37–47. (Boca Raton: Florida: CRC Press, 1990). “The focus of the Laboratory Animal Welfare Act of 1966 was prevention of illegal transfer of family pets to research institutions by requiring individuals or institutions that bought or sold dogs or cats to be licensed and by establishing a record-keeping system to document the legal acquisition and transfer of animals.” (38)

moment, can scarcely be appreciated at a critical distance – the manner in which they respond to profound transformations in the definition, regulation, and perhaps revenge, of animal life, has not been adequately addressed. Symptomatic of this pervasive critical inattention is the near-unanimous disparagement of *Monkey Shines*, and the confusion with which it has been met as the project that should follow his celebrated trilogy finale, *Day of the Dead* (1985). According to Tony Williams, for example, “although it fails to reach the creative levels of *Night of the Living Dead*, *The Crazies*, *Dawn of the Dead* and *Day of the Dead*, it is by no means a total failure.”²²⁶

Not only are these two films of a piece – both are openly concerned with comparable medical institutions – their formal constructions bear gross homologies that invite a comparative reading, as if from opposite angles to a line whose imposition becomes, as a result, called into question: in the first film, human experimentation, in the second, animal; in one, apocalypse and a return to a state of nature, in the other, a timely commentary on big science and its apocalyptic potentials. In other words, an animalized human, then a humanized animal; but in each, a calling into question of their most basic description, the model of the subject they refer to, and the productive and political rather than experimental or exploratory power of the laboratory, medicine, and bioengineering.

Both films revolve around a laboratory, experimentation, and crippling pressures to produce results. In *Day of the Dead*, a small group of scientists, led by Dr. Matthew Logan (Richard Liberty), and a military unit commanded by Captain Henry Rhodes (Joe Pilato), cohabitate uneasily in an underground bunker in the Everglades. Assisted by Dr. Sarah Bowman (Lori Cardille), Logan, referred to pejoratively as “Frankenstein” for his gruesome experiments, is convinced that rather than reversing their condition, with the limited medical resources at their

²²⁶ Tony Williams, *The Cinema of George A. Romero: Knight of the Living Dead* (London: Wallflower, 2003), 141.

disposal, the zombies can be trained to become docile through behavioral conditioning, that their former lives persist in them, and that with the proper rewards system they can be “civilized” and controlled. The proof is his star test subject Bub (Sherman Howard), himself a former Army surgeon, who much to Rhodes’ disgust is shown capable even of loading and handling a firearm, saluting his superiors, and enjoying Wagner. “This is the same animal,” Logan remarks, only “operating less perfectly.” Needing only a brain stem to function, the zombie does not eat for replenishment but out of “instinct,” and this empty drive can be repressed or managed – a nod, perhaps, to Lorenz’s Nazi affiliations. Logan’s successes aside, for Rhodes the belated discovery of their “reward” system – flesh from the soldiers who died procuring Logan’s subjects – is the final straw: Logan is promptly executed, civil war erupts, the bunker is overrun by zombies.

Monkey Shines follows a similar trajectory. After a failed suicide attempt, Allan Mann (Jason Beghe), a law student paralyzed from the neck down by a recent accident, takes on Ella (Boo), a trained helper monkey donated from a research lab by his friend Geoff (John Pankow). Ella, however, in response to the mysterious “memory cell” shots Geoff is now secretly giving her, begins to develop a sexual attraction to, and rage against, Allan and proceeds to slowly kill off those closest to him on his behalf. Instead of a stolen pet turned research animal, the dramatization of which plays on feelings of loss and the disenfranchisement of property, *Monkey Shines* begins with a stolen research animal turned domestic companion. This animal, in other words, does not begin in the home, domesticated, as a member of the family, but arrives unassimilated. Movement from the home to the lab is in effect a movement towards death – the lost Dalmatian that Phinzy tracked down had already been euthanized in an experiment – whereas, to journey from lab to home, and so towards care, family, and a second life, can only serve to expose their violent incongruity. Instead of disappearance and mourning, the family is

confronted with a trauma victim incapable of rehabilitation or readjustment, bearing all the signs – some psychological, some physical – of an institutional past, which as a result comes all the more starkly into view.

Because Ella's experimental history is presented as something that must be amended if she is to be trained as a helper monkey, it is understood that Ella may or may not be stable, if only because the experiments' effects on her are unknown. When Allan's friend Geoff approaches Melanie Parker (Kate McNeil) for her services, and skips to the front of the queue because he is able to provide a monkey for training, he is careful not to tell her the kinds of experiments in which she has been involved – experiments that are not in actuality over. Though Geoff did at first presumably have only the best of intentions in “donating” Ella – it remains unclear throughout the film whether he intended from the start to continue the experiments after the donation – the pressures attached to his grant and exacted by his overbearing boss Dean Burbage, played by a menacing Stephen Root, quickly get the best of him.

Thus, Ella, who at first appeared to have been rescued from the lab, finds herself exposed, outside its modest accountability, to the reckless abandon of a desperate scientist. With Burbage suddenly breathing down his back, Geoffrey is forced – reluctantly, it would seem – to resume the experiments discreetly, without Allan's knowledge and without the controlled environment of his laboratory. In Burbage, institutional pressures to produce “results” – obviously, not negative ones – find terrible personification, which Romero's film patiently links to Geoff's desperate, clandestine acts. However, Geoff is also harassed from outside the university, which only adds to the sense that his path is becoming increasingly unsustainable, and dangerous: when he first pulls up to his lab, he sees animal rights activists spray-painting epithets on the facade, which is labeled for us with a placard that reads, simply, “Experimental

Medicine.” With Burbage and the university demanding results, on the one hand, and the animal rights activists calling for the “liberation” of the research animals, on the other, Geoff’s decision to free Ella from the lab while yet continuing to conduct experiments on her can be seen as an ill-conceived, impossible mediation of the two irreconcilable forces. It is also the moment when, with the hope to escape or gain some reprieve from these opposing forces, the experiment is displaced from a controlled setting to the world in its potential entirety.

If the laboratory was once able to function as an autonomous site relatively free from social and economic intervention – Dean Burbage, torn from the pages of Shelley and Wells, is the mad scientist figure unaccustomed to public attention and ethical oversight – here it has become necessary to employ the family, the individual, and the social directly *as* the laboratory. Ella’s promotion from sacrificial animal to companion and surrogate thus follows an equal and opposite animalization of the home. That is, it would be a mistake to treat Ella’s adoption into the home, and ensuing development of a telepathic connection with Allan, as a traditional anthropomorphic gesture, for it comes only as a tenuous result of the inclusion of the home and Allan within the parameters of the experiment itself. Which is to say, Allan, his family and friends are as animalized, and rendered experimental subjects, as Ella is anthropomorphized and marked as human, intelligent, and self-possessed.

The clinical shift from anarchic objectification to animal welfare law demands a transition – visually and iconographically – from the circumscribed scene of a vivisector’s table to a more diffuse and extended network of relations, practices, and institutions. The laboratory technician character embodies this implacable demand, to feel and not to feel, to care for and to kill, injure and treat. After all, laboratory technicians, whose presence in the laboratory was mandated only after 1985, don’t just break up or disassemble animal families but replace them,

assuming familial nurturing and social functions. Technicians accordingly develop procedures to manage their attachment to research animals. In an interview for an ethnography on care practices in animal experimentation, one technician remarked that, “And you know, they have names and ... it’s a *disadvantage* to get too close, because it’s no fun when they’re about to be put down. I mean, it becomes a dear friend of mine. So, I have tendency to become a little too much of a friend.”²²⁷ The empathic technician smuggling the lab animal home is a fixture of these films – a historic novelty – and embodies through their presence a broader institutional context. Overtaking, or suddenly appearing beside, the (mad) scientist, vivisector, or experimenter character, they insert a voice of empathetic dissent or restraint where once there was none. While the laboratory assistant character is not exactly a new creation – the hunchbacked Fritz (Dwight Frye) in the original *Frankenstein* (1931), later to become the famous Ygor under Bela Lugosi’s tutelage – his or her relationship to the procedures under way changes radically in the postwar period. Opposed to Igor’s slavish obedience – for which he is either killed by the monster, or made to befriend it, in different film adaptations – the animal technician is more accurately described as the *animal’s* assistant.

The animal technician appears in a number of guises – as a handler, a lab assistant, trainer – but in each case holds an intermediary position with respect to the institution’s regulation of the research animals and the film’s regulation of the spectator’s affections. In *Monkey Shines*, the most perceptive of these films, Melanie, who trains helper monkeys for the disabled, is contraposed to Geoff, an experimental biologist, and Dean Burbage, his boss and vivisector, each

²²⁷ Tora Holmberg, “Mortal Love: Care Practices in Animal Experimentation,” *Feminist Theory* 12, no. 2 (2011): 152.

cast in the role, relative to her, of the mad scientist.²²⁸ In the more subtle lab experiment films, such as *Deep Blue Sea*²²⁹ and *Rise of the Planet of the Apes*,²³⁰ the animal technician is presented as holding an impossible position, caring for the animals while at the same time being tasked with facilitating their eventual execution.

3.2 ANIMAL POLITICS, BIOPOWER, AND RISE OF THE PLANET OF THE APES

For the animal, the postwar period is defined, structurally, by a collision of institutions that in the previous century could not have seemed more remote: the farm and the lab. The result is a strange combination. On the one hand, a total, intimate intervention in animal life and sexuality; on the other, a cold, regimented objectification of their bodies. Theories of power otherwise appropriate to human affairs – articulated in studies of factory farm and laboratory administration, for example – are thus conceivably inadequate to, say, their animal subjects.

²²⁸ Similarly, in *Link* (1986), student Jane Chase (Elisabeth Shue) is hired by Dr. Steven Phillip (Terence Stamp) to help out around her professor's old decaying mansion, until Link, the super-intelligent orangutan who's also serving as Dr. Phillip's butler, rebels against his master's attempts to sell him to a vivisectionist. Matthew Broderick's character, Jimmy Garrett, in *Project X* (1987) plays a similar role, only instead of assisting a mad scientist, a broader, more faceless military-governmental experimental apparatus is represented as carrying out the same functions. When Jimmy, a pilot, is reassigned to a flight simulator experiment that tests radiation poisoning on chimps, he quickly sympathizes and identifies with Virgil, the next in line, and calls up Teri MacDonald (Helen Hunt), the graduate student who taught Virgil sign language. They then plan his escape and sabotage the experiment.

²²⁹ In *Deep Blue Sea* (1999), Carter Blake (Thomas Jane), a shark wrangler unable to find other work on account of his bootlegging past, is conscripted reluctantly into handling the lab sharks for the ambitious, and reckless, Dr. Susan McCallister (Saffron Burrows) who, in her quest to cure Alzheimer's, puts everyone on the remote underwater lab at risk and is herself ultimately killed by one of her test subjects. Carter's disapproval of Dr. McCallister's work, his prescience in foreseeing the extent of the disaster to come, and, perhaps most importantly, his understanding of, and agility in handling or evading, the sharks are presented as keys to his moral and mortal survival.

²³⁰ *Rise of the Planet of the Apes*, which also features an experiment motivated to cure Alzheimer's, is not quite as kind to its animal technician: though Robert Franklin (Tyler Labine) is presented as empathetic and sincere in his care for the animals – he refuses to kill infant Caesar when the experiment is shut down – he later contracts the virus that will, in a matter of days presumably, wipe out the human race. That an animal technician plays host to the disease that will destroy humanity is perhaps not without a sense of irony – and in some respects marks an end, symbolically, to this paradigm.

It is nonetheless tempting to discover in the factory farm²³¹ or the laboratory reassurance that the absence of animals in his discussions of biopower is “not due to any essential poverty in the potential scope of Foucault’s term”²³²; but if “animals are missing in Foucault’s landscape” it is because, as Paola Cavalieri argues, his histories of sexuality and power tend to use animals as “merely a metaphor for, or as a parallel to, the condition of the ‘other’ – that is, human – beings.”²³³ Animals, then, to be more precise, are less missing from models of power and the subject than they articulate its figures and subtend their organization. Thus, where *disciplinary* power animalizes, treats the human as animal, and works on the subject as an organism, *biopower* – a science of “populations” – is “directed not at man-as-body but man-as-species.”²³⁴ Indeed, pastoral power is, as Foucault says, “politics seen as a matter of the sheep-fold” and “the salvation of the flock.”²³⁵ But if the animal is the model *for* power, its paradigm and figure, how then can it also be its object and subject? If politics is ovine, then what is ovine power?

It is as if, when it comes to the animal, models of the subject, discipline, and power must, like Baron Munchausen stuck in a swamp, pick itself up by its own hair. From factory farm to zoo to laboratory, Foucauldian analyses are confronted by the conditions of their existence: power without subjects, surveillance without internalization, bodies without techniques. Indeed, if “cows on the way to slaughter are sometimes quite reluctant to follow the herd,” as Stephen

²³¹ For example: L. Holloway and C. Morris, “Exploring Biopower in the Regulation of Farm Animal Bodies: Genetic Policy Interventions in UK Livestock,” in *Genomics, Society and Policy* 3, no. 2 (2007): 82–98.

²³² Dinesh Joseph Wadiwel, “Cows and Sovereignty: Biopower and Animal Life,” *borderlands* 1, no. 2 (2002).

²³³ Paola Cavalieri, “A Missed Opportunity: Humanism, Anti-humanism and the Animal Question,” in *Animal Subjects: An Ethical Reader in a Posthuman World*, ed. Jodey Castricano (Waterloo: Wilfrid Laurier University Press, 2008), 100.

²³⁴ Michel Foucault, *Society Must be Defended (Lectures at the Collège de France, 1975–1976)*, tr. David Macey (New York: Picador, 2003), 243.

²³⁵ Michel Foucault, *Security, Territory, Population (Lectures at the Collège de France, 1977–1978)*, tr. Graham Burchell (New York: Palgrave Macmillan, 2007), 130, 126. If “Western man has become a confessing animal,” the pleasure itself he confesses is, too, animal: “a knowledge of pleasure, a pleasure that comes of knowing pleasure, a knowledge-pleasure; and as if that fantastic animal we accommodate had itself such finely tuned ears, such searching eyes, so gifted a tongue and mind, as to know much and be quite willing to tell it, provided we employed a little skill in urging it to speak.” (Foucault, *The History of Sexuality*, 59, 77)

Thierman observes, “most would see this as a simpler form of resistance than the types of redirection and reappropriation of power that Foucault seems to have in mind.”²³⁶ So even though, as common sense would dictate, “there does not seem to be a field of responses that are available to them, and they are certainly not recognized as subjects in any meaningful way,”²³⁷ well-intentioned analyses intent on promoting animals to subject status overlook the absence of an essential component of disciplinary power: not the institutional aim to produce “the obedient subject, the individual subjected to habits, rules, orders, an authority that is exercised continually around him and upon him” – that much the animal knows – but rather the requirement that “he must allow [it] to function automatically in him.”²³⁸

Though we may wish for a different result, in actuality the modern animal dwells in this liminal zone or broken link, subject to the apparatuses of subjectification but detached from the project of the western liberal state to which they are otherwise attached. Like Vittorio De Sica’s *Umberto D* (1952), Robert Bresson’s *Au Hasard Balthazar* (1966), and Dariush Mehrjui’s *The Cow* (1969) – three films that transformed the language of cinema (and which are discussed in the next chapter) – *Rise of the Planet of the Apes* (2011) addresses precisely this question: “the imposition of law and order ... between man and animal, whether man-with-animal or the becoming-animal” of man.²³⁹ By extending the umbrella of biopolitics to include animals as subjects when they are not, an animal biopolitics *within* animal social structures becomes

²³⁶ Stephen Thierman, “Apparatuses of Animality: Foucault Goes to a Slaughterhouse,” *Foucault Studies* 9 (September 2010): 98.

²³⁷ Thierman, “Apparatuses of Animality,” 100.

²³⁸ Michel Foucault, *Discipline and Punish: The Birth of the Prison*, tr. Alan Sheridan (New York: Random House, 1995), 128–129.

²³⁹ Brian Price, *Neither God Nor Master: Robert Bresson and Radical Politics* (Minneapolis: University of Minnesota Press, 2011), 70–71.

invisible or, worse, unthinkable. What we need instead is a *comparative biopolitics*²⁴⁰ attentive to the modes by which the one always runs up against the other, is parasitic to it, and can only seek to reshape or break it. As Jean Baudrillard remarks in a remarkable and neglected chapter, ‘agonism’ in the factory farm – that is, the overpopulation threshold at which animals begin to attack each other – is a political intervention into an existing animal politics, and not, as it were, a biopolitics of otherwise unmanaged bodies. “One thus wished to break the *pecking order* and *democratize* access to food through another system of distribution,” he notes. “Failure: the destruction of this symbolic order brings along with it total confusion for the birds, and a chronic instability.”²⁴¹

The experimentally determined thresholds at which agonism occurs is not, then, a management of bodies, strictly speaking, but a political attack on the relations that constitute the fabric of animal society. Without this distinction, biopolitics discourse becomes itself biopolitical – and its weapons figures, models, images. Biopolitical analyses often begin with precisely this ground-clearing gesture, as when Anat Pick declares with some self-evidence, “I start off from the double premise that [...] the human-animal distinction constitutes an arena in which relations of power operate in their exemplary purity (that is, operate with the fewest moral or material obstacles).”²⁴² Even here, it seems, in biopolitics theory, the animal is to be confined to a kind of theoretical laboratory, testing and perfecting not drugs and medical procedures but *concepts*.

As a simplified, docile, proto-subject, who is neither so fully formed as to deserve a biopolitics in its own right nor so incomplete as to be ineligible for its techniques, the animal

²⁴⁰ I take this term from Johan M.G. van der Dennen, “The Biopolitics of the Great Apes,” in *The World of Biology and Politics: Organization and Research Areas (Research in Biopolitics, Volume 11)*, eds. Steven A. Peterson and Albert Somit (Emerald Group Publishing Limited, 2013): 91–133. “Findings – Not only Man is a political animal.”

²⁴¹ Jean Baudrillard, “The Animals: Territory and Metamorphoses,” in *Simulacra and Simulation*, tr. Sheila Faria Glaser (Ann Arbor: University of Michigan Press, 1994), 131.

²⁴² Anat Pick, *Creaturely Poetics: Animality and Vulnerability in Literature and Film* (New York: Columbia University Press, 2011), 1.

construed by this discourse is less a pure figure of power than power *figured*. “It can hardly be debated, I think,” Cary Wolfe says with some hesitation, “that ‘the animal’ is, today – and on a scale unprecedented in human history – the site of the very ur-form of that *dispositif* and the face of its most unchecked, nightmarish effects.”²⁴³ Represented as solitary, reductively corporeal, and meticulously controlled from the cage to the bolt gun, the animal of biopolitics theory appears *miraculously*, without sociality or kinship, and as if sprung directly from the forehead of *zoe* itself.

Rise of the Planet of the Apes by contrast concerns itself with an *animal* politics, which emerges from the laboratory. Caesar (Andy Serkis+), the undocumented offspring of a research animal euthanized by biotech firm Gen-Sys, is adopted by the program’s chief scientist Will Rodman (James Franco) after the experimental trials are terminated and the remaining experimental subjects killed. Having congenitally inherited the therapeutically-enhanced intelligence of his mother, nicknamed Bright Eyes (Terry Notary), Caesar rapidly develops an understanding of his abject position in human affairs. When he, Will, and Will’s veterinarian girlfriend Caroline Aranha (Freida Pinto) visit Muir Woods early in the film, Caesar’s gaze from a Redwood tree-top lingers from afar, through the canopy, on his exclusion from their picnic below. The family, he realizes, is a lab by other means. On the trail heading back to the car, their encounter with a dog on a leash makes Caesar question the one on him, which Will gently, if maliciously, tugs. “Am I pet? Who is my father? What is Caesar?” he signs to Will. Recognizing Caesar’s dissatisfaction with his answer, Will drives him to the Gen-Sys parking lot and tells him the truth.

²⁴³ Cary Wolfe, *Before the Law: Humans and Other Animals in a Biopolitical Frame* (Chicago: University of Chicago Press, 2013), 46. “Indeed, the practices of maximizing control over life and death, of ‘making live,’ in Foucault’s words, through eugenics, artificial insemination and selective breeding, pharmaceutical enhancement, inoculation, and the like are on display in the modern factory farm as perhaps nowhere else in biopolitical history.”

From here, the film will shed its human infrastructure. When a neighbor attacks Will's father (John Lithgow), whose severe Alzheimer's motivated Will's development of a cure, Caesar intervenes violently, and is detained by Animal Control as a result. After being assigned by court order to a primate holding facility, Caesar experiences a two-fold realization: that he can only be an object of brutality for humans and that the community with which he needs to find inclusion is animal. Likened to a prison, and its custodians to sadistic prison guards – Dodge Landon, played by a menacing Tom Felton, takes special pleasure in animal suffering – the facility introduces Caesar to the true cast of the film: Maurice (Karin Konoval), the seer-like circus ape, Rocket (Terry Notary), the Alpha chimpanzee, Cornelia (Devyn Dalton), Caesar's future partner, and Buck (Richard Ridings), the great gorilla. Forlorn at first, Caesar draws in chalk on his cell wall the window from his home – which he will erase in fury after Will's first visit. Resolved by the failure of his human family, Caesar turns to his new one. When Dodge and his dopey sidekick Rodney (Jamie Harris) drop by the facility at night with their dates, Caesar picks Rodney's pocket – not to escape, after they've left, but to consolidate power within.

In a remarkable scene, Caesar then enters the common area – big tree, tire swing, Serengeti sunset mural – to free Buck, the massive gorilla, from his cage. Rendered by captivity fearful of freedom – he's too uncontrollable to have ever been let out – Buck steps one foot out, recoiling from the sensation – of astroturf, of anything – before bursting from the cage, scaling the tree, and roaring triumphantly. “Grunts questioningly,” the closed-caption reads, as Buck turns to Caesar, who has also freed Rocket, the Alpha who attacked Caesar on his first day of internment. With Buck looming behind Caesar, Rocket bows, with his hand out in supplication. When Will returns the next day with a bribe for John Landon (Brian Cox) to secure Caesar's release, Caesar's gaze lingers on the leash in Will's hand before defiantly closing the cell door,

locking himself in. “I guess he likes it better with his own kind,” Cox quips. Inspired by Caesar’s act, the chattering of the apes grows into revelrous, terrifying cheers, led by Buck. Power, the film suggests, is formed not by force but by community – and administration. Later that night, Caesar doesn’t reward his followers directly for their support but rather bestows on Rocket the task, and privilege, of rewarding. After demonstrating, Caesar gives him the bag of treats from which to dispense cookies to each outstretched hand – to break the pecking order, Baudrillard would say. “Why cookie Rocket?” Maurice asks. “Together strong,” Caesar replies, bundling sticks together. But “apes stupid,” Maurice retorts. Thus, the state he has formed and bureaucracy he has established requires a department of education, to be secured in the dead of night by Caesar who, after escaping temporarily to retrieve Gen-Sys serum from the fridge back at home, deploys the gas in the facility, rendering the ape army intelligent. When at home, for a moment, Caesar pauses, in perhaps the most striking image of the film, to gaze over the sleeping forms of Will and Caroline: vulnerable, oblivious, and at peace without him, they for the first time appear otherwise to Caesar.

United and enhanced, the ape army under Caesar’s command does not flee for the Redwoods directly. Rather, after killing Dodge publicly in a display of power, Caesar’s gaze lingers on the Gen-Sys tag on a cage door in the facility – which, beyond serving as a prison for animals broken by the lab, also supplies them to be broken. Perched as conquerors on Sutro Tower, they survey the city, which will soon be wiped out by the very serum that animates them. Like Buck from his cage, the film explodes outward into geopolitical space, visualizing a vast revenge of animal life upon familiar, fragile landmarks: the Golden Gate, the San Francisco Zoo, the FiDi. When they invade the lab to free their brethren – first amongst them is Koba (Chris

Gordon), his eye gouged and face scarred from endless experiments – they smash the equipment before proceeding to the zoo to do the same.

Critical reception of the film generally fails to appreciate its radical subversion of the original. The revelation at the end of the first adaptation that George Taylor (Charlton Heston) *is* home, only in a distant future, is one of despair, just as the rendering of humans as animal, and animals as human, is meant less to question the order of things than to instruct us to treasure our supremacy, as if waking from a terrible dream that pictured otherwise. Only through a foolish and preventable act of nuclear self-destruction, *Planet of the Apes* (1968) warns us, will we cede our place as nature's custodian. Heston's famous line – "Take your stinking paws off me, you damn dirty ape!" – is thus transposed in the prequel-reboot to the sadist Dodge, his last words before Caesar, making an exception to the moral code he instills in his army, kills him – and the source text. Rupert Wyatt's film takes special delight, deserved but rare, in the decimation of humanity, which unfolds over the credits in a shockingly minimal, avisual gesture: the clean green lines of flight paths exponentially spreading the virus. Humanity, scourge of the earth and torturers of animals, is dispensed with as unceremoniously as its deputies, whose outstretched hands are left grasping: most dramatically, when Gen-Sys CEO (Steven Jacobs) plummets to his death under Koba's steely visage, but also with Will who struggles even to get a meeting with Caesar on the Golden Gate Bridge and then in Muir Woods. Not to mention Caroline, who simply disappears from the film. For *Rise*, the animals under observation are our understudies: observing and biding their time, while we make ourselves sick, before stealing the show.

3.3 THE POSTWAR ORIGINS OF THE LAB ANIMAL FILM, ECO-THRILLERS, AND THE OUTBREAK NARRATIVE

Rise as such completes a long arc in the laboratory thriller, which is generically structured by two opportunities: the escape of the lab animal and the extension of the experiment to the world in its entirety. After *King Kong* (1933) and *Godzilla* (1954), in the postwar era everything gets bigger and clunkier: the animals, the lab, the science. Instead of the lone, sadistic scientist exiled for his transgressions, a state-sponsored military-industrial complex adopts his cause, institutionalizes his dream, and creates a monster. In a sense, these films express the obverse side of primitivist armchair anthropology: in the experimental laboratory, nature is to be improved upon, not arrested, and evolution artificially induced, not aborted. In the 40s and 50s, the two are brought into dramatic relief, in two, competing directions. On the one hand, instead of the laboratory being banished to the wild, as in the Moreau films, the wild emerges from the laboratory and threatens to overtake humanity as a whole. Packaged in thinly-veiled allegories of nuclear threat and the horrific biological effects of radiation, films like *Lost Continent* (1951), *The Beast from 20,000 Fathoms* (1953), *Them!* (1954), and *Attack of the Crab Monsters* (1957) displace to a primitivist setting anxieties of self-destruction and the indiscriminate, uncontrollable mutation of lifeforms introduced by cold war science.²⁴⁴ Indeed, this period or cycle of films is distinguished by its extension of established primitivist anxieties to the world in its supposed entirety, introducing an ecological anxiety otherwise muted in prewar films.

²⁴⁴ See: Robin L. Murray and Joseph K. Heumann, “‘As Beautiful as a Butterfly’? Monstrous Cockroach Nature and the Horror Film,” in *Monstrous Nature: Environment and Horror on the Big Screen* (Lincoln: University of Nebraska Press, 2016), 24–26.

That the cold war monstrous animal could just as easily be the effect of science gone wrong as of some terrestrial, prehistoric time returning from the deep, as in *The Black Scorpion* (1957) and *The Deadly Mantis* (1957), is perhaps indicative of the eroding distinction between culture and nature, science and mysticism, human and animal that haunts this period with new, unfamiliar force. In Jack Arnold's *Tarantula* (1955), the anxiety of nuclear fallout is in part a pretext for addressing emerging concerns over population growth, finite resources, and the fragile, interconnected ecology that makes of humans animals, if not as organisms then as a species.²⁴⁵ The trope or aesthetic of, plainly, *size* – giant animals, scientific teams, the world – that cuts across so many of these films is likewise indissociable from the emerging factory farm system, their increasingly ambitious bioengineering programs, and the unprecedented scope of food production. In *Tarantula*, Professor Gerald Deemer (Leo G. Carroll) uses radioactive isotopes to grow baby animals to an abnormally large size in just a few days, to feed a growing human population.

For this cycle of films, modern science creates or unleashes the beast rather than sacrifices its body for knowledge or the development of science itself. Or, rather, the prehistoric, primitivist settings of these films is now able to *express* scientific progress rather than mark its lost, natural, repressed past. These films as such lack interest in animal psychology or interiority. The animal augmented remains flesh, only amplified to express its potential. However, roughly contemporaneous with the primitivist cold war monster film, which was situated abroad in time or space, the domestic experimental laboratory film, which too often depended upon primitivist themes, was distinguished not by ecological anxieties but by a concern for maintaining human

²⁴⁵ For a discussion of Jack Arnold's films and their themes of "regression from civilisation to primitivism" (192), see Mark Jancovich, *Rational Fears: American Horror in the 1950s* (Manchester: Manchester University Press, 1996), 167–196. In *Tarantula*, Jancovich observes, Professor Gerald Deemer's "experiments on the spider have detached it from its relationships with nature and placed it in a position of dominance over humans." (190)

specificity, consciousness, and identity in the face of profound challenges to human evolutionary exceptionalism. These films bridge the earlier era of lab animal vivisection body horror with the later genetic thrillers, to which we will turn in the next chapter.

Beginning with the mad doctors of the 1930s – *The Testament of Dr. Mabuse* (Fritz Lang, 1933), *Mad Love* (Karl Freund, 1935), *Metropolis* (Fritz Lang, 1927) – this tradition experienced a transformation in the 40s, moving from industrial and ‘collage’ figures of experimentation to more amorphous, immaterial, and mystical conceptions of animality. Instead of an animal body assembled from the outside, so to speak, this animal is the effect of a latent code, hormonal therapy, or the consciousness to which a body has been ‘assigned’, like a glove. Thus George Zucco transplants the brain of a young man into a gorilla in Stuart Heisler’s *The Monster and the Girl* (1941) and Dr. Sigmund Walters (John Carradine) puts the brain and glands of a young woman into the skull of an ape, creating the femme fatale Paula Dupree in Edward Dmytryk’s *Captive Wild Woman* (1943). Starting with *The Man Who Changed His Mind* (1936), the *trans-species mind swap film*, as it might be called, reimagines a number of themes that will continue, with various modifications, into the 90s: instead of the mad doctor, an irresponsible one; instead of animal consciousness, a degenerate human mind; instead of evolution, primitivist regression. As late as Ken Russell’s 1980 *Altered States*, in which Dr. Edward Jessup (William Hurt) and his colleagues experiment with sensory deprivation water tanks and drugs to achieve “biological devolution,”²⁴⁶ the mapping of evolution onto embryology permitted the recuperation of a primordial primitivism that Darwin specifically feared in the *term* evolution, preferring as he did

²⁴⁶ See: Fernando Espi Forcen, *Monsters, Demons and Psychopaths: Psychiatry and Horror Film* (CRC Press, 2016), 192–195. Forcen reads *Altered States* as responding to advances in cognitive science that suggest “animal consciousness might be better explained in a spectrum rather than a dichotomic human versus non-human animal model.” (192)

the bulkier “descent with modification.”²⁴⁷

That the experiments, however grotesque, are done on the mind and identity, not the body, positions these films and their conceptions of life closer to trans-species reincarnation films like the later *Fluke* (1995)²⁴⁸ than to earlier antivivisectionist models, such as the first two Dr. Moreau films, *Island of Lost Souls* (1932) and *The Island of Dr. Moreau* (1977).²⁴⁹ Where the latter focus on the sadism of the scientist, representing the doctor as indifferent to or delighting in the suffering he causes, the former offers an alternative, spiritual form of human-animal hybridization or interchangeability.²⁵⁰ The relation between the two anthropomorphic gestures is nonetheless clear: reincarnation, which extends souls to animals, assumes, in reverse, the same interchangeability of human and animal species as does the research lab, only the one

²⁴⁷ Three films, released over a sixty year period, indicate both the persistence of this theme, and its detachment from actual scientific or medical advancements: *The Man Who Changed His Mind* (1936), *Brainstorm* (1983), and *Unforgettable* (1996). In the first, brilliant but snubbed scientist Dr. Laurience (Boris Karloff) invents a machine that can be programmed to switch the minds of people (and animals, it turns out) around him without their knowledge; while in the second, brilliant but uncontrollable doctors Lillian Reynolds (Natalie Wood) and Michael Brace (Christopher Walken) develop a computer system for, at first, recording and playing back actual experiences of people, and then, after adding the capability of tapping into ‘higher brain functions’, literally jumping into someone else’s head and playing back recordings of what he or she was thinking, feeling, and seeing. In the third, *Unforgettable* (1996), which may have been inspired by *Brainstorm* (1983), after Dr. David Krane (Ray Liotta), a medical examiner investigating crime scenes for the Seattle Police, attends the lecture of Dr. Martha Briggs (Linda Fiorentino), who is studying the technique of memory transferal in rats (which involves injecting spinal fluid from one animal to another), he steals the serum and begins combining it with spinal fluid from recently murdered victims in order to find their (and his wife’s) murderers.

²⁴⁸ Where mind swap films feature a kind of scientifically advanced mental or subjective ‘incarnation’, *Fluke* obtains the same result through an equally mystical and unexplained process of *reincarnation*. When Thomas Johnson (Matthew Modine), a bad husband and father, dies in a car accident, he comes back to life as Fluke, a dog (voiced by Matthew Modine and Sam Gifaldi) inclined to watch over his family and, as it turns out, ultimately redeem himself. It is however no coincidence that Johnson’s (or Fluke’s) epiphany, in the climactic scene, that he was a neglectful, workaholic husband is reached in a cosmetics lab. After being abducted by Sylvester (Ron Perlman) to be used in cosmetics testing experiments, Rumbo (voiced by Samuel L. Jackson), who died saving him, reminds him with his last breaths of his family obligations, to which he now returns.

²⁴⁹ Or the cartoon, “Hot Cross Bunny” (1948), in which a doctor at the Eureka Experimental Hospital plans to put the characteristics of a chicken into the brain of experimental rabbit No. 46, Bugs Bunny.

²⁵⁰ The indebtedness of these films to mad vivisectionist archetypes and antivivisectionist sentiments is likewise somewhat explicit, though with significant mutations: Dr. Laurience in *The Man Who Changed His Mind* and doctors Lillian Reynolds and Michael Brace in *Brainstorm*, and perhaps Dr. Martha Briggs in *Unforgettable*, are less mad and sadistic than transgressive and reckless. Snubbed or marginalized by the scientific community, rather than representative of it, they fail to discriminate between humans and animals, a distinction the scientific community is presented as upholding, and rightly so, the films seem to suggest, as all hell breaks loose when humans are subjected to experiments best confined to animals in a lab.

affirms the equivalence of life where the other exploits it. In this sense, to the list of fantastic mechanisms – machine, computer, serum – permitting a mind swap, god, the soul, or reincarnation are treated as one more technology. Further, beyond the equivalence often drawn between animals and humans in the trans-species reincarnation film, the 80s and early 90s seemed to employ essentially the same format in strictly human-to-human reincarnation films.²⁵¹

Both the trans-species mind swap film and the lab animal film to which it is closely related feature animal bodies, if not protagonists, and the camera tends to stay closely with them, following their movements and unusual points of view. For a cinema that takes as its theme the captivity and confinement of movement – in the lab, in the iconic cage, and, most dramatically, on the table – animal movement becomes in itself an overdetermined accomplishment, an object of study and delight. In nearly all of these films – *Monkey Shines* (1988), *Project X* (1987), *Hollow Man* (2000), *Rise of the Planet of the Apes* (2011), *Splice* (2009) – the escape of the research animal is presented as not only a moment of bodily liberation, but an excuse for the camera to travel and exhaust – vertically and horizontally, but in any case inhumanly – the architecture and institution of experimental labs.

The research animal escape narrative was a popular fixture in the post-AWA period. In *Watchers* (1988), based on a novel by Dean Koontz, a boy takes in a stray dog, who turns out be

²⁵¹ Chevy Chase's *Oh Heavenly Dog* (1980), a comedy in which Browning, a PI killed on the job, comes back as Benji (played, as it were, by Benji) to solve his own murder, is what *Fluke* pretends to be until Johnson realizes he was at fault for his own death and the man and best friend he suspected, and who has since grown close to his wife, is in fact innocent. However, both resemble, in their suspicion and surveillance of the protagonist's widow, human reincarnation films from the same period – such as *Chances Are* (1989), in which happily married Louie Jeffries (Christopher McDonald), after being killed crossing the road, is reincarnated as Alex Finch (Robert Downey, Jr.) who, twenty years later, begins dating (unbeknownst to him) his own daughter Miranda (Mary Stuart Masterson), but after beginning to remember his former life proceeds to have an affair with his widow and girlfriend's mother, Corinne (Cybill Shepherd)! The trend of body swap and reincarnation films running from the late 70s through early 90s is roughly coextensive with the lab animal film and the human-animal mind swap film, suggesting a deeper connection between the two, and one not so easily explained by a popular interest in strictly scientific themes and advancements: *J.D.'s Revenge* (1976), *Heaven Can Wait* (1978), *All of Me* (1984), *Big* (1988), *Vice Versa* (1988), *Always* (1989), *Switch* (1991), *Heart and Souls* (1993), *What Dreams May Come* (1998), *13 Going on 30* (2004), *Circulation* (2008).

an ultra-intelligent runaway from a genetic research lab. Similarly, in *Man's Best Friend* (1993), Max, a genetically mutated dog endowed with human-like intelligence and special abilities, is accidentally released from a lab, and then adopted by news reporter and animal rights advocate Lori Tanner (Ally Sheedy). These films tend to be about evasion, confrontation, and speed. The animal is invariably on the run, but capable of ferocious and dexterous tricks that highlight the body and restore its freedom of movement. For this reason, it is significant, ideologically and formally, that the vitality and expressiveness of the animal body is often narratively neutralized by its supposed sickness or infection, which must be contained through recapture. In *Primal Rage* (1988), for instance, a scientist at a Florida university inadvertently creates a "rage virus" while performing experiments intended to restore dead brain tissue in baboons. When a journalist for the college paper breaks into the campus lab – the "outbreak" in these films is often initiated by a naive animal rights advocate – he's bitten by one of the infected baboons and the virus soon spreads. Only, to my knowledge, the animated *The Plague Dogs* (1982) directly critiques this recuperating gesture, through its depiction of the the plight of two dogs who become the focus of an intense manhunt after escaping from a research lab. To keep citizens from capturing or sheltering the canines, authorities lie to the newspapers, claiming that the dogs may be carrying bubonic plague. The film moreover uniquely resists the indulgence in visibility that otherwise characterizes this genre. "As a black dog in a nocturnal setting, Rowf is so dark it is sometimes difficult to see him," Anja Höing and Harald Husemann observe. In contrast to "disnified" animated animals, Rowf's "expression often remains hidden, which renders him somewhat detached and difficult to connect with."²⁵² In the end, "the non/human heroes of *The Plague*

²⁵² Anja Höing and Harald Husemann, "The Vicious Cycle of Disnification and Audience Demands: Representations of the Non/Human in Martin Rosen's *Watership Down* (1978) and *The Plague Dogs* (1982)," in

Dogs end up not only physically defeated, but mentally broken as well.”²⁵³

Despite its close resemblance to the escaped lab animal narrative, the ‘infected escapee’ subgenre marks a conservative shift in the representation of the lab and the lab animal. If the post-AWA lab animal film was defined by an expanded interest in the experimental institution, on the one hand, and a sympathy with the lab animal, on the other, this film recovers some of the legitimacy of the former while managing to neutralize the latter: that is, though the scientist and the experimental institution are vilified for their recklessness and abuse of animals, they are nonetheless cast as the only ones who possess the expertise to fix the problem; likewise, if the animal is still a point of sympathy, its expression is mitigated by the countervailing fear of the virus or contagion they carry, a fear that invariably justifies and necessitates the extermination of the animals.

The zoonotic disease that threatens to wipe out the human race is a common narrative trope, but often only as an origin story for an outbreak – as in *Outbreak* (1995), the opening sequence of which establishes the simian origins of the the Ebola-like virus – or as a retroactive explanation, as in *Contagion* (2011), which ends with this revelation, or *The Breed* (2005), a mediocre horror film in which a pack of teens vacationing on a remote island are slowly picked off by a pack of vicious wild dogs who, it turns out, are the result of a “rage virus”-like experiment (perhaps not unlike the one in *Primal Rage*). At the end of the film, a few of the remaining characters stumble onto an abandoned lab where, judging from the equipment strewn about, a sadistic surgeon once performed his experiments before, presumably, succumbing to his subjects (perhaps not unlike the end of *Eyes Without a Face*). Here, in an image as cliché as it is

Screening the Nonhuman: Representations of Animal Others in the Media, ed. Amber E. George and J.L. Schatz (Lanham: Lexington Books, 2016), 106.

²⁵³ Anja Höing and Harald Husemann, “The Vicious Cycle of Disinfection and Audience Demands,” 110.

affective – a deserted island lab – a whole history of animal representation is able to be invoked quickly through even the most uninspired shorthand. As Juvenal wrote: “Expect the same commonplaces from the best and worst poets.”²⁵⁴

Only the recent *Isolation* (2005) specifically relates genetic manipulation and animal experimentation to broader ecological and world health crises without simply employing the lab animal and its milieu as a narrative premise for a more narrow, human-centric disaster film. Epitomizing the shift from the immediate post-AWA film to what could be called an ecological lab film, *Isolation* features a ‘mad scientist’ John – from Bovine Genetics Technology, a factory farm research arm – who is researching, on a rented isolated farm, genetic modifications of cattle to increase their fertilization (not unlike *Tarantula*). After being bitten by a research cow during a difficult birth, the veterinarian Orla (Essie Davis) discovers, while performing an autopsy, that the stillborn fetus is itself pregnant with a strange, living hybrid, which then escapes and proceeds to infect – that is, ‘impregnate’ – cows and humans alike.

Linking the factory farm system with experimental bioengineering, *Isolation* points to a more complex interspecies ecology than that of the lab itself, and through its wet aesthetic and unique form of body-horror – not of mammals per se, but unrecognizable hybrids – articulates a kind of “biopolitical imaginary,”²⁵⁵ if one that includes the animal in what Gwendolyn Blue and Melanie Rock have theorized as a “trans-biopolitics,” which they define as a complex, technologically-mediated interspecies network that is more mobile and global than biopolitical

²⁵⁴ Juvenal, *Satires*, 1.6, quoted in Alessandro Manzoni, *On the Historical Novel [Del romanzo storico]*, trans. Sandra Bermann (Lincoln: University of Nebraska Press, 1984), 99. “Expectes eadem a summo minimoque poeta.”

²⁵⁵ Michael Dillon and Luis Lobo-Guerrero, “The Biopolitical Imaginary of Species-being,” *Theory, Culture & Society* 26, no. 1 (January 2009): 1-23.

networks proper.²⁵⁶ *Isolation* points to the lab animal as both a tremendous source of capital and innovation and a hazardous source of disease, the spreading of which threatens a kind of systemic revenge. Does this film then signal a new kind of animal, one that is molecularly unstable, genetically modified, and more allied with the virus and contagion – which is to say, death itself – than the human? The more recent *genetic* lab animal films – *Isolation*, *Splice*, *Rise of the Planet of the Apes* – are perhaps defined by this alliance, between the animal and a molecular, or otherwise invisible, interiority or composition that overtakes it.

The traditional conception of the laboratory as a site, space, or institution is also challenged in these films: in each case, as in *Isolation* and the ecological infection film, the experimental subject develops outside the controlled setting of the lab, but with the unforeseen consequence of the experiment, rather than the animal, escaping. In a reversal of the lab animal escape narrative, each of these films moreover features a return *to* the lab, into which the animal bursts in an act of frenzied revenge. Anticipating *Rise of the Planet of the Apes*, *Monkey Shines* takes special care in articulating this imbrication of lab and world – which, too, ends with Ella the monkey freeing her sisters and destroying the lab. When Geoff is first called in to Burbage’s office, to account for his lack of results, he answers the accusation that his funders are getting nervous with the retort, “I’ve seen you on three different talk shows defending the slaughter of animals for research. You’ve got the anti-vivisectionists ready to firebomb the university. That’s what’s making the money nervous.” This backstory, given in brief, also helps to explain why the animal rights activists caught spray-painting Geoff’s medical research lab yelled “Torturer!” as they ran away: Burbage’s radio talk show provocation has drawn activist attention to the university. So even though Geoff is not a vivisectionist, and uses animals for relatively more

²⁵⁶ Gwendolyn Blue and Melanie Rock, “Trans-biopolitics: Complexity in Interspecies Relations,” *Health* 15, no. 4 (July 2011): 354.

benign experiments, the indiscriminate anger of animal rights groups has begun to target his work on Burbage's behalf.

It is not until much later in the film, however, that we are let to see Burbage's butchery more directly. In a clever scene that tests and displays Ella's secretly augmented intelligence, Allan tells Ella to dial Geoff's number even though he's already in the room. Confused, she hesitates. A delighted Allan then hypothesizes to a skeptical Geoff that she must know "you're in the room, so it makes no sense to call you on the phone. She's unbelievable! She's like a miniature person!" So Geoff steps out and Allan repeats the command that Ella this time follows. However, instead of the phone ringing, Burbage answers, which reveals that he's intruding in Geoff's lab, to either tamper with or steal his results. Then, as if in reaction to a stimuli-response mechanism – which perhaps explains why Burbage would answer the phone and betray his trespassing – Geoff is provoked immediately to take Ella into the kitchen and give her another injection, remarking, "you really are getting smart, aren't you, sugar?"

Having located the experimental biologists and the university-science complex within the parameters of the experiment itself, the scene then cuts, across time and space, to Geoff pounding on the door to Burbage's lab, which Burbage, in bloody surgical gloves, opens slowly to reveal, in the background, an even bloodier operating table with what appear to be vivisected monkeys stretched out on the surface. Exploiting the menacing affect of the tableau behind him, Burbage then proceeds to lecture an astonished and disturbed Geoff on animal treatment: "one gets conditioned by the carrot, or by the stick. If you're drowning, for example, it helps concentrate the rodent mind." The scene then cuts into a close-up of what has been distracting us in the background all along, a Morris water maze: that is, a clear, rectangular fish tank filled halfway with water, at the surface of which a small white rat can be seen swimming furiously

and futilely around the edge, in search of an exit. Burbage's implication is clear. Geoffrey is the rat susceptible to conditioning by a stick, in this case to produce results – and his immediate submission following the “staged” phone call speaks to the hideous success of this method. On the other hand, however, it was Ella's passing of the intelligence test – the results that Burbage seems to demand – that allowed Geoff to place that phone call in the first place, thus suggesting that the form of conditioning Burbage practices is barbaric and unnecessary – which is to say, sadistic, if effective.

But the broader point to be gleaned from this scene is that the “experiment” – “in fear,” this film reminds us, through its subtitle – extends beyond the laboratory to include the technicians themselves and their competing theories of conditioning. The experiment is done by and on everyone, without clear results or control. The methods applied to animals apply to humans, or, as with Burbage – who is, after all, a dean – the conditioning of one requires the conditioning of the other. In this sense, the displacement of the experiment to the home and domestic space represents not only a desperate attempt on Geoff's behalf to evade irreconcilable social forces – the university and the activists – but also expresses, on the part of the film, the imbrication of experimental and managerial techniques. The conducting of an experiment, this film seems to say, always includes and reflects the management of the experimental laboratory itself. The bureaucratic management of laboratory technicians, the procurement and politics of funding, and the institutional pressures they exact corresponds to, if not repeats in technique, the experiments, values, and forms of objectification or instrumentalization they practice. Further, misrecognition is represented less as interfering with the production of knowledge than being implicated in it. Geoff is only susceptible to Burbage's managerial experiment because he excuses himself in advance from the pool of candidates eligible for experimental manipulation –

namely, animals. “In this sense,” the film seems to be saying, “we are all animals, and laboratory animals, whom one continually tests in order to extort their reflex behaviors.”²⁵⁷ If the “initial ‘illusion’ of the subject consists in simply forgetting to include in the scene his own act – that is, to overlook how ‘it counts, it is counted, and the one who counts is already included in the account,’”²⁵⁸ then this scene establishes the process of subjectification without which the experimental apparatus would not be possible.

It is, then, by recourse to a broader medical and experimental apparatus that Allan and Ella are made to resemble, complement, and correspond to each other. Ella’s experimental history, from which she has only ostensibly escaped, not only resembles Allan’s own “misdiagnosis,” or, at the very least, the neural condition from which he in actuality suffers, but also figuratively if not literally refers to the neurological and motor disorders that the experiments conducted on her would tend to research. Thus Ella, who could otherwise have been sacrificed to research to develop a treatment for Allan, is able to function *as* him or on his behalf, as a helper monkey, mediating his will and its physical execution. Whereas Allan, who would otherwise only be treated with pharmaceutical drugs and therapies developed through experiments on animals, is coded as one: through the “simulated” paralysis from which he suffers, the conditions surrounding its “misdiagnosis,” and the experiment on him that Geoff, his best friend, is secretly conducting. Moreover, over all of this hangs the Silver Spring monkeys controversy, which both directly informs the film’s representation of laboratory animals and its relation to medical research, and which was, at the time, still unresolved and very much in the

²⁵⁷ Jean Baudrillard, “The Animals: Territory and Metamorphoses,” 130.

²⁵⁸ Slavoj Žižek, *The Sublime Object of Ideology* (London: Verso, 1989), 58, quoting Jacques Lacan, *The Four Fundamental Concepts of Psycho-Analysis* (Harmondsworth, 1979), 26.

news.²⁵⁹ It would not be until July 1990, two years after the release of this film, that PETA's application to the Supreme Court for custody of the monkeys would be rejected, and days later the last of the monkeys killed.

3.4 VICTORIAN PORNOGRAPHY, ANIMAL SEXUALITY, AND THE STOCK MARKET

For the Victorians and the iconography popularized by the powerful antivivisectionist movement, the animal could only be as sympathetic as the vivisector was cruel or sadistic. Their figures were inverse and formed a whole, the one implying the other. Thus, the suffering of the animal was made an index of the vivisector's cruelty, which appeared, in its isolation and withdrawal from institutional mediation, as the effect of a personal, psychological disposition. The suffragist and antivivisectionist Frances Power Cobbe's (1822–1904) much disseminated *Illustrations of vivisection: or, experiments on living animals*, which described in vivid, plaintive

²⁵⁹ The events of *Monkey Shines* refer broadly to the well-known Silver Spring monkeys controversy, which unfolded to considerable public attention from 1981 to 1990 and concerned the experimental use and abuse, by Edward Taub of the Institute of Behavioral Research in Silver Spring, Maryland, of 17 wild-born macaque monkeys. When PETA's Alex Pacheco, who began working undercover in the lab in May 1981, alerted the police, who were still able to be shocked by this kind of information, they raided the Institute and removed the monkeys, charging Taub with 113 counts of animal cruelty. The event marks the origin of the modern animal rights movement and its public media representation. The ensuing battle over the monkeys' custody saw the first organized celebrity interventions on animals' behalf, a trend pioneered by Brigitte Bardot in her famous 1977 photo shoot embracing an endangered seal pup; an amendment in 1985 to the Animal Welfare Act; the transformation of PETA from a small, unknown group into a national organization; the creation of the first North American Animal Liberation Front cell; and the first animal research case to reach the United States Supreme Court. For a highly subjective, and erotic, account of the effectiveness of Brigitte Bardot's suggestive photo shoot, see Chantal Nadeau, "BB and the Beasts: Brigitte Bardot and the Canadian Seal Controversy," *Screen* 37, no. 3 (Autumn 1996): 240–250. For a speculative account of the role of the Animal Liberation Front in the Silver Spring monkeys case, see Caroline Fraser, "The Raid at Silver Spring," *New Yorker*, April 19, 1993. After the monkeys were liberated, and presumably relocated, their presence, as evidence, was required for the case to proceed, at which point they mysteriously reappeared. For an account of the Federal courts' treatment of the Silver Spring monkeys case, see Bridget Klauber, "See No Evil, Hear No Evil: The Federal Courts and the Silver Spring Monkeys," *University of Colorado Law Review* 63 (1992): 501–520.

detail the methods of vivisection and their excruciating endurance, was the no less concerned with establishing its practitioners as mad and sadistic. Only the insane, she felt, could exact such suffering. Mixing quotations from philosophers, politicians, activists, and biologists, their timeless consensus forged by schematic diagrams and illustrations, Cobbe's text strove to expose the much-lauded biologist's surgical table as less a site of scientific discovery than a deranged and unproductive scene of blood, cries, and torture.

If the antivivisectionists' opposing of scientific discovery to suffering seems today naive, their consideration of scientific practices as aesthetic, expressive, libidinous acts – the spectacle and dramatic display these operations represented for medical students, for example – feels prescient, and anticipates contemporary modes of inquiry. Cobbe likened the “spectacle of a surgical operation” to that of “gambling, watching executions, bull-fights”²⁶⁰ – in short, a form of entertainment. Congruently, in her landmark examination of the historical relationship between women's rights, the working class, and the antivivisection movement, Coral Lansbury describes an ‘affective community’ attached to not only public demonstrations of vivisection but experimental medicine culture itself: from the “jeering medical students” (or “medical hooligans,” as they were known in the press) “who made a point of disrupting antivivisection meetings” to the bawdy, crude atmosphere of the “operating theatre,” the sentiments, language, and methods of subjection and objectification developed in the vivisector's lab were oriented, she argues, around women and animals, linking them through a series of substitutions and correspondences.²⁶¹

Though the degree to which nineteenth century women “saw their own condition

²⁶⁰ Frances Power Cobbe, “Schadenfreude,” in *Prose by Victorian Women: An Anthology*, ed. Andrea Broomfield and Sally Mitchell (London: Routledge, 1995), 340.

²⁶¹ As related in the *Memoirs and Letters of Sir James Paget* 50–51; in Coral Lansbury, “Gynaecology, Pornography, and the Antivivisection Movement,” *Victorian Studies* 28, no. 3 (Spring 1985): 415–416.

hideously and accurately embodied in the figure of an animal bound to a table by leather straps with the vivisector's knife at work on its body"²⁶² remains dubious, the circulation of tropes, scenarios, and aesthetic registers between the popular tableaux of vivisection and surgery, on the one hand, and sadomasochistic restraint fantasies, on the other, has achieved a kind of permanence in the pornographic imaginary. "The language of pornography is the language of the stable," Lansbury writes, with some scorn: "women are made to 'show their paces' and 'present themselves' at the command of the riding master who flogs and seduces them into submission."²⁶³ Indeed, the iconic imposing table and chair, adorned with adjustable stirrups and leather straps, populated Victorian fiction across diverse genres and scenarios. From Anna Sewell's *Black Beauty* to John S. Farmer's well-known pornographic fictions to the illustrations for vivisectional trade catalogues, the traffic in images and aesthetics is clear, and each genre, under Lansbury's attentive eye, can be seen invoking the others. "From approximately 1870 on, a recurring figure in the pornographic novel is the doctor who seduces women patients on a couch or table equipped with restraining devices," she observes. "Throughout Victorian pornography, the riding master with his whip and the doctor with his scalpel interchange roles."²⁶⁴

That the relationship between the lab animal and the vivisector was regarded as a model of not only horror and brutality but erotics and sadomasochistic fantasy speaks to the complex forms of domination and mastery into which the animal was folded, forms that cannot be thought of as strictly objectifying and instrumental, or at least not in the usual sense. If the lab animal

²⁶² Lansbury, "Gynaecology, Pornography, and the Antivivisection Movement," 414–415.

²⁶³ Lansbury, "Gynaecology, Pornography, and the Antivivisection Movement," 421. For Lansbury, the desires and pleasures of the submissive are inscrutable, if not impossible. "In a great many pornographic novels between 1870 and 1910, women are repeatedly subdued and tied down so they can be 'mounted' more easily, and they always end as grateful victims, trained to enjoy the whip and the straps, proud to provide pleasure for their masters." (421)

²⁶⁴ Lansbury, "Gynaecology, Pornography, and the Antivivisection Movement," 424.

represented a form of ‘clinical material’ to be used and dispensed with as an object of sorts, it also rather uneasily opened on to subjective, erotic forms of domination, which both threatened to recover the subject repressed in vivisection tableaux and to animalize otherwise erotic encounters. As such, the aestheticization of these encounters – the specialized equipment, rich tableaux, and prescribed roles – resists what could be called, in a gesture to Foucault’s famous thesis in the introduction to *The History of Sexuality*, the “primal hypothesis.”²⁶⁵ After all, where we should expect to find, according to this ubiquitous if vague regard for human sexuality as base and animal, a divestment of cultural accessories, we find instead their proliferation and hardening into elaborate, artificial forms. The bestialism of Victorian sexuality and its legacy is not one of liberatory disrobement or return to nature but elaborate contrivance: costume, leather, props, and iconographic gestures coded as animal.

The mad scientist figure specifically embodies this ambivalence, caricatures of which can rather definitively be traced to Emanuel Klein’s testimony in 1875 before the Royal Commission on the Practice of Subjecting Live Animals to Experiments for Scientific Purposes.²⁶⁶ His apparent pleasure in tormenting animals – what Cobbe termed “schadenfreude” – became a source of embarrassment to the Commissioners and outcry from the general public. Wilkie Collins’ Dr. Benjulia, from his novel *Heart and Science*, and H. G. Wells’ Dr. Moreau were specifically inspired by Klein’s chilling performance.²⁶⁷ Postwar cinema, however, departs from

²⁶⁵ Michel Foucault, *The History of Sexuality. Volume 1: An Introduction*, tr. Robert Hurley (New York: Random House: 1990), 10–13.

²⁶⁶ Richard D. French, *Antivivisection and Medical Science in Victorian Society* (Princeton: Princeton University Press, 1975), 104.

²⁶⁷ “It is Moreau’s role as vivisector that makes him so difficult to assess as scientist. Is he a great physiologist devoted to pure research, or a mad scientist driven by the very animal forces he tries to overcome, suspect of taking a sadistic enjoyment in prolonged and exquisitely painful operations? Both images of Moreau – the dedicated researcher and the sadistic torturer of animals – would have been familiar to Well’s audience as characteristic of the positions of the opposing sides in the late-Victorian debate over vivisection.” (Mason Harris, Introduction to *The Island of Doctor Moreau*, by H. G. Wells (Peterborough, Canada: Broadview Press, 2009), 44–45.)

this point, introducing a new regime: instead of objectification and its violence, subjectification and its traumas. Instead of the rejection of psychosocial features of animal life, their embrace and entrainment. In this sense, postwar animal cinema becomes more, rather than less, perverse, and closely follows if not feeds modern horror's fascination with a violence that requires pain be felt and experienced. Instead of asking how we feel about violence to animals – a strategically narrowed question – postwar cinema asks how animals feel, and how we feel about their feeling.

The pharmaceutical and physiological advances that permit the scale of the factory farm and the collapse of human and animal bodies, also gives rise to new forms of disgust. For all the modern forms its consumption and instrumentation take, the animal, whose breast milk we imbibe and body we devour, disturbs all notions of contact and familiarity, sexual and violent, reproductive and affective. If “it is notorious that many animals, though perfectly tamed, refuse to breed in captivity,”²⁶⁸ as Darwin wrote, it is nonetheless essential that they be made to, manually – and the stock market, whose very name bears and obscures its bestial origins, depends upon it. Indeed, for Marx, in a famous passage, “it is only after men have raised themselves above the rank of animals ... that a state of things arises in which the surplus-labour of the one becomes a condition of existence for the other.”²⁶⁹ What is lost in biopolitical accounts of animal stock, then, is precisely its replenishment, that vast and intimate regulation of animal sexuality on which capital itself arguably depends.

This lack, moreover, only redoubles when we consider the absolute priority of animal husbandry, captivity, and domestication to human sexuality and its performance. From leather

²⁶⁸ Charles Darwin, *The Variation of Animals and Plants under Domestication*, vol. 2 (London: John Murray, 1905), 163.

²⁶⁹ Karl Marx, *Capital: A Critique of Political Economy*, vol. 2, part 2 (New York: Cosimo, 2007), 561. It was not until 1964 however that the Chicago Mercantile Exchange introduced the first modern futures contract on a live animal, thereby allowing meat buyers and suppliers to diminish their exposure to the seasonal risk that live cattle trading creates.

bdsm equipment to dog collars and leashes, horse bits and riding crops, hogties and frog-ties, spider gags and meat hooks,²⁷⁰ desire is figured *as* animalistic even as animal desire itself is systemically neutralized or neutered, controlled and commodified. That animal and human sexualities intersect the most palpably in bdsm has perhaps only served to further obscure a deeper cultural, affective, and political imbrication. If there can be “no space for political agency in the experience of submissives,”²⁷¹ Rosalind Galt observes of certain feminist approaches to animal studies, then the Victorian pornographic tableau of the stable can only serve to further discover women’s and animals’ linked objectification under a domineering, patriarchal gaze.

Nor can this censure on the bestial be confined to an “overly allegorical understanding of bdsm”²⁷² such as Lansbury’s. For Deleuze, and the celebrations of *becomings-animal* his work has inspired, the bestial is almost too direct, too literal: where *becoming* becomes-confused with *being*. “There is no need for bestialism in this,” he writes, “although it may arise, and many psychiatric anecdotes document it in ways that are interesting, if oversimplified and consequently off the track, too beastly. It is not a question of ‘playing’ the dog, like an elderly gentleman on a postcard; it is not so much a question of making love with animals.”²⁷³ Or is it, in part? In a Danish instructional video for pig farmers, entitled “Five-Point Stimulation Plan,” a close-up of a farmer’s wedding ring precedes his methodical bringing of the pig to climax²⁷⁴: in

²⁷⁰ To say nothing of doggy style and reverse cowgirl, or the prevalence of animal figures in typing (e.g. bears, cubs, pumas, cougars, pandas).

²⁷¹ Rosalind Galt, “Perverse Aesthetics: Maria Beatty, Masochism, and the Cinematic,” *World Picture 4* (Spring 2010), 2. “Based,” that is, “on the common misconception that dominant women are a reversal of patriarchal relations and should be seen as ‘good’ by feminists, whereas submissive women merely reiterate patriarchy and are ‘bad’.”

²⁷² Galt, “Perverse Aesthetics,” 2.

²⁷³ Gilles Deleuze and Félix Guattari, *A Thousand Plateaus*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 278–279. Immediately preceding this passage, Deleuze writes, axiomatically, “*Sexuality proceeds by way of the becoming-woman of the man and the becoming-animal of the human.*” Again, there does not seem to be a space reserved for the woman to become-animal.

²⁷⁴ Through techniques that include straddling her rear to simulate the weight of a sow, fisting her from behind to stimulate her clitoris (which in pigs is internally situated), and then depositing semen in her with a pump at the

its nervous attempt to dissuade perception of a bestial act, the formal gesture serves only to confirm its ineluctable veracity for the pig. Indeed, the lab animal melodrama, I argue in the next chapter, begins precisely here, where a certain tradition of an animal biopolitics leaves off: namely, with animal desire, initiation, sexuality.

The anxiety that unites the laboratory and the factory farm, the pet and the endangered species, is not that of an abject juridical subject but of a sexual being, whose body and desires are as inscrutable as they are ineluctable. The lab animal and its cinematic articulation begins *after* liberation and beyond the questions of rights to which this whole problematic is attached. Trading in the law, the state, subjecthood, for the community, sexuality, and taboos, the modern animal is borne of the family and *its* laws – against perversion, incest, bestiality, and ‘crimes against nature’ – the very problems raised by the postanimal genetic thriller. Or rather, like the classical mythological chimera, its genetic counterpart too organizes fear – of bodies, boundaries, and their sexual, or corporeal, mixing. Despite its moorings in medical fact, the transgenic, chimeric creature remains, as Sarah Franklin might say, “totemic in the anthropological sense of working to secure the very meaning of kind and kinship.”²⁷⁵

proper moment. Produced by the Department for Nutrition and Reproduction at Denmark’s National Committee for Pig Production, and brought to my attention by popular science writer Mary Roach, through private email correspondence.

²⁷⁵ Sarah Franklin, *Dolly Mixtures: The Remaking of Genealogy* (Durham: Duke University Press, 2007), 28.

4.0 EMOTION CAPTURE: ANIMAL PERFORMANCE, BIOENGINEERING, AND DIGITAL CREATURES

“I cannot say at what moment you have the right to be called ‘face.’ The human face is completely different and only afterwards do we discover the face of an animal. I don’t know if a snake has a face. I can’t answer that question. A more specific analysis is needed.”²⁷⁶

Emmanuel Levinas

At the height of his work on Buffon’s *Histoire naturelle*, Jacques de Sève, the great French illustrator, was commissioned to provide the frontispiece for Racine’s *Phèdre*.²⁷⁷ The image, of an event otherwise related only through dialogue, shows Hippolytus’ fatal battle with a horned monster risen from the waves. Assembled in fragments from the royal zoological collections, the fabricated monster – a masterpiece of comparative anatomy in its own right – could serve as the frontispiece for de Sève’s own oeuvre. Composed of bodies in motion, his chimera performs animal movement itself – its variety and semblances of form, its “motions and emotions.”²⁷⁸ Refusing the call to, as Michael Taussig writes elsewhere, “take the face to be the figure of appearance, the appearance of appearance, the figure of figuration,”²⁷⁹ de Sève’s monster –

²⁷⁶ Emmanuel Levinas, “The Name of a Dog, or Natural Rights,” tr. Seán Hand, in *Difficult Freedom: Essays on Judaism*, ed. Peter Atterton and Matthew Calarco (Baltimore: Johns Hopkins University Press, 1997), 172.

²⁷⁷ For Racine’s illustrated *Oeuvres*, published in 1760. Jacques de Sève was commissioned by Buffon to provide the quadruped illustrations for *Histoire naturelle, générale et particulière* (1749-1778, in 36 volumes). He also illustrated eighteenth-century editions of La Fontaine’s *Fables choisies et mises en vers* (originally published between 1668 and 1671).

²⁷⁸ Elizabeth Amy Liebman, “Animal Attitudes: Motion and Emotion in Eighteenth-Century Animal Representation,” *Journal for Eighteenth-Century Studies* 33, no. 4 (December 2010): 678.

²⁷⁹ Michael Taussig, *Defacement: Public Secrecy and the Labor of the Negative* (Stanford: Stanford University Press, 1999), 3.

viewed from the back and faceless – is a body of intensities for which movement, not the face, is the organ of expression.

Noting its insistence on the anatomical movement of animal bodies and the problems for visualization they provoke, I want to use de Sève’s illustration to introduce a different mode of illustration: motion capture and digital animal performance. Like de Sève’s work – and Marey’s a century later – CGI ‘illustrations’ of animal behavior challenge received notions of representation and media. These three moments, I argue, belong together, refer implicitly to each other, and describe a trajectory united by their essential if not inaugural role in three origins: cinema, ethology, and the digital.

While it is commonplace to regard chronophotography as a precursor to motion capture – “Motion capture is Marey brought to the digital,”²⁸⁰ as Stephen Mamber puts it – the development and orientation of *both* technologies around almost exclusively animal subjects remains conspicuously overlooked in digital cinema scholarship. Like Marey’s Paris workshop, Weta Digital and Rhythm & Hues, the two leading studios for VFX “creatures,” are also laboratories for applied ethology. Quite literally. Zoologists, then and now, work on set, shape the production, and prevail upon its story. Digital animals in a certain sense represent the collision of these two traditions: motion capture and ethology, anatomy and behavior. Marey & Muybridge + Lorenz & Tinbergen = VFX & Motion-Capture.

What, then, does it mean for cinema that its origin and future – chronophotography and motion capture – depend on visual technologies devised to capture not just movement but animal movement? Just as, for Marey, chronophotography was a *means* for seeing and isolating the anatomy of animal movement, for Weta and R&H, modeling is driven and advanced by almost

²⁸⁰ Stephen Mamber, “Marey, the analytic, and the digital,” in *Allegories of Communication: Intermedial Concerns from Cinema to the Digital*, ed. John Fullerton and Jan Olsson (Rome: John Libbey, 2004), 89.

exclusively animal problems: how to render animal movement, muscles, skin, eyes, fur – in short, the physiological events of animal bodies that escape human vision. Like de Sève’s monster, Caesar from *Rise of the Planet of the Apes* (2011) – or Richard Parker from *Life of Pi* (2012) – is an assemblage of physiologies and anatomies both real and virtual, motion captured and rendered. The visual technologies that render them were developed specifically for visualizing animal movement and behavior. For visual effects departments, the animal’s body *is* its performance. Joe Letteri, supervisor of the digital creation of the apes for Weta, describes the production of Caesar as a physiological performance: or rather, a performance *of* physiology. “We have a model for how the fat layer combines with the muscles. We talk about how the skin slides over muscles, the combination of skin and muscles moving together, counter to each other.”²⁸¹

That said, the digital performance of animal bodies is not simply a matter of synchronizing, or “hardcoding,” discrete physiological “layers” – but also of articulating sequences of behaviors and their relationship to environments and bodies, affects and emotions. Instead of Marey’s “locomotion” in a void, the localization of movement *on* the body, which becomes, as a film-body unto itself, a manifold surface expressing states and desires. For *Life of Pi*, Rhythm & Hues spent a year fine-tuning how Richard Parker’s paw twitched as he shifted his weight, how he swallowed²⁸² – or how, as animation director Erik de Boer described it, “the nails protracted and darker fur would come out with those nails – the pink of the nail. Now when we collide with the ground we can see the shape change, the anger and aggression.”²⁸³ Just as Andy Serkis studied footage of chimps for his mocap performances, *Pi* VFX artists mined

²⁸¹ “VFX Supe Joe Letteri on *Rise of the Planet of the Apes*,” StudioDaily, February 17, 2012.

²⁸² Mekado Murphy, “A First Mate Bares His Fangs: Creating a Tiger for *Life of Pi*,” *The New York Times*, November 16, 2012.

²⁸³ Ian Failes, “*Life of Pi*: A Tiger’s Tale,” *FXGuide*, November 26, 2012.

documentaries for theirs and flew to Paris over two years to spend time with trainer David Faivre’s tigers and collect video footage – of “rolling paws, yawns, eye twitches, lower-jar stuff – all the close-in detail,” says de Boer.²⁸⁴

As with de Sève’s monster, the countenance of digital animals is the body, not the face – and its organ of expression, *fur*, not the mouth. For VFX artists, fur represents the greatest challenge. Its haptics and responsiveness, physical detail and sheer complexity, makes it, in life as well as fiction, the seat of mammalian expression. To meet this challenge, the fur system was completely rewritten between *King Kong* (2005) and *Rise*. After Weta’s software development team head Alasdair Coull read of Professor Eitan Grinspun’s innovations in hair simulation and “fur grooming” at Columbia University, he was consulted to help write the program Barbershop, a brush-based modeling tool that permits artists to manipulate each individual strand of hair. It is what allows for the complex simulations of wind and inertial dynamics in *Rise*, especially for the big orangutan Maurice, who had matted clumps of fur on his arms and legs.²⁸⁵ On *Kong* they could groom hair “procedurally” – have this area go left, this one go right with a wave, but with Grinspun’s “principled” differential equations they could be *barbers*. As Joe Letteri, supervisor of digital creation, put it: “They could get in there with a comb and scissors and start grooming.”²⁸⁶

Before *Pi*, nearly every film Rhythm & Hues had worked on featured talking animals – with *Babe* (1995), they had put an end to sloppily synching animal mouths to voiceover, and

²⁸⁴ Failes, “*Life of Pi*.”

²⁸⁵ Vincent Frei, “*Rise of the Planet of the Apes*: Dan Lemmon – VFX Supervisor – Weta Digital,” *Art of VFX*, September 23, 2011.

²⁸⁶ “VFX Supe Joe Letteri on *Rise of the Planet of the Apes*.” Grinspun and his team of graduate students have helped scientists from Disney, Pixar, Adobe, and Weta solve some of the toughest CGI problems – whether recreating the dab of a bristled paintbrush, getting Rapunzel’s hair in *Tangled* to float in an underwater cave, or fluff Tintin’s dog Snowy. See: Patricia Cohen, “Perfecting Animation, via Science,” *The New York Times*, December 29, 2010.

revived the live-action animal family movie – but for Richard Parker expressivity could not be displaced from body to face. Because R&H artists were accustomed to creating ‘talking animal’ characters, VFX supervisor Bill Westenhofer demanded using a real tiger in part of the scene where Richard Parker jumps from the boat, in order to force his artists to match in subtlety the most difficult visual effect: *wet fur*.²⁸⁷ Disturbing ontological distinctions between body and environment, surface and touch – distinctions assumed and enforced by production processes – wet fur is not a visual effect amongst others. Because the water simulations are run in *Houdini* but the fur, muscle, and tiger are run in *Voodoo*, there can’t be wet fur, only a tiger *in water*.

Here, following Laura Marks’ study of *The Skin of the Film*, we might consider a corresponding *fur of the film*, and examine its purchase on the representation of animal emotiveness and embodiment – a possibility Jennifer Barker seizes upon, in passing, in *The Tactile Eye*. “If we take ‘skin’ to mean the literal fleshy covering of a human or animal body,” she writes, “then a film couldn’t possibly have a skin. But if, as Merleau-Ponty said of touch, ‘skin’ also denotes a general style of being in the world, and if skin is not merely a biological or material entity but also a mode of perception and expression that forms the surface of a body, then film can indeed be said to have a skin.”²⁸⁸ Just as the countenance of the animal is the body not the face, the skin of the film, in this context, is fur. The chapter that Darwin devotes to the “Means of Expression in Animals,” in *The Expression of the Emotions in Man and Animals*, is likewise distinguished by its refusal to “take the face to be the figure of *appearance*.”²⁸⁹ At least twice the author recounts bearing a “stuffed snake” – once into a monkey-house – to study the

²⁸⁷ Rick Marshall, “Oscar Effects: How *Life of Pi* Caught a Digital Tiger by the Tail,” *Digital Trends*, February 22, 2013.

²⁸⁸ Jennifer M. Barker, *The Tactile Eye: Touch and the Cinematic Experience* (Berkeley: University of California Press, 2009), 26.

²⁸⁹ Michael Taussig, *Defacement*, 3.

bristling of the back, the instantaneous erection of hair. Fur, and other “dermal appendages,” are described as acting as a kind of face for animals, registering emotions or states through an orchestration of minute muscles. “The movement is effected, as we know from [Albert von] Kölliker’s interesting discovery, by the contraction of minute, unstriped, involuntary muscles, often called *arrectores pili*, which are attached to the capsules of the separate hairs, feathers, etc.”²⁹⁰ The movement of fur held similar interest for de Sève. For an unpublished preparatory drawing of the skin of a leopard he charged more than he did for any other image invoiced to Buffon. “De Sève’s drawing has extraordinary life, *without* facial expression or gesture in the limbs,” Amy Liebman observes, continuing. “The eye follows the sinuous contour of the back, the chiaroscuro modeling of the haunch and mobile hip, the animating movement of the spots that travel along the body: spots that are the defining feature.”²⁹¹

The controversy surrounding the Academy Awards’ refusal to consider Andy Serkis as a nominee for best supporting actor has obscured this transformation in animal performance. In defending Serkis’ performance as a performance, colleagues – James Franco, for instance, in a well-circulated op-ed – run the risk of demoting in significance the components of Caesar or Kong that exceed the actor and “perform” the animal *overneath*. In this view, for a digital creature to count as a performance, there must be a human underneath driving it, and digital effects little more than “make-up” applied as mere veneer. All that “the Weta effects team did,” Franco explained, “was to essentially ‘paint’ the look of Caesar over Andy’s performance. This

²⁹⁰ Charles Darwin, *The Expression of the Emotions in Man and Animals* (New York: Oxford University Press, 1998), 104.

²⁹¹ Liebman, “Animal Attitudes,” 677–678.

is not animation as much as it's digital 'make-up.'"²⁹² The inadequacy of this remark to capture the total performance of Caesar is evinced by digital animals like Richard Parker who are fully rendered yet equally lifelike, animated, and agential. Distinguishing Caesar from Richard Parker on ontological grounds thus requires an appeal to an originary, "breathing human," as James Franco described Serkis' performance, who alone can put that "spark of life in its eyes and the life in its limbs."²⁹³

If preserving Serkis' face and eyes across the production process is essential to standard defenses of his performance as a performance, it is because they are precisely what motion capture renders spectral and unlocatable – by capturing their motion, and motion alone. While mo-cap technology has been developed to preserve a shared theatrical space to improve actors' performances – Franco credits their ability, introduced by *Rise*, to "look into each other's eyes" as essential to the quality of their performances – the eyes he sees are not what we see in Caesar's gaze.²⁹⁴ Strictly speaking, the "spark of life" in Caesar's eyes was breathed into him by VFX artists, not Serkis: in addition to modeling the "surrounding musculature of the eyelids and the orbital cavity," VFX supervisor Dan Lemmon explained, "We cheated them whiter – as we did in *King Kong* – in order to make it more clear which way the apes were looking, which makes it easier for the audience to read their facial expressions."²⁹⁵

Astonishingly, the story itself was rewritten to justify this cheat – "by attributing the whitening to a side effect of the drug that gives the apes intelligence and makes their irises green.

²⁹² James Franco, "OSCAR EXCLUSIVE: James Franco On Why Andy Serkis Deserves Credit From Actors," *Deadline*, January 8, 2012.

²⁹³ Franco, "Why Andy Serkis Deserves Credit From Actors."

²⁹⁴ For *Lord of the Rings*, Gollum's face was hand-animated separately in post-production, and Serkis had to re-do the live-action performance on a stage; with *Avatar* they could capture face and body together (Letteri); but with *Apes*, for the first time, live-action cameras were able to record Franco at the same time Serkis was filmed on the performance capture cameras. (Andy Serkis, "Serkis: Playing Virtual Parts On The Big Screen," interview by Terry Gross, *Fresh Air*, NPR, August 4, 2011.)

²⁹⁵ Frei, "*Rise of the Planet of the Apes*: Dan Lemmon – VFX Supervisor – Weta Digital."

That is why the apes at the very beginning of the film have darker eyes that are more consistent with real apes – they haven't received the drug yet."²⁹⁶ Indeed, the "soul" that Franco sees in Caesar's eyes but falsely attributes to Serkis is discernible in Richard Parker's gaze without the option of recourse. The enigmatic gaze of the tiger, which Pi's father Santosh (Adil Hussain) warns him against mistaking for a human gaze underneath, is not only totally rendered but "cheated," as well. Because, with tigers, "the eyes don't rotate in the socket nearly as much as with a primate," Bill Westenhofer explained, "we found at first that when we tried to stick at this too closely, it looked bad. But nothing is ever as simple as that, and they do roll around some, so it came down to studying this."²⁹⁷

"How to perform animals out of facelessness?"²⁹⁸ Una Chaudhuri asks in an essay entitled "(De)Facing the Animals" and introduced by Emmanuel Levinas' remark, when asked if animals had faces, that "the priority here is not found in the animal, but in the human face. I cannot say at what moment you have the right to be called 'face.' I don't know if a snake has a face. I can't answer that question."²⁹⁹ Just as motion capture scholarship tends to regard the face as the chief organ of expression, scholarship on animal representation and live-action animal performance can mistake attention to the body for a "defacement" of the animal.³⁰⁰ After citing

²⁹⁶ Vincent Frei, "Rise of the Planet of the Apes: Dan Lemmon – VFX Supervisor – Weta Digital." There is an interesting subtext, or excess, to this synchronization of story and aesthetic: in the original *Planet of the Apes*, Charlton Heston's character is nicknamed by his captors "Bright Eyes," the name given to Caesar's mother.

²⁹⁷ Rick Marshall, "Oscar Effects: How *Life of Pi* Caught a Digital Tiger by the Tail."

²⁹⁸ Una Chaudhuri, "(De)Facing the Animals: Zooësis and Performance," *TDR/The Drama Review* 51, no. 1 (Spring 2007): 12.

²⁹⁹ Emmanuel Levinas, "The Name of a Dog, or Natural Rights," tr. Seán Hand, in *Difficult Freedom: Essays on Judaism*, ed. Peter Atterton and Matthew Calarco (Baltimore: Johns Hopkins University Press, 1997), 172.

³⁰⁰ Scarcely an essay on Levinas and animals – especially regarding "The Name of a Dog," about a dog named Bobby who "unwittingly" bears witness to his humanity in a concentration camp – fails to cite this passage as symptomatic of a deeper, ethical defacement of animals. See, for instance: Barbara Jane Davy, "An Other Face of Ethics in Levinas," *Ethics & the Environment* 12, no. 1 (Spring 2007): 39–65; Matthew Calarco, "Facing the Other Animal: Levinas," in *Zoographies: The Question of the Animal from Heidegger to Derrida* (New York: Columbia University Press, 2008); Jacques Derrida, *The Animal That Therefore I Am*, tr. David Wills (New York: Fordham University Press, 2008), 107–110; David Clark, "On Being 'The Last Kantian in Nazi Germany': Dwelling with

this same passage in an essay on the illustrations of French physiologist Louis-Antoine Ranvier, Nancy Anderson announces her intentions: to imagine “face-to-face encounters between the nonhuman and the human, the experimental animal and the experimenter. [...] And I want to do this by looking for faces, literally, in these publications. The fact is that images of intact animals are rarely presented in these texts, and the inclusion of a face is even rarer.”³⁰¹ The *face* of the animal, however – if by face, recognition and expression are meant – is its *body*, in movement. As well-intentioned as Anderson’s search for missing animal faces in medical textbooks might be, “what I wish to caution against,” following Mieke Bal, “is the conflation of the *slogan* of the face-to-face with an ethics of vision” in what Bal calls “discourses of the face.”³⁰²

What unites de Sève, Marey, and Westenhofer, however, exceeds an interest in fur: each, in their own medium, recognized that the animal needs to be *made* visible, and each transformed available techniques and technologies to that end. Digital production complicates this demand by permitting an unprecedented faithfulness to animal behavior without directly presenting behavior uncomposed, although what we mean by ‘directly’ is itself called into question by such techniques. In assembling more animal *effect* than animal, the risk is run of losing life in that

Animals after Levinas,” in *Animal Acts: Configuring the Human in Western History*, ed. Jennifer Ham and Matthew Senior (New York: Routledge, 1997), 181–182; Gary Steiner, *The Moral Status of Animals in the History of Western Philosophy* (Pittsburgh: University of Pittsburgh Press, 2005), 216–217.

³⁰¹ Nancy Anderson, “Facing Animals in the Laboratory: Lessons of Nineteenth-Century Medical School Microscopy Manuals,” in *The Educated Eye: Visual Culture and Pedagogy in the Life Sciences*, ed. Nancy Anderson and Michael R. Dietrich (Lebanon, NH: Dartmouth College Press, 2012), 48. Ranvier, who had worked in the laboratory of Claude Bernard, assembled his own manual, *Traité technique d’histologie*, which includes numerous illustrations of vivisectioned frogs. Of one illustration, for Anderson “hardly a hint of a face remains,” while the body, which does express, is but a “vestige” of the animal’s liveness. “We could see a live animal emerge, however,” she observes, “in the digits of the limb, caught in the still image, spread wide as if clutching at empty air – a vestige of the naturalistic animal’s liveness.” (60) The body of the animal in illustration disturbs the privileging of the face in expression, and for Anderson and Ranvier’s frogs, liveness cannot help but be identified in the digits. Of another illustration, she notes, in passing: “Again, it is the silhouette of a raised paw that carries the weight of animation, with digits that seem to grasp anxiously at the white space between image and text.” (61)

³⁰² Mieke Bal, “The Commitment to Look,” *Journal of Visual Culture* 4, no. 2 (2005): 152. “I will henceforth call this the *discourse of the face*, in order to avoid the leap to a claim for an ethical position that comes with the phrase ‘face-to-face’.” (154)

“blind spot or empty center around which real action is arranged.”³⁰³ In a remarkable scene towards the beginning of Paul Verhoeven’s *Hollow Man* (2000), a film very much about seeing a life that is always animal, this gambit achieves a kind of hyperbolic status, folding in on itself like a photograph that “shows itself as a photograph,” that “shows the showing-itself of the photographed thing.”³⁰⁴ Invisibility here is a disappearance achieved through painful, piecemeal deconstruction, layer by layer. Having already successfully developed an invisibility serum for the US military, Dr. Sebastian Caine (Kevin Bacon), a brilliant but megalomaniacal molecular biologist, has engineered a serum that will reverse the invisibility effect on his test subject, a female gorilla named Isabelle. Perched at the threshold of life and death, visibility and invisibility, the one is revealed as precariously related to the other: following the injection move through Isabelle’s body, we see her “rendered” directly, the circulation of blood giving way to tissue then to muscle and finally to fur.

If the animal has always been at risk of erasure, it is also, as Akira Lippit has written of the invisible man, a figure *of* erasure.³⁰⁵ A barber, perhaps. Trimming, disassembling forms – or, to use the language of VFX departments, “grooming” the image. In practice and theory, “there are always bits of Andy [Serkis] that stick out outside Caesar’s silhouette and need to be painted out.”³⁰⁶ Instead of simply extending what we mean by “actor” to include Serkis, and thereby relegating mo-cap technology to a “prosthetic” role, we need to begin with the body of the character rather than the actor – Caesar rather than Serkis – and examine both the who and the what that performs it. After all, the alien agent introduced by motion capture is not Serkis but the

³⁰³ Seung-hoon Jeong, “The Precarious Gift and the Digital Animal in *Life of Pi*,” (“Liminal Image: Precarious, Blurred, Digitized” panel, Film-Philosophy Conference: Beyond Film, ASCA (Amsterdam) and EYE Film Institute Netherlands, July 10–12, 2013).

³⁰⁴ Jean-Luc Nancy, *The Ground of the Image*, tr. Jeff Fort (New York: Fordham University Press, 2005), 86.

³⁰⁵ “The invisible being is a figure under erasure, but also a figure of erasure, of antigraphy.” (Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis: University of Minnesota Press, 2005), 120.)

³⁰⁶ Vincent Frei, “*Rise of the Planet of the Apes*: Dan Lemmon – VFX Supervisor – Weta Digital.”

mo-cap suit, not the actor underneath but the body *rendered* – a term that, as Nicole Shukin illustrates throughout *Animal Capital: Rendering Life in Biopolitical Times*, usefully evokes both animal and visual processes. Like the “rendering” of animal bodies – through the separation of fat from tissue by heat in the production of soap, glycerin, candles, and industrial liquids like biofuel – mo-cap technologies “render” animal bodies by isolating and hardcoding human and animal ‘tracks’ through a process that conspicuously resembles the gene editing technologies at the heart of the film itself, a convergence to which we will soon turn.

4.1 ANIMAL PERFORMANCE, BAZIN, AU HASARD BALTHAZAR, AND THE COW

While digital technology has upset traditional notions of indexicality, its effect on acting has been less dramatic than we might imagine. Even before CGI and motion capture, the film actor, as Benjamin put it, was already fundamentally estranged from her image, its “creation by no means all of a piece” but rather “composed from many separate performances” taken out of order.³⁰⁷ The eponymous green screen, in this sense, more advanced than introduced this general “alienation.” Indeed, the principal reasons given for rejecting Andy Serkis’ performances as performances – he functions more as a “prop” than an actor, he imitates rather than performs – can also paradoxically suggest that motion capture performance is the *quintessence* of acting. Like the ‘reality effect’ Benjamin describes in “Work of Art,” the “pure aspect” of characters’ feelings and interactions, once “freed from the foreign substance of equipment,” is also “the

³⁰⁷ Walter Benjamin, “The Work of Art in the Age of Mechanical Reproduction,” tr. Harry Zohn, in *Illuminations*, ed. Hannah Arendt (New York: Schocken Books, 2007), 230.

result of a special procedure,” and one that demands of the actor a certain *evacuation* of emotiveness.³⁰⁸ Thus, for Rudolf Arnheim, to whom Benjamin refers, “the latest trend” is “treating the actor as a stage prop chosen for its characteristics and ... inserted at the proper place,” which would harden into a philosophy through Hitchcock for whom, simply, “actors are like cattle,” as he put it, to convey his preference for non-Method actors.³⁰⁹

With animal subjects, the conditions imposed by film on all performance either collapse in on them themselves or are taken to their conclusion. On the stage, and often in film, live animal performance depends upon capturing and sequencing movement, not establishing contact with the camera or spectator. Through what is generally called “matrixing,” animal actions are confined to rote behaviors and then quickly contextualized through editing. However, the dividend yielded by the frustrations encountered in directing animals is precisely the unselfconsciousness with which they move, making them, in a sense, perfect actors. For Kracauer, you will recall, the first of the cinema’s proper subjects is movement, epitomized by “the chase” sequence, which in turn is at its purest with animals, who can only move and never ‘act’ – a conviction that persists across film theory history.³¹⁰ From Balázs to Bazin and beyond, this same appraisal of the animal, as the purest of cinematic subjects, grounds the cinema in a theory of performance as movement – and not, for example, as recognition and intersubjectivity. Exceeding figuration, the animal appears directly, unmediated by awareness or

³⁰⁸ Benjamin, “The Work of Art in the Age of Mechanical Reproduction,” 233.

³⁰⁹ Arnheim quoted in Benjamin, “The Work of Art in the Age of Mechanical Reproduction,” 230; Hitchcock quoted in Frank P. Tomasulo, “‘You’re Tellin’ Me You Didn’t See’: Hitchcock’s *Rear Window* and Antonioni’s *Blow-Up*,” in *After Hitchcock: Influence, Imitation, and Intertextuality*, ed. David Boyd and R. Barton Palmer (Austin: University of Texas Press, 2006), 263. Hitchcock then quickly amended his statement, continuing, “actors *should be treated* like cattle.” The director often instructed performers to “drain their face of all expression.” (263)

³¹⁰ Siegfried Kracauer, *Theory of Film: The Redemption of Physical Reality* (Princeton: Princeton University Press, 1997), 42. As discussed in the first chapter, each of the examples Kracauer gives includes or features animals.

culture. In a section on “Animals,” in *Visible Man*, Béla Balázs muses on the pleasure of watching animals on film:

The particular pleasure we derive from watching animals on film is that they are not acting, but living. They are unaware of the camera and go about their business with an unselfconscious seriousness. Even if they are trained for film performance, we are the only ones who know that it is all just theatre. They are unaware of this and take it all completely seriously. An actor likewise intends to create the illusion that his expressions are not just ‘performances’ but the expression of his actual feelings at that moment. But no actor can succeed in this as well as an animal. For animals there is no question of illusion; it is all the most genuine reality. It is not art; we are eavesdropping on nature.³¹¹

For Balázs, then, the animal is the ideal actor, while the human actor strives to be *as* an animal, becoming rather than affecting a role – even if “no actor can succeed in this as well as an animal.” Georges Bataille’s quip that “the animal is in the world like water in water” would perhaps better describe the animal on-screen than in-world.³¹² In an essay on the donkey’s performance in Robert Bresson’s *Au Hasard Balthazar* (1966), Brenda Austin-Smith observes, taking as her point of departure Hitchcock’s remarks, that in lacking “purposeful expression” and interiority, the animal actor embodies this ideal. “The donkey’s perfection arises from its limitations as a self-conscious being, creating a performance standard the human actors struggle to achieve through their suppressions of interiority.”³¹³ In an interview, Bresson described casting the donkey in just these terms:

³¹¹ Béla Balázs, *Visible Man*, tr. Rodney Livingstone, in *Béla Balázs: Early Film Theory*, ed. Erica Carter (New York: Berghahn Books, 2010), 60.

³¹² Georges Bataille, *Theory of Religion*, tr. Robert Hurley (New York: Zone Books, 1989), 19. See: Jill Marsden, “Bataille and the Poetic Fallacy of Animality,” in *Animal Philosophy: Essential Readings in Continental Thought*, ed. Peter Atterton and Matthew Calarco (London: Continuum, 2004).

³¹³ Brenda Austin-Smith, “Acting Matters: Noting Performance in Three Films,” in *Theorizing Film Acting*, ed. Aaron Taylor (New York: Routledge, 2012), 28.

I was very much afraid, not only while writing on paper, but while shooting the film, that the donkey would not be a character like the others, that is to say would appear a trained donkey, a performing donkey. So I took a donkey that knew how to do absolutely nothing. Not even how to pull a cart. I even had a great deal of trouble getting him to pull the cart in the film. In fact everything I believed he would give me, he would refuse me, and everything that I believed he would refuse me... he gave me. Pull a cart, for example, one says to oneself: a donkey will do that. Well, not at all!... And what I have said to you somewhat rejoins if you will, what I was saying about actors... I wanted that animal to be, even as an animal, crude matter.³¹⁴

Consistent with traditional assessments of animal performance, “Bresson’s most distinctive gesture,” according to Nico Baumbach, “is the attempt to evacuate acting from his work,” for which animals offer the perfect “vessel.” “This does not mean,” however, “as it means for many other filmmakers, an emphasis on improvisation or an incorporation of documentary techniques. On the contrary, for Bresson, it means the opposite. The ‘model’ in Bresson’s terminology does not play another character, nor does she play herself, nor in Brechtian fashion is she to play both herself and the character, but rather, she is to not play at all. The model, according to Bresson’s direction, speaks mechanically – reduces her body and voice to a vessel for the text, which in turn becomes the vessel for a body and a voice.”³¹⁵ Neither an intentional subject nor an impassive object, this animal seems almost to give nothing at all. A vessel, a model, a prop, the animal actor slips between familiar categories, leaving one to wonder what is achieved by their inventory.

³¹⁴ Quoted in Nico Baumbach, “On Robert Bresson and Filmed Animals,” *Fiction International* 40 (Fall 2007): 39.

³¹⁵ Nico Baumbach, “On Robert Bresson and Filmed Animals,” 39. Baumbach places Bresson’s approach to animal performance within a grander narrative that assumes that the animal across cinematic history is the *same* animal – that is, one unchanged by the techniques of perception themselves, not to mention the implicated biotechnological developments to which we will soon turn. “The first few years of cinema sought subjects that seemed to affirm the presence of the image—notably, crowds, children and animals—because they were unselfconscious and unpredictable. A distance from theatricality was the mark of the contingent and this highlighted the miracle of the new apparatus. As the polymorphous perversity of early cinema with its vaudeville roots gave way to an industry marketed toward the middle class, narrative cinema became codified and the animal was excised for the same reasons that it had been a focal point so many Lumière and Edison films at the end of the 19th century – its inability to act. / The animal was to return, of course, but only in its proper place. It would become domesticated through animals that could act – the comic relief or sentimental gesture of the well-trained dog or monkey.” (39)

In fiction and nonfiction films alike – animals undermine the distinction, in this view – the animal’s presence on screen performs an ethological or documentary function, accessing directly the authenticity that acting can only simulate. For the same reasons, described in my first chapter, that render animal labor ineligible for scientific management, animal actors can only be filmed within rather specific, and limiting, conditions – conditions they hence auto-naturalize, rendering the fictive non-fictive and the theatrical real. The sense of wondrous fear elicited by Chaplin in the cage with the lion in *The Circus* (1928), and compellingly recounted by Bazin, is made possible by the fundamental *undisciplinability* of animals – the narrow, controlled settings under which they can be said to perform or their behavior be reliably and safely predicted. “Pull a cart, one says to oneself: a donkey will do that,” as Bresson remarked. “Well, not at all!” It is this partial availability to ‘training’ that makes animals constitutively secretive, and their behaviors susceptible to only rote, cinematic orchestrations like the one to which Bazin unfavorably compares Chaplin’s daring venture.

For this reason, a problem arises in opposing, as Bazin does, montage to continuity, with respect to animals. Both are beset by anthropomorphic strategies, which differ in kind but not power. If animals are difficult to direct on account of their relative obliviousness to directing, they are also equally susceptible to anthropomorphic projection when filmed ‘continuously’. For Bazin, who admirably expressed great uncertainty on the question of animals and cinema, the animal seems to wander in this space between absolute authenticity and artificial construction – and his essays on the subject lovingly trace, and mimic, their strange purgatory. As Serge Daney observes, for Bazin, “the essence of cinema becomes a story about animals.”³¹⁶ But this story, for Bazin, is nonetheless a tragic one.

³¹⁶ Serge Daney, “The Screen of Fantasy (Bazin and Animals),” tr. Mark A. Cohen, in *Rites of Realism: Essays on Corporeal Cinema*, ed. Ivone Margulies (Durham: Duke University Press, 2003), 32.

Death, which Bazin discusses in this context in “Death Every Afternoon,” alone permits the animal to escape its Kuleshovean cage, announce its “documentary value,” and resolve the “comparative possibilities of anthropomorphism and montage.”³¹⁷ But when otherwise unfronted by animals confronting their own mortality, for the spectator “it is quite obvious that the human feelings we attribute to animals are [...] a projection of our own awareness. We simply read into their looks or into their behavior those states of mind that we claim they possess because of certain outward resemblances to us, or certain patterns of behavior which seem to resemble our own.”³¹⁸ Such effects thus exceed the artifice of editing, which merely embraces it. When affects invade the screen animal from all sides, the mere absence of cuts is insufficient obstruction to imposed resemblances. With Tourane’s editing, of which Bazin is critical, the apparent action and meaning attributed to the animals do not exist prior to assembly. Here, then, montage simply serves to produce an anthropomorphic impression unextractable by conventional means: acting. However, death scenes excepting, that authenticity threatened by the receptivity of animal figures to anthropomorphic projection cannot be protected by any technique.

Consider, for example, Dariush Mehrjui’s *Gav* (*The Cow*, 1969). Not unlike his Italian neorealist counterparts, Mehrjui’s film has been understood through the prism of what he now refers to as the ‘cinema of the dispossessed’, namely, as a film concerned with “desolation and despair in a remote Iranian village, where the mysterious dying of a pregnant cow drives its owner insane and affects the collective life of the village.”³¹⁹ Indeed, after the film was ‘smuggled’ out of the Venice Film Festival, the Shah’s government was moved to release it

³¹⁷ André Bazin, “Death Every Afternoon,” tr. Mark A. Cohen, in *Rites of Realism: Essays on Corporeal Cinema*, ed. Ivone Margulies (Durham: Duke University Press, 2003); André Bazin, “The Virtues and Limitations of Montage,” in *What is Cinema?: Volume 1*, tr. Hugh Gray (Berkeley: University of California Press, 2005), 44.

³¹⁸ Bazin, “The Virtues and Limitations of Montage,” 43.

³¹⁹ Jamsheed Akrami, “Sustaining a Wave for Thirty Years: The Cinema of Dariush Mehrjui,” in *Life and Art: The New Iranian Cinema*, ed. Rose Issa and Sheila Whitaker (London: National Film Theatre, 1999), 129.

domestically, if with the disclaimer that it was set forty years before its making, placing its events prior to his modernization campaign.³²⁰

As with *Umberto D* and *Au Hasard Balthazar*, in *The Cow* the human-animal relationship at its center has been read by critics as an allegory for, paradoxically, entirely intra-human affairs. In the most cynical, superficial readings, the poverty and dispossession into which post-revolution Iranians – or post-war Italians – have fallen compares only to the lowly beast, into whose company the disenfranchised find themselves inauspiciously demoted. The imprudence of critical attempts to reduce the animal image to human emblem is however belied by the nature of the relationships themselves, which endure as intimate, authentic, disillusioned visions of animality. That the film relies in part upon montagist techniques of construction to express this vision, which of course centers on the death of the cow, less undermines Bazin's perspective than evades it. The animal life, and death, at stake is richer than the starkly delimited impression of danger with which Bazin is predominantly concerned.

If it's difficult, formally, to let the animal be seen, it's no less challenging to protect its apparition from allegorical abrogation. Even when films submerge themselves in animal worlds, imparting an unmistakable respect for their object, an anthropocentric model is still yet capable of effacing its signature – which moreover in these cases does not appear as a totem or object, but as a titular character, co-star, and order raised to metaphysical heights. Allegorizing-by-animal threatens the subsumption of one by the other, a result Lesley Stern deftly resists in observing that in *The Cow* she is both a real cow, present in the image, unsubstitutable, and a symbolic cow, standing in for the state. She carries immense symbolic responsibility. Yet," she continues, "the gestural exchanges between the cow and the man are quotidian and tender. The

³²⁰ Akrami, "Sustaining a Wave for Thirty Years: The Cinema of Dariush Mehrjui," 129.

only cow in the village, she is pregnant, and he cares for her: walks with her, feeds her, embraces her, sleeps with her at night, eventually spending all his time with her. When she dies he cannot accept her not being there, and takes her place in the stall, starts becoming cow, eating straw and mooing.”³²¹

Indeed, should we wish, rightly, to preserve the primacy of *The Cow* as an allegory of a particular moment in Iranian politics, it must still be asked how such an allegory requires the animal to be told. Inevitably, we must engage the text of the film and the performance of the animal, of which Max Nelson reminds us in a note in *Film Comment* when he observes that “one of the *The Cow*’s most striking features is the way its formal language occasionally shifts into a stranger and less stable register than that of traditional realism. In such moments, the film becomes uncivil, frenetic, disorienting – sung in a tongue unknown.”³²² The tongue unknown, however, is animal. And if we wish to follow Nelson further, insofar as he reads Hassan’s (Ezatollah Entezami) madness, withdrawal, and identification with the dead cow as his “renouncing the terms of their existence – and more broadly, the community of *humankind*,” then the frenetic filmmaking to which he turns, and which in formal terms distinguishes the film, must be received as an attempt at speaking in animal tongues.³²³

In considering Hassan’s tender relationship to the cow, Stern finds, rightly, that immediately “we confront the question: Can animals act? Yes.”³²⁴ More broadly, however, to act as a performer cannot be separated from questions of agency and access, of “actants,” in perhaps

³²¹ Lesley Stern, “‘Once I’ve devoured your soul we are neither human nor animal’: The Cinema as an Animist Universe,” *The Cine-Files* 10 (Spring 2016): 7.

³²² Max Nelson, “Dariush Mehrjui’s *The Cow*,” *Film Comment* 5, no. 2 (March/April 2015): 11.

³²³ Nelson, “Dariush Mehrjui’s *The Cow*,” 7; my emphasis.

³²⁴ Stern, “‘Once I’ve devoured your soul we are neither human nor animal’,” 7.

the simplest sense: “They *do* things and they interact with other things, other beings on the screen.

All bodies in film are performative, articulated within a larger performance text that is the film. All bodies in film are also fictional – cut up, dispersed, faded in, spaced out, speeded up, slowed down. The theoretical challenge for those interested in performance has been to understand *how* the body in cinema – all bodies, animal and human – can produce affects and transmit energy, how the body of the actor, through disposition, movement, timing, can initiate a circuit of mimetic affect linking viewers with the screen, how it can do all this though it is fictional.³²⁵

As sympathetic as this argument appears – it does remind us of the animal’s formal primacy – it nonetheless performs a questionable acrobatics, the suspiciousness of which is furthered by its punctual appearance in attempts to recuperate animals from aesthetic regimes that have failed to adequately recognize them. In Kracauer, too, we find this move, which, if we trace its contours more broadly, underwrites a deeper fork in the image. In resisting the domination of the image by human themes and figures, the image becomes, as Kracauer puts it, “democratic.” However, like the animal performer as vessel or model, the democratic image can quickly collapse into a fragile neutrality: a flat plane deflated of power, where no one point organizes the field any more than any other. As with Stern, the language employed struggles to express an objective, irreducible materiality, and the eye it imagines verges on the robotic. Any distinctions formed must inhere to the image ‘itself’, which is but a play of provisional, gestaltist affects. It is not a cow and a man but forms, shapes, lines that assume cow- and man-figure.

On the risks of “democratic” readings of the image, I’m reminded of an aside in a subsection, in *Theory of Film*, devoted to “phenomena which figure among the blind spots of the

³²⁵ Stern, “‘Once I’ve devoured your soul we are neither human nor animal’,” 7.

mind” because “habit and prejudice prevent us from noticing them,”³²⁶ in which Kracauer relates an anecdote from an article by John Maddison, a British Ministry of Information civil servant, “about the perceptual and psychological capacities of African film spectators based on the history of the British Colonial Film Unit in West Africa.”³²⁷

The role which cultural standards and traditions may play in these processes of elimination is drastically illustrated by a report on the reactions of African natives to a film made on the spot. After the screening the spectators, all of them still unacquainted with the medium, talked volubly about a chicken they allegedly had seen picking food in the mud. The film maker himself, entirely unaware of its presence, attended several performances without being able to detect it. Had it been dreamed up by the natives? Only by scanning his film foot by foot did he eventually succeed in tracing the chicken: it appeared for a fleeting moment somewhere in a corner of a picture and then vanished forever.³²⁸

To ask what film theory teaches us about animals, and animals about film theory, can risk seeming naive, even backward, about codes of critical inquiry; and yet, remarks like Kracauer’s too figure among the blind spots – if not of film then of film theory. Indicating an at once sustained and suppressed engagement with nonhuman life, Kracauer’s anecdote should remind us that ‘reading for animals’ is always to read for humans-as-animal, and with all the risks that that entails. From its primitivist mobilization in colonial ethnology to ethological notions that what the animal body speaks *is* truth, film is always at once an *animistic* – or “polytheistic and theogonic” machine, as Jean Epstein puts it³²⁹ – and a psychophysical apparatus that works on,

³²⁶ Kracauer, *Theory of Film*, 53.

³²⁷ Peter J. Bloom, “Refiguring the Primitive: Institutional Legacies of the Filmology Movement,” *Cinemas: revue d’études cinématographiques / Cinemas: Journal of Film Studies* 19, nos. 2–3 (Spring 2009): 169–182. The article in question: John Maddison, “Le cinéma et l’information mentale des peuples primitives,” *Revue Internationale de filmologie* 1, nos. 3–4 (1948): 307–308.

³²⁸ Kracauer, *Theory of Film*, 53.

³²⁹ Jean Epstein, “On Certain Characteristics of Photogénie,” trans. Tom Milne, in *French Film Theory and Criticism: A History/Anthology (1907–1939): Volume 1*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 314. If Epstein’s *photogénie* reveals the “inner lives” of objects, it is because “these lives are like the life in charms and amulets, the ominous, tabooed objects of certain primitive religions. If we wish to understand how an

as, and through bodies, especially ours. In the screen animal, the two are directly confronted. Seeing animals can function as a shibboleth for the animalization of the seeing spectator.

4.2 MONTAGE AND COLLAGE, BIOENGINEERING AND CHIMERAS

The authenticity threatened, for Bazin, by the receptivity of animal figures to anthropomorphic projection cannot be protected by any technique. Capturing justly, with fealty, the death of the cow can be assisted by montagist technique, just as its life, captured in continuity, can succumb to ever-human appropriations, as is precisely the wont of filmmakers like Bresson. Contemporary cinema and its digital creatures make this plain. Subject neither to montage nor continuity editing, strictly speaking, CGI animals and their VFX studios undermine the priority of this opposition in understandings of fidelity – broadly, of course, but for animals decisively.

The terms of Bazin’s argument here feel conspicuously inappropriate. While digital animals are the height of artifice, they also permit, as such, a dramatic expansion of the animal’s world. Richard Parker, in *Life of Pi*, circumvents entirely the arbitrary, and in themselves anthropocentric, parameters of ‘matrixing’, permitting for the first time the elaboration of truly animal milieux. Nor are such milieux simply sensational. Like Marey’s chronophotographic studies and Lorenz’s analyses of behavioral components, VFX creatures make visible animal movements otherwise inaccessible to the camera. Far from effacing animal bodies, or rendering them virtually immaterial, visual effects permits animals to be performed with a commitment unavailable to live action production. From a strict Bazinian perspective, it could scarcely be

animal, a plant, or a stone can inspire respect, fear, or horror, those three most sacred sentiments,” he continues, “I think we must watch them on the screen, living their mysterious, silent lives, alien to the human sensibility.” (317)

imagined that inroads to animal authenticity would pass not around but through such attractions. The whole duration of *Pi* (Suraj Sharma), a son of zookeeper, trapped on a rowboat with a tiger, filmed continuously and frantically, could be read as a particularly clever rejoinder to Bazin's reading of Chaplin's *The Circus*. Impossibly, a digitally-rendered tiger produces in us a response reserved for the real, and on terms precisely forbidden.

That said, just as the ghost of continuity is preserved in this encounter, so too is the vestige of montage. Risibly, continuity is here reducible to a phantom camera, its set a monument to a Lippitian disappearance. In rendering and modeling animal physiology, montagist principles persist – not on the literalist level of cutting and combination but in the fabric of the forms themselves. The critical opprobrium met by artificial constructions of animals perhaps overlooked the destination of their trajectory. In *Grammar of Murder*, Karla Oeller discerns in Eisenstein's *Strike* (1925) a transformation in the signification of life that exceeds a critique like Bazin's.

Consider the concluding sequence of *Strike* (1925), in which Sergei Eisenstein intercuts a massacre of workers with clips of the actual slaughter of a bull: Eisenstein himself notes that the sequence will not have the same meaning for all audiences; the killing of the bull will leave abattoir workers unmoved. Even abattoir workers, however, would not interpret the juxtaposition of slaughterhouse and massacre as equating the killing of persons with the culturally accepted work of the butcher. There could be a perverse slippage of meaning here – except that something beyond the formal juxtaposition of massacre and slaughter coordinates our interpretation of the scene. We personify the bull; we do not taurify the people. Representations of killing rely on our awareness of the irreducible human individual.³³⁰

“Here,” she concludes, “cinema does not primarily show phenomena; it produces signification. The contiguity of the slaughter of the bull with the massacre of the strikers exists not within the

³³⁰ Karla Oeller, *A Grammar of Murder: Violent Scenes and Film Form* (Chicago: The University of Chicago Press, 2009), 1.

story world, but on the level of discourse.”³³¹ That “signification,” at risk of a “perverse slippage,” points to a convergence, encouraged by the scene’s gaining speed of cross-cutting, of human and animal.

The passage from this kind of editing to digital creatures is perhaps already indicated by its “genetic” character: not only does it generate from discrete units a chimeric effect, but the language and logic of its construction – splicing – suggests a corporeal hybridization, only instead of bodies, their inscription, representation, or affect. As Akira Lippit points out, Eisenstein described montage as “hieroglyphic copulation” and film editing generally as a system that denotes “the transmission of complex data from one shot to another – all of which may not cross the viewer’s threshold. According to Eisenstein’s fantasy, filmic shots, like genetic structures, comprise dominant and recessive traits: when they are crossed, certain features are exposed upon the surface of the filmic body while others perform a subliminal function, sustaining the linkage between shots.”³³² At the same time, according to medical historians, “film and tape splicing” served as “inspiration for the metaphorical naming of gene splicing.”³³³ Like Lorenz and Tinbergen describing animal behavior as a reel, modern medicine conceives of genetic engineering as a mode of montage editing – where, you could say, the body is treated as its own imaging device.

From montagist juxtapositions like Eisenstein’s to digital chimeras, the animal tracks a dissolution or decomposition, not into an anthropological economy but into an ecological order that exceeds it, swallowing the screen and animating its elements. Both *Dren* (Delphine

³³¹ Karla Oeler, *Grammar of Murder*, 1.

³³² Akira Mizuta Lippit, *Electric Animal: Toward a Rhetoric of Wildlife* (Minneapolis: University of Minnesota Press, 2000), 194.

³³³ Rita Temmerman, “Sociocultural Situatedness of Terminology in the Life Sciences: The History of Splicing,” in *Body, Language and Mind: Volume 2, Sociocultural Situatedness*, eds. Roslyn M. Frank, René Dirven, Tom Ziemke, Enrique Bernárdez (Berlin: Mouton de Gruyter, 2008), 332. The OED refers to F. A. Talbot, *Moving Pictures*, (1912: xii, 137) to define “film and tape splicing.”

Chaneac) of *Splice* and Caesar (Andy Serkis) of *Rise of the Planet of the Apes* explicitly, and in a sense finally, confuse the human and the animal. As genetic hybrids or chimeras they exceed the metaphoric correspondences of ‘role reversals’ and manifestly combine human and animal traits, both diegetically – Caesar gains a human-like intelligence, Dren is partly the result of her creator’s own genetic material – and extra-diegetically – Caesar is performed by Andy Serkis, using motion capture technology, and Dren is the result of compositing and a prosthetics-envisaged Delphine Chaneac. With the traditional roles of the laboratory exceeded – the subject of the last chapter – what new “post-animal” animal does this post-human chimera announce? Conversely, what new conception of life does this convergence of cinematic and genetic strategies of composition signal, for film and bioengineering alike?

After all, digitally rendered animals and bioengineered chimeras both attempt to build or create or, to use Nicole Shukin’s term, “render” an animal ‘from scratch’: one from the outside, through a simulation of actual animal movements and behavior, and the other from the inside, from data, a code, and eventual fertilization. How are these two renderings implicitly related? They could not, at first glance, be more tenuously bound. One is fictive, simulated, representational, the other real, born, alive. The digital simulation is derived from observation and behavioral study; the genetic from experimental biology. The digital animal is created through visual effects, character animation, and performance capture technology; the other through bioinformatics programs. Is the animal disappearing into the folds of an increasingly autonomous simulation that no longer even requires the animal, much less animal actors, or do these procedures represent a stunning convergence of human and animal identities – the final collapse of the ‘great chain of being’?

Though our genetic age and its monstrous creations would seem to have inaugurated the

denaturalization of the animal, the animal has of course never been natural. Breeding and husbandry are bioengineering by other means and have always involved techniques of hybridization and ‘artificial evolution’. Conventional, popular understandings of ‘nature’, which are often animated by well-meaning ecological defenses, must assume that, as Sarah Franklin observes in her book on Dolly the sheep and kinship, the “opposite of successful domestication is the rogue, stray, or ‘wild’ animal that cannot be tamed. However, such animals are as much products of domestication as their successfully tamed counterparts because it is domestication that makes of their wildness both failure and otherness.”³³⁴ The very species and ecosystems marked for preservation against human activity and celebrated as native are often neither. Vermont’s state flower, the red clover (*Trifolium pratense*), is indigenous to Africa; New Hampshire’s purple lilac (*Syringa vulgaris*) is native to Europe; Indiana’s peony (*Paeonia lactiflora*) comes from China.³³⁵ Vast ecological interventions using CRISPR technologies to edit gene sequences of flora and species, to exterminate pests and disease-carrying mosquitoes, are now underway, exacting one intervention upon another.³³⁶

Berger’s famous lament – “In the last two centuries, animals have gradually disappeared. Today we live without them.” – is belied by the fact that most animals encountered in daily life

³³⁴ Sarah Franklin, *Dolly Mixtures: The Remaking of Genealogy* (Durham: Duke University Press, 2007), 215n10.

³³⁵ Karan Davis Cutler, “Many official state flowers aren’t native plants,” *The Christian Science Monitor*, September, 8, 2011.

³³⁶ On the use of gene-editing technologies to eradicate rats in New Zealand, see: Ed Yong, “New Zealand’s War on Rats Could Change the World,” *The Atlantic*, November 16, 2017. “Until the 13th century, the only land mammals in New Zealand were bats. In this furless world, local birds evolved a docile temperament. Many of them, like the iconic kiwi and the giant kakapo parrot, lost their powers of flight. Gentle and grounded, they were easy prey for the rats, dogs, cats, stoats, weasels, and possums that were later introduced by humans. Between them, these predators devour more than 26 million chicks and eggs every year. They have already driven a quarter of the nation’s unique birds to extinction.” On the use of gene-editing technologies to eradicate malaria, see: Jennifer O’Mahony, “A swarm of mutant mosquitoes is out to eradicate malaria,” *Wired*, September 21, 2018. “Over the next year in the village of Bana, Burkina Faso, a group of scientists will set loose up to 10,000 mosquitoes sprinkled with fluorescent dust. The sterile, male swarm will represent the first ever release of a genetically modified, malaria carrying mosquito species into the wild. It’s a milestone not only for science, but also for community engagement and regulatory hurdles in Africa.”

in the premodern era were bred, domesticated species, and of minimal variety.³³⁷ Likewise, the animal species represented in the modern era were not those that even the ancestors of an early cinematic audience would have encountered but rather those that could only have been seen illustrated, if at all. The early cinematic animal was not a ghost conjured up to treat a loss that, by definition, the spectator could not herself have directly experienced. If artifice is to be attributed to any technology, strictly speaking, it is neither genetic nor industrial but aesthetic, and its author or origin suspect. Darwin, Nicholas Russell reminds us, was “anxious to find in the artificial selection exerted by humans upon domesticated animals a parallel series of very gradual changes over time to those which he believed had occurred in wild species under the influence of natural selection.”³³⁸ Alongside the features bred for by human custodians, Darwin “postulated that exaggerated fancy points, such as the fantail character of some varieties of domestic pigeon, had not been derived from any deliberate human decision to select for such extreme character expression. The early breeders did not have in mind the final form to which the varieties would come after many generations of breeding.”³³⁹ The development of lifeforms occurs unevenly, its features an assemblage of collaborative efforts, their results unfolding on a scale that exceeds intentions. The final form, and all forms are final, is aimless.

In place of the fiction of a natural animal obliterated by modernity, and of which cinema can only eulogize, I suggest a cinema that alternately observes and interferes with the means of transforming life. The animal, in film as in life, is montage and collage incarnate, a form given

³³⁷ John Berger, “Why Look At Animals?,” in *About Looking* (New York: Pantheon Books, 1980), 11.

³³⁸ Nicholas Russell, *Like Engend’ring Like: Heredity and Animal Breeding in Early Modern England* (Cambridge: Cambridge University Press, 1986), 4–5.

³³⁹ Russell, *Like Engend’ring Like*, 5. “Scientific breeding programs based on the application of this genetic theory are so complex and expensive that only large operators or national organizations can organize them effectively. Where breeding is on a small scale, practice remains relatively untouched by modern genetics, for example in dog, cat and Thoroughbred horse breeding. Here the discrimination between strategies has not really improved since the eighteenth century and may, in fact, be worse.” (11)

over to forms. The will for monstrous forms summons animal mediums, just as the elaboration of animal figures demands resourceful assembly. Indeed, the technically innovative means by which the staging and subsequent escape of the titular King Kong was achieved, in the original, was suggestive of a broader transformation in the screen animal – from live animal attraction to assembled animal effect. From the sign advertising “King Kong: The Eighth Wonder of the World” that opens the sequence, the camera tilts down to reveal first a real crowd in front of an exterior theater facade, and then, inside the theater, on one side of a split-screen, a second real audience filmed inside the Shrine Auditorium – and then, finally, on the other side, a miniature curtain, the animated raising of which reveals the chained Kong, who is placed on the real Shrine stage through a second split screen. The close-up shot of Kong grunting at the crowd was filmed using the Big Head.³⁴⁰

Apparent and delightful to spectators at the time – even if, for the film’s publicity, “deception was deemed necessary to protect the fantasy created onscreen”³⁴¹ – was the overburdened means by which Kong and the audience were placed in the same space. That “unreality of certain sets” – in this case, literally – which Jean Ferry links to the film’s “violent, oneiric power (the horribly realistic representation of a common dream)” and its “monstrous eroticism (the monster’s unbridled love for the woman, cannibalism, human sacrifice)” is less a

³⁴⁰ This and other production insight from Ray Morton, *King Kong: The History of a Movie Icon from Fay Wray to Peter Jackson* (New York: Applause Theatre & Cinema Books, 2005), 70. When *King Kong* had its official world premiere on March 23, 1933 at Grauman’s Chinese Theater in Hollywood, the big head bust used in the close-up of Kong grunting at the crowd was placed in the theater’s forecourt, around which the seventeen-act *The Dance of the Sacred Ape* was performed by a troupe of African American dancers.

³⁴¹ Tanine Allison, “More than a Man in a Monkey Suit: Andy Serkis, Motion Capture, and Digital Realism,” *Quarterly Review of Film and Video* 28, no. 4 (2011), 325.

symptom of technical limitations than “what gives this film value.”³⁴² By way of the animal, we might add. For the spectator then and now, the dramatic artifice of the scene’s construction – the use of miniature models, animation, cloaked close-ups, split-screens, glass paintings, and animatronics over a few short minutes – can neither be humored for the narrative nor entrusted with its purpose. The artifice doesn’t require disbelief be suspended, because it is indispensable, creates the scene, and dominates its style; but neither can it be considered a purposive act of self-reflexive allegory, as if its collagist techniques were deployed specifically to comment on its constituent elements.

The art historian Florian Rodari describes collage itself, which emerged as an art form at this time, as a form of crude surgical grafting, if one that “amounts to an evisceration” of culture “amplified by the contrast between the cruelly descriptive treatment of the grafted organs and the mincing banality of the illustration.”³⁴³ Just as the integrity of the animal body could never be assured on screen – it permitted the most inventive transgressions – the disintegration and rearrangement of forms, violence *to* form, lent itself to animal effigies. Surrealist collage performs a mythological surgery or grafting of animal, human, and technical elements into one, monstrous body – not simply as a juxtaposition of elements but as an expression, contained by the body they comprise, of an inner synthesis. The collage-monster, as Elza Adamowicz calls it, troubles the language of juxtaposition and synthesis, in that it tends to preserve the contours and autonomy of constituent elements. “Such dissecting strategies, labeling the spare parts of the monster,” she writes, “do not account for its global meaning; it remains an agglomeration of

³⁴² Jean Ferry, “Concerning King Kong,” in *The Shadow and its Shadow: Surrealist Writings on the Cinema*, ed. and tr. Paul Hammond (San Francisco: City Light Books, 2000), 161.

³⁴³ Florian Rodari, *Collage: Pasted, Cut and Torn Papers* (Geneva: Albert Skira (Editions d'Art), 1988), 102–103; quoted in Elza Adamowicz, *Surrealist Collage in Text and Image: Dissecting the Exquisite Corpse* (Cambridge: Cambridge University Press, 1998), 205n40.

parts, a linguistic monster and not a new synthesis.”³⁴⁴ The hybrid monsters in the surrealist bestiary, which filled the pages of *Documents* (1929–1930) and *Minotaure* (1933–1939),³⁴⁵ were not signs of evil or symptoms of the deformed, but embodied new states of “alterity,” a differing of the self from, or within, itself. The “surrealist monster suspends and neutralizes oppositions rather than resolving them. [...] The disparate parts of the hybrid creature, while overlapping, retain their autonomy; it is their monstrous interlocking which generates meaning, not their common denominator.”³⁴⁶

The bioengineered chimera, by contrast, like de Sève’s figure and its classical forebears, is physiologically successful – and glorious. Superseding the industrial ‘spare part surgery’ of Frankenstein and Dr. Moreau’s butchered, sewn-up creations, the contemporary creature is plenary, in both senses – plural but coherent. Metamorphosing, changing genders, evolving – as seen in *Splice*, *Jurassic Park*, *Prometheus*, and elsewhere – the bioengineered chimera is comprised of bodies within, morphologically, rather than from without, by assemblage.³⁴⁷ Where in surrealist collage “the disparate parts of the hybrid creature, while overlapping, retain their autonomy,” the genetic chimera develops and transfigures with integrity, expressing at once the mutation of species and species-as-mutation. The dream of a *special* body – a body *of* species – surely inspired Najarian and Simmons, in their 1972 classic *Transplantation*, to select the chimera – this “fabulous monster, part lion, part goat and serpent,”³⁴⁸ as the symbol of a successful transplant of genetically foreign material. Like de

³⁴⁴ Adamowicz, *Surrealist Collage in Text and Image*, 95–96.

³⁴⁵ See: Joyce Cheng, “Mask, Mimicry, Metamorphosis: Roger Caillois, Walter Benjamin and Surrealism in the 1930s,” *Modernism/Modernity* 16, no. 1 (January 2009): 61–86.

³⁴⁶ Adamowicz, *Surrealist Collage in Text and Image*, 96–97.

³⁴⁷ See: Cecil Helman, “Dr Frankenstein and the Industrial Body: Reflections on ‘Spare Part’ Surgery,” *Anthropology Today* 4, no. 3 (June 1988): 14–16.

³⁴⁸ John S. Najarian and Richard L. Simmons, preface to *Transplantation*, ed. John S. Najarian and Richard L. Simmons (Philadelphia: Lea & Febiger, 1972), vii.

Sève's frontispiece, a chimera adorns its cover.

In classical mythology, the chimera gave fantastic form to crimes against nature. An abomination for its transgression of natural law – the taxonomy of species – Racine's monstrous form is marshalled to figure a second violation: that of the family. Where the minotaur obstructs, the chimera expresses: in this case, the incestuous relationship between Phèdre and her stepson Hippolytus. The modern chimera, now as then, manifests a monstrous violation of moral laws that, in proving elusive in nature, compel disclosure by more fantastic means. In each case, the space measured between nature and its deformation is erotic and ineluctable. Jackie Stacey defines the *genetic imaginary* as the “fears and desires organizing a particular repertoire of genetic fantasies that have a deeper, often indirect, set of cultural investments and associations”³⁴⁹ – investments that verge invariably on the *familiar*. The story of the chimera, for the *Phèdre* no less than *Splice*, is a melodrama.

Of *Splice*, which distinguishes its project from *Monkey Shines*, Steven Shaviro observes that “Elsa doesn't secondarily familialize a transgenic creation that initially threatens to escape her control and that of the conventional gender coordinates. It is rather the case that she develops the transgenic creation *in the first place* in order to produce a body upon which those

³⁴⁹ Jackie Stacey, *The Cinematic Life of the Gene* (Durham: Duke University Press, 2010), 10–11. The conclusions reached in Jason Scott Robert and Françoise Baylis' landmark 2003 paper “Crossing Species Boundaries,” confirm our suspicions. Though the paper begins with a systematic critique of the notion of “species identity” – “the belief that the boundaries between species are fixed rather than fluid, established by nature rather than by social negotiation” (2) – they conclude, in a moralizing turn, that “the engineering of creatures that are part human and part nonhuman animal is objectionable because the existence of such beings would introduce inexorable moral confusion in our existing relationships with nonhuman animals and in our future relationships with part-human hybrids and chimeras.” (9) In other words, the creation of chimeras confronts us with “the possibility that humanness is not a necessary condition for being granted full moral rights” (10): which is to say, because the moral status of nonhuman animals is, they admit, more “contingent on the will of regnant human beings” and “different moral obligations, dependent on social conventions” than on, say, any firm scientific or evolutionary rationale, its disturbance would produce social upheaval. “Therefore, to protect the privileged place of human animals in the hierarchy of being, it is of value to embrace (folk) essentialism about species identities and thus effectively trump scientific quibbles over species and over the species status of novel beings.” (10)

conservative, familiar and familialist coordinates may be inscribed.”³⁵⁰ Dren’s problems emerge not from scientific but familial experiments, the unwelcome side-effects of which are less genetic and deformational than social and conventional. ‘Her’ transformation – and we must put her in ‘scare’ quotes – in fact resolves the drama, succinctly. From the repeated attempts to feminize her to the primal scene that places her firmly in an Oedipal trajectory to the incestuous violations that realize her precarity, Dren is melodramatized classically, achieving inclusion through peril, just as her mother did. The home made for Dren – a drab room modeled on her abused mother’s childhood bedroom – stages ‘care’, in all forms, as instrumental through means the laboratory can scarcely furnish. Atavistically, the family drama of *Splice* terminates in *generic* recourse: in the barn to which Dren is dragged await restraints and a surgical table, upon which she is docked like a Victorian dog. For Clive Nicoli (Adrien Brody), however, witnessing the scene is also transformative: in her suffering, she becomes a subject. He may love her, after all.

In contrast to *Monkey Shines*, the familial crisis in *Splice* remains unresolved. We are left with Elsa (Sarah Polley) impregnated from her rape by Dren, survived by none. A specter tormenting the *genetic imaginary*, this chimera yet-to-come – recall Ronnie’s (Geena Davis) nightmares of larval birth in *The Fly* (1986) – subtends the field, haunting all animal futures. Consider the ‘easter egg’ afterword of *Prometheus*, which reveals the titular *Alien* of the original film – CRISPR ‘snipping’-by-cinema, one could say – as the outcome of a complex genealogical production that involves at least five lifeforms, one of which is human: the alien genetic material introduced by digestion to Charlie (Logan Marshall-Green), whose consequently genetically-modified sperm impregnates Elizabeth (Noomi Rapace), who bears a tentacled creature that kill-fucks the Creator of the human species – and bears, finally, the *Alien*. This alien, as nature

³⁵⁰ Steven Shaviro, “*Splice*,” *The Pinocchio Theory* (blog), June, 12, 2010. Author’s emphasis.

diagrams it, is Elsa: (grand)mother-aunt.

Undecidably extraterrestrial or engineered, this animal is as foreign as it is atavistic, as otherworldly as it is ancient. Less alien than long-lost cousin, the chimera is vexed by reunion and genealogy. Poor, frail Peter Weyland (Guy Pearce) just wants Daddy's approval, which is answered by his Creator with a crushing blow to the head in a scene that, quite cleverly, inverts (on the screen) and reverses (in roles) a kindred scene in an earlier film of Ridley Scott's, *Blade Runner* – when Roy Batty (Rutger Hauer) is moved by his maker's indifference to lovingly crush his skull in mad, tearful disappointment: "Hieroglyphic copulation," Eisenstein might say. Indeed, in the alien *concept* – a truly modern invention, of H.G. Wells – the animal reclaims evolution from the provincial mantle of human affairs. Darwin must come before Wells, just as there could be no Wells without Darwin. The leap, in *War of the Worlds*, from Mars to Earth figures a longer stride – from an anthro-teleological evolution to a limitless, undirected animal plurality: of forms and faculties, intelligences and organizations, hybrids and strange desires. In a certain sense, the originary vivisectionist who often makes an appearance in these films is here ushered onto the stage only to take a final bow. Brent Spiner's delightful performance of Dr. Brackish Okun in *Independence Day* unwinds through parody the mad scientist's oblivious, inhumane fetishization of "clinical material." While he assumes, in delirious distraction, that his subject is dead, we see the specimen's digits twitch and then curl – and soon the doctor is made, fittingly, into a ventriloquist's dummy, face pressed to the glass and translating threats from the mothership to the President.

CONCLUSION: ANIMALITY AFTER THE ORGANISM

“The animal has lost the organic, as much as matter has gained life.”

Gilles Deleuze, *Cinema 1*

Beating hearts sustained by film projectors, bird cinemas screened to avian audiences, behaviors rendered as special effects: from Marey to Lorenz to Weta Digital, the animal enfolded by the cinematic apparatus has become co-extensive with it, ever in peril of being consumed. The distance from Jacob von Uexküll’s joyful *Umwelt* – the snail’s experience of time made visible by experiment – to optogenetics – the use of light to control cells in living tissue – is circuitous but short. The bucolic animal of yore has become what Richard Grusin calls “pre-mediated,” and Eugene Thacker “biomedia.”³⁵¹ Nature has given way to ecology, politics to biopolitics, the human to the posthuman. Life, in short, is newly confused, in both theory and practice, object and inquiry. Pigs’ hearts beat in our chests, transgenic cows’ udders crush their brittle legs to feed us, the wind carries spores with monkey DNA. In this work, which recognizes the irreversible intervention of the laboratory in the future of the animal, I aim to affirm the animal *augmented* by modernity, that artificial, modified, natureless chimera that absorbs and expresses our world’s most grotesque contradictions, bears its beating, and does not just survive endangered in the cracks, but flourishes in its cesspool and everywhere promises to outlive us.

³⁵¹ See: Andrew Murphie, “The World As Medium: A Whiteheadian Media Philosophy.” To be published in *Immediations*, ed. Erin Manning, Anna Munster and Bodil Marie Stavning Thomsen (Open Humanities Press/Punctum Books).

Visuality and its machinations have not intervened in life surreptitiously. The animal conceived, and created, is a monster – and its aesthetic teratological, in both senses: the study of monsters and tumors. “Filled with clumps of matted hair, protruding lumps of bone, cartilage, bronchial and gastro-intestinal epithelium and even teeth,”³⁵² teratomas announce the animal we find today: dissolved and unrecognizable, a source of ‘innovation’. “These bizarre, parthenogenic, disordered mixtures of tissue,” Jackie Stacey observes, “mix together life and death, health and illness, the normal and the pathological, the human and the monstrous. This is the teratological imaginary.”³⁵³ Like the execution-machine Officer’s succumbing to his instrument in Kafka’s *In the Penal Colony*, Brundle’s final transformation in *The Fly* – merging with the teleporter itself – is less a metamorphosis gone awry than a promise, that what will supersede the organism is *matter*: a quivering, uncertain cocktail of flesh and machine. “The cyborg,” Donna Haraway writes, “appears in myth precisely where the boundary between human and animal is transgressed.”³⁵⁴

Writing on early film but resonant today, Deleuze observes, “The animal has lost the organic, as much as matter has gained life.”³⁵⁵ Inaugurated by the first short scientific films of animal life, augmented by the *animist* aestheticism of film’s first theorists, creeps the “*non-organic life of things*, a frightful life, which is oblivious to the wisdom and limits of the

³⁵² Melinda Cooper, *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era* (Seattle: University of Washington Press, 2008), 17; quoted in Jackie Stacey, *The Cinematic Life of the Gene* (Durham: Duke University Press, 2010), 41.

³⁵³ Stacey, 41.

³⁵⁴ Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 152.

³⁵⁵ Gilles Deleuze, *Cinema 1: The Movement-Image*, tr. Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1986), 52.

organism.”³⁵⁶ With traditional ontological distinctions between human and animal dismantled, both are at risk of absorption into an undifferentiated pool of life, nature, and environment, demolishing all discrimination. The awesome convergence of digital and genetic codes has revived vitalism, dressed in futurist garb. In freeing the image from the camera, what were chains are found to have also been an anchor: CGI, compositing, and modeling permit the image to roam every surface, all ‘camera’ movements equally possible, no ‘angle’ restricted by ‘space’. “Vertov’s non-human eye, the cine-eye, is not the eye of a fly or of an eagle, the eye of another animal. Neither is it – in an Epsteinian way – the eye of the spirit endowed with a temporal perspective, which might apprehend the spiritual whole. On the contrary, it is the eye of matter, the eye in matter, not subject to time.”³⁵⁷ What was once Vertov’s eye is today ours to share: the eye of matter, the eye in matter.

In the primordial soup of this eye we encounter an effect reminiscent of the cinema’s animal origins: *avisuality*. The “paradoxically antivisual tendency”³⁵⁸ of medical imaging technologies, as Lisa Cartwright puts it, reawakens in the superabundance of the digital cinematic image. Like the credit sequence for *Rise of the Planet of the Apes*, after the animal and in its place we find “a category of complex visuality, a system of visuality that shows nothing, shows in the very place of the visible, something else.”³⁵⁹ In the recent *Annihilation* (2018), however, we find hopeful dissent against this general obliteration of life and its expression. The film, based on a novel by Jeff VanderMeer, stages, to unravel, the secret isomorphism of genetic and digital imaginaries: the alien intelligence that has crash-landed on Earth, it is soon revealed,

³⁵⁶ Ibid.

³⁵⁷ Deleuze, *Cinema 1: The Movement-Image*, 83–84.

³⁵⁸ Lisa Cartwright, *Screening the Body: Tracing Medicine’s Visual Culture* (Minneapolis: University of Minnesota Press, 1995), 23.

³⁵⁹ Akira Mizuta Lippit, *Atomic Light (Shadow Optics)* (Minneapolis: University of Minnesota Press, 2005), 32.

makes of atoms genes, and genes atoms. A chimerical monster screams with its victim's voice box, transplanted by cosmic edit – an anonymized authority we recognize as authorial but which has invaded the screen. Forms can no longer be trusted; the organic demures to matter. We may soon learn to love the animal we were told does not exist.

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