FIELDWORK:
ECOLOGICAL PEDAGOGY IN MODERNIST FICTION AND FILM

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ABSTRACT

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Fieldwork: Ecological Pedagogy in Modernist Fiction and Film, takes part in the growing re-evaluation of modernism's environmental and ecological entanglements. Pairing a comparative media studies approach with an historical emphasis on scientific methodology and science education, *Fieldwork* challenges early ecological science's reputation as an anthropocentric, control-oriented discipline. Rather, *Fieldwork* diversifies our historical understanding of the relationship between ecological science and modern cultures: in harnessing scientific and aesthetic pedagogies of *interest,* ecological science teaches ecological knowing and feeling as responsive to—and responsible for—a nature made of colliding agencies. To recover "the interesting" as an ecological category, the project traces the centrality of interested thinking, feeling, and aesthetics to ecological science's documentary methods. As a method of information collection and a formal aesthetic, this documentary practice—what I term *lingering*—intersected with various strains of modernist experimentation, both popular and avant-garde. I locate lingering ecological documents and documentaries—and thus the epistemological, ethical, and ontological values of interested ecology—in the work of ecologists like Sir Arthur Tansley, Lilian Clark, Gilbert White, and William Beebe as well as in writings by Virginia Woolf, the Surrealist André Breton, the "interest" films of Gaumont-British Instructional Films, and the films of para-Surrealist and marine scientist Jean Painlevé. I contend that modernism is informed by ecological knowledge work—and that modernism teaches us to understand ecological science as the document of a world enlivened by interest's cognitive and affective lessons.

Each chapter offers a case study in the role that media environments and material ecosystems play in teaching interested ecology. In Chapter One, *Fieldwork: Modern Ecology's Picturesque Attachments,* Sir Arthur Tansley's archive reveals how the founding father of British ecology thoughtfully deploys media difference in his popular science manuals to revitalize the art and science of ecological fieldwork, and rescue it from banality. Chapter Two, *Garden Work: Prosaic Alightments Among Modern Ecology and Fiction,* describes how the technologies available to women ecologists—prose and garden—teach interested thinking as an experimental protocol and ontological position, and which is archived within Virginia Woolf's fiction. Chapter Three, *Camera Work:* Secrets of Nature *and the Eros and Ethics of Modern Ecology* illustrates how this "interest" film series, drawing on the descriptive practices of field ecology, employs the cinema as a tool for teaching interested ecology's subtly erotic affective character and related ethical comportment. Chapter Four, *Water Work: Three Species of Ecological Surrealism* claims that Surrealist-ecologists teach a lyric fieldwork behavior through the poetic fluidity of merely interesting species lists. The chapters detail the cognitive, affective, and representational practices of interested ecology as they circulated and became inscribed within verbal and visual media. *Fieldwork* claims that forms of description and representation are critical to the construction of this scientific lyricism: indeed, modern ecological thinking exists and persists within this specific media environment.

To Lily and Penelope:
it is wonderful to watch you bloom.

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TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

This dissertation explores a set of questions concerning the sensibility of ecology—or, how ecologists made sense of feeling—in a primarily British, but often also European and trans-Atlantic institutional science as it came to prominence in the early half of the twentieth century. In what habits of thinking and feeling did these modern ecologists participate, and how did those entangled cognitive and affective experiences generate ecological data, theory, and educational praxis? On a personal level, how did ecologists look, touch, and move within the field, and how did those patterns of behavior shape the documents produced by these researchers? Conversely, how did these documents produce the experiences of ecological fieldwork? And how was this practice of documentation shaped by larger, external forces, including the structures of educational institutions, rapid innovations in media technology, and, perhaps most importantly, the vitality of ecosystems themselves? By attending closely to the intellectual values of scientific documentation, teaching, and research, I aim to diversify how modern ecology and its relationship to modernity has been understood. To this end, *Fieldwork: Ecological Pedagogy in Modernist Fiction and Film* pairs a comparative media studies approach with an historical emphasis on scientific methodology and science education to challenge oft-cited assumptions about early ecological science as motivated by an ethics of environmental regulation. Rather, *Fieldwork* identifies a wide-spread—if under recognized—ecological pedagogy that contrasts sharply with this portrait of modern ecology: in harnessing scientific and aesthetic pedagogies of *interest*, ecological science teaches ecological knowing and feeling as responsive to, and responsible for, a nature made of colliding agencies. From university research centers to school gardens, Field Studies Council stations to cinema houses, ecologists were subtly and precariously

moved by a bristling interest in organisms and their environment. *Fieldwork* illuminates this history by attending carefully to ecology's knowledge work, its popularization across contemporary art forms, and the modern media environments that shaped it.

Fieldwork historicizes ecological thinking as an interdisciplinary event within the media ecologies of twentieth-century modernity: I examine how the technologies and aesthetic histories adopted by a nascent ecological science informed this field's documentary praxis. For while the field mapping methods of early plant ecologists or the written records of ecologists seeing the ocean floor for the first time are creations of scientific protocols, they are also informed by a rich intellectual engagement with artistic image-making across media. In this way, I alert modernist studies to the substantial and varied relationship of ecology to cultural expressions of modernism and modernity. While modernist studies is beginning to address the historical proximity of ecological science and various modernist avant gardes, my own take on this relationship is structured by tracing some intertextual lineages among ecology and modernism as well as—and primarily—a very close attention to the contours of knowledge work and its performance across both scientific and aesthetic traditions. To do this work, I position a handful of aesthetic experiments from the modernist archive as valuable sources for recuperating interested ecology. *Fieldwork* contends that modernism registers this mode of ecological thought and teaches us to perceive its epistemological, ontological, and ethical values.

The project ranges widely through the representational conventions of this science's institutional and popular media and contextualizes such media within the fields of art and science history to show how interested ecological thinking circulates among modernist experimentations with documentary form. Throughout, I point towards ways in which interested ecological thinking sends runners and shoots into modernist texts and images, and how these materials in

turn help us learn the postures (cognitive, emotive, and embodied) of the interested field worker. This is in part because there *are* direct lines of cultural and even literary inheritance among ecology and modernism, even if those relationships can be difficult to trace. But this documentary relationship is also defined by the environment that ecology and avant-garde modernism share. Ecology and modernism both question the subject's role in picturing, and thus changing, modern life; the effect of media technologies on this rendering; and how one might experiment with documentation in order to better capture the relationship of the subject to the material world she records, inhabits, creates. Modernism, I insist, is ecological education in two senses. The texts I bring to bear here teach ecological thinking by circulating its cognitive and affective character, and they also teach readers how to see ecological science's variegated epistemological and ontological patterns. In making this argument, *Fieldwork* thus offers the first aesthetic history of ecological science as it came to prominence between the years of 1890 and 1940.

Throughout, I forward a history of science methodology that responds to the recent call from the editors of *Osiris* to excavate and historicize science's many "emotional styles" — affective experiences constructed by culture as well as "technologies, disease entities, laboratory models, and scientific texts"—and to allow these newly-charted scientific emotions to refigure histories of affect (Dror et al 14). I argue that understanding interest as a prominent ecological cognition and emotion lends nuance to how we have understood modernist culture and its environmental commitments, "thus contribut[ing] to and/or challeng[ing] grand historical narratives" of both the history of science as well as modernism's often seemingly disaffected, if not antagonistic, responses to notions of nature and the natural (Dror et al 1). Indeed, one aim of this study is to encourage interested ecology to refigure how we understand the perceptual and

intellectual experience of modernism and modernity. But *Fieldwork* poses a more comprehensive historical model for this type of work in two ways: (1) by emphasizing the intimate entanglement of feeling and knowing, thus tying the concepts, methods, and theories of scientific knowledge work to emotions and affects and (2) recalling the role that aesthetics play in science as representative and research technologies, thus embracing interdisciplinary inclinations within science history. The yield of this approach is a document of the entanglement of modernism and ecology as not only co-existent within a shared experience of modernity, but as conversant and related documentary practices.

Chapter One, "Fieldwork: Ecological Science's Picturesque Attachments," identifies the *ecological picturesque* as a documentary practice tied to early twentieth century ecological fieldwork methods that cultivate viewers' interest in landscapes as they change over time. Starring the extensive and diverse archive of Sir Arthur Tansley, the founding father of British ecology, the chapter begins by locating interest as critical to the teaching and praxis of modern ecology, and questions this scientist's clear attachment to picturesque aesthetics—a category that has long been associated with interested thinking and feeling—throughout his popular works. A complex polymath who developed a long-standing intellectual engagement with the institutional, educational, and Freudian psychology of his day, Tansley positioned interest as a necessary cognitive and affective experience for understanding ecology in relational, systemic, and formal terms. The chapter reads Tansley's deployment of the picturesque as a critical ecological pedagogy: I contend that his popular manuals make use of the aesthetic not simply to ornament ecological manuals with pleasing pictures, but to teach ecological knowledge work. I illuminate this point by mapping a shared documentary emphasis among modern ecological fieldwork methods and picturesque aesthetics. The ecological picturesque creates representations that aim

to map, with indexical ambitions, the vitaly interesting formation of fields, landscapes, and ecosystems. Indeed, this documentary relationship has long been evident among texts that dabble in the hunt for the picturesque, many of which also inspire the protocols of modern ecological science. In reconstructing the interdisciplinary history of ecological education and fieldwork methods, Chapter One describes modern ecology's ontological stance as attentive to a nature made of colliding agencies—including the mapping practices of the interested researcher, whose practices of thinking and representing are often overtaken by the form of the field itself.

Chapter One demonstrates the ways in which modern ecologists participate in the relationship of representation to actuality that Michael Sherringham, via Charles Taylor, describes as the "Modernist epiphany": ecologists, like the modernist avant-gardes I bring to bear here, understand that "it is not the description or presentation of a thing—object or landscape—that makes something appear, but rather a juxtaposition of images or words: 'the epiphany comes from between the words or images, as it were, from the force field they set up between them, and not through a central referent which they describe while transmuting.' What is involved is the creation of a frame around reality, which makes something appear—indirectly—by giving it a structure. Modernist epiphany involves mediation" (81). Chapter One demonstrates that the picturesque, as a pictorial practice, as a field work, is a multi-media practice of *presentation* that, via the juxtaposition of image and word, encourages relationships among organisms and environments to appear. And the nuances of thinking and feeling introduced into ecological thinking by various media technologies remain critical to mapping its growth patterns throughout both science and art.

For this reason, Chapters Two-Four trace the circulation and alteration of this documentary practice across media. Each subsequent chapter pairs practices of modern writing

and/or filmmaking with contemporary ecological texts in order to historicize the epistemological, ontological, and aesthetic relationship among an interest-based ecological science and modernist documentary aesthetics. In addition to demonstrating confluences of descriptive practice, the chapters reconstruct buried historical intersections between ecology and modernism, often noting direct inheritances across the archival record. For example, Virginia Woolf's model of subjectivity, the *Secrets of Nature* series' renderings of field work, and the descriptive practice of Charles Elton's *Animal Ecology* (1927) emerge from a common textual starting point: Gilbert White's highly picturesque eighteenth-century field document, *The Natural History of Selborne.* The pedagogies of modern ecology are evident within the modernist texts I bring to bear here, but my aim is to also remain attuned to the avant-garde's own pedagogical directive.[1] Modernism circulates and performs the cognitive and affective traits of this science, and teaches readers today how to see the overlooked contours of this science's worldview. Understanding modernism as the document of ecological training helps us better perceive the disciplinary values of ecological science in this critical moment: modernism teaches us to understand ecology as the science enlivened by interest's cognitive and affective lessons.

Chapter Two, "Garden Work: Prosaic Alightments Among Ecology and Fiction," begins this work by reading Virginia Woolf's prose experiments in "Kew Gardens" and *To The Lighthouse* as documents of the interested ecological cognition performed by feminized bodies in fields and gardens across Britain. The chapter situates interested ecological education within this science's gendered history to offer a fresh understanding of what interested ecological *thinking* and *subjectivity* might look like. The slow, experimental, and reiterative practices of documentation specific to interested ecological thought—what I label here as *lingering*—was

1 As Alan Golding suggests, "Avant-gardes have always been didactic, in their production of manifestoes, their strong element of social critique, and their claims on the art of the future" (86).

often pejoratively feminized as the field attached its institutional values to the projects of imperialism. Indeed, lingering garden work contrasts sharply with the speedy, efficient observational work of disinterested, and specifically masculine, aerial ecological survey, for which the field's early history has become known. The scale of this experimental ecology is slow and small, marked by reiterative returns to small, fragmented plots, looking for the interesting aberrations among tiny data points that mark a garden's densely tangled formation, and the many small, if critical, agencies that compose it. This includes the alterations made by experimental practitioners' interested manipulations; as a practice of documentation, interested ecological experimentation responds to and registers human agency, even as it emphasizes the significant alightments of bees and seeds among its representation of plant communities and ecosystems. The lingering subject doesn't only persist in the space of fields and gardens, then, but imagines her impact on landscapes over *time:* the documents she produces register the ways in which her actions linger beyond her immediate presence in the garden. Ecological lingering is thus a species of the kind of slowness Lutz Koepnick identifies as critical to aesthetic modernism, oriented around notions of "sensory experimentation, ongoing movement, change, and indeterminacy" (18).

The lingering bodies and cognitive patterns of Woolf's fiction, as well as the picturesque aesthetics of Tansley's popular manuals, are evident throughout a contemporary film series most often known as the quintessential example of the 'interest' film: Gaumont British Instructional Films' *Secrets of Nature.* A series of over 144 short films produced between 1920 and 1940, *Secrets of Nature* is beginning to be understood as a critical source of modern ecological "unconsciousness," to use Caroline Hovanec's recent terms (246). But Chapter Three, "Camera Work: Ecology, Erotics, and Ethics" positions this series within the history of the ecological

picturesque and its pedagogical parameters to illuminate its role in shaping modern ecological *consciousness.* This chapter explores the affective experience of ecological field and garden work as peculiarly erotic and ethically oriented, and traces the adaptation of this erotic ethics via the interesting, descriptive practice of ecological fieldwork texts among the groundbreaking techniques and editing practices of *Secrets of Nature*. In conversation with contemporary theories of eroticism, I locate this erotic ethics via the descriptive prose of the series' source text, *The Natural History of Selborne.* The eroticism modeled by White's text—and then translated into cinematic grammar by *Secrets of Nature*—is precarious, carefully punctuated by interesting aesthetics to both forge and truncate cross-species attachments, simultaneously bridging and respecting the distances that inhere within ecosystems and among organisms. Interested ecological field work is often titillating, but never overpowering, respectful of the alterity, sovereignty, and agency of other life forms as they beckon to us intermittently, across spatio-temporal—and formal—distances. And interesting descriptive pedagogies teach readers of White's text and viewers of *Secrets of Nature* to comport themselves accordingly in the field.

The dissertation's investigation of documentary and descriptive techniques and technologies culminates in positioning Surrealism as a form of ecological fieldwork. Chapter Four: "Water Work: Three Species of Ecological Surrealism," curates a comparison of co-existent writers dabbling among both ocean ecology and Surrealism to explore species lists—merely interesting documents attached to every ecological study—as a resource for Surrealist poetics. By attending closely to the ways that this form of writing underscores both images and words, the chapter identifies interested ecological thinking as a formative cognitive, affective, and aesthetic experience for Surrealism. Examining the work of André Breton, the pioneering ocean ecologist William Beebe, and Jean Painlevé, the French scientist, filmmaker, and educator,

I demonstrate the persistence with which species lists generate poetic forms of writing and image-making identifiable as *surrealiste.*

Specifically, I demonstrate how the special relationship to visual media that species lists inhabit helps to make the kinships among matter and materiality—so vital to Surrealist epistemology—visible. Indeed, while André Breton was asserting the "inadmissible" nature of Surrealism's flora and fauna, modern ocean ecology was also redesigning its species lists to better document, and cultivate, these surreal kinships—what William Beebe identifies as "brotherings"—among its highly interested professional and popular audiences. I pursue some textual histories among ecology and Surrealism to underscore this relationship: species lists are critical, after all, to the studies in an ecologically-oriented comparative anatomy in which many notable Surrealists were trained, as James Leo Cahill has recently shown.[2] But my methodology in this chapter draws inspiration primarily from the form of the species list itself, and the kind of associative, relational, and comparative knowledge work that it inspires. In this way, I mark the epistemological variations and nuances that reading this common form of science writing introduces into our understanding of Surrealist protocols, and particularly, its practices of description. André Breton's *L'amour fou* typifies the form of poetics I classify here; William Beebe adapts this form to both describe and evoke ecological experiences that defy words; and Jean Painlevé tethers this lingering aesthetic to movements of other cognitions and affects adrift in the same pool of science education. His species lists arrest a roving, positivist curiosity and its shallow rationalism, while lending some intellectual movement to the profound stasis that wonder administers. Painlevé's case study demonstrates one instance of how interested ecology interacts with the larger affective environment of modern science and modernist art, revealing

[2] See Cahill's *Zoological Surrealism: The Non-Human Cinema of Jean Painlevé,* U of Minnesota P, 2019.

aesthetic and historical relationships among modern ocean ecology and Surrealism, and lending new insights into this avant garde's well-documented wonderment at ocean life.

Each chapter emphasizes the role of material ecosystems in the creation of the documentary techniques and technologies explored here, demonstrating the entanglement of environmental and media ecosystems at the center of modernism and modernity. Field, garden, and ocean shape the documentary innovations of ecologists throughout the chapters; in Chapter Three, the unique environment of cinematic experience becomes a site of ecological research and teaching. In this way, I am not only constructing a metaphorical relationship between environments and media networks, the history of such association Ursula Heise has explicated (168). I forward something like Heise's "more general ecology of space"—through specific case studies—which, for Heise, "would be an important step in the 'greening' of media ecology, as well as in the investigation of 'posthuman' identities that unfold at the interface of nature and technology" (168). Indeed, this approach to media studies is useful in mapping how scientific thinking and feeling are produced and disseminated by people, environments, and technologies. The chapters thus build towards a methodological argument for conducting affective history—scientifically and otherwise—ecologically: that is, with the tools and techniques of ecological fieldwork in mind. Indeed, a primary tenet of interested ecological fieldwork is the directive to begin an ecosystemic study with the small, often trivial things to which our interest attaches, to "see and handle" those alluring beings, before positioning them within a larger network of relation, as Tansley claims (Tansley and Evans 15). To that end, I begin by planting interest within modernist culture, bringing forward its centrality to theories of cognition, affect, and subjectivity within modern psychology and educational psychology. As we will see, the cultivation and experience of interest is entangled with both the media and environmental

ecologies of modernity: indeed, interested thinking and feeling draws these environments into relation with each other.

Planting Interested Ecology

This project necessarily takes part in the growing re-evaluation of modernism's environmental and ecological entanglements.[3] Indeed, *Fieldwork* participates in an effort among other green projects in modernist literary and visual culture to understand a presiding notion of modernist ontology that frames "existence as a 'blur' between physical presence and intellectual process," as Jeffrey Mathes McCarthy has argued (26). *Fieldwork* also works to understand the ways in which modernism "illuminate[s] the discursive construction of alternative subjectivies and national identities through the discourses of nature that were evolving to serve new purposes in the modernist moment;" interested ecology and its aesthetic experimentations can be understood as a "modernism [that] reconsiders a world divided into active humans and inert objects" (McCarthy 2, 5). From narratology beyond the human[4] to romantic modernism[5] to the nonhuman cinema of zoological Surrealism,[6] modernist studies is thoroughly invested in understanding how a variety of aesthetic modernisms documented—and thus created—notions of community that decentered anthropocentric primacy through representational experimentations.

3 That modernism has a reputation for being disinterested in nature and its systems need hardly be footnoted; as Robin Schulze claims in *The Degenerate Muse: American Nature, Modernist Poetry and the Problem of Cultural Hygiene* (2013), neither ecocriticism nor modernist studies has historically read literary modernism, in its embrace of the technological, the urban, and the material, as interested in forging an environmental ethos, upholding the notion that nature is anti-modern (5). This is likely one reason why texts like Heidi Scott's *Chaos and Cosmos: Literary Roots of Modern Ecology in the British Nineteenth Century* (2014) and Louise Economides's *The Ecology of Wonder in Romantic and Postmodern Literature* (2016) avoid modernism and modernity as a useful literary site for the development of ecological thinking, preferring to look at aesthetic projects immediately preceding and succeeding modernism for examples of ecological epistemology.

4 See David Hermann's *Narratology Beyond the Human: Storytelling and Animal Life.* Oxford UP, 2018.

5 See Alexandra Harris, *Romantic Moderns: English Writers, Artists and the Imagination from VW to John Piper,* Thames and Hudson, 2010.

6 See James Cahill's *Zoological Surrealism: The Nonhuman Cinema of Jean Painlevé,* U of Minnesota P, 2019.

Modern interactions with life sciences, including ecology, have also become a point of focus within this discussion, as scholars of European and American modernism have begun to note how "science and literature. . . shared a common environment in which they coevolved, sometimes in symbiotic and other times in antagonistic ways," as Caroline Hovanec has recently suggested (*Animal Subjects* 5). I join writers like Hovanec, Tim Armstrong, and Christina Alt in asserting that questions of intersubjectivity were paramount for modern scientists and artists alike, and that interdisciplinary exploration of these questions was a critical feature of modernist intellectual endeavor (Hovanec, *Animal Subjects* 15).[7] I, too, read scientific texts like literary and cinematic texts, uncovering tendrils of relationship among them that these other studies are likewise interested in mapping (*Animal Subjects* 17). My primary interventions lie, however, in examining the less charismatic responses of modern subjects to their environments than those figured in these accounts, on the one hand, and in my suggestion that modern media ecologies should be accounted for in understanding the relationship between modernist art and science, on the other. These might appear to be separate concerns, but as I show throughout this study, theorists and educators of interest were keenly aware of the ways in which this subtle experience might be fertilized and/or cut back by different means of representation.[8] I create a thick

[7] See Tim Armstrong, "Modernism, Technology, and the Life Sciences." *Cambridge Companion to Literature and Science.* Ed. Stephen Meyer. Cambridge UP, 2018. 223-241 and Christina Alt, *Virginia Woolf and the Study of Nature.* Cambridge UP, 2010.

[8] Hovanec's exploration of H.G. Wells's fiction and the writings of animal ecologist Charles Elton, for example, emphasize grotesque and horrific human/animal encounters (and thus calling into question notions of ecological control) (47). And Joshua Schuster's wonderful *The Ecology of Modernism: American Environments and Avant-Garde Poetics,* for example, explores the seeming paradox among modernist poets between their sharp attention to environments while also "remaining ambivalent about environmentalism" (3) and draws a parallel between a vacillating attachment among modernists, environments, and environmental ethics and the quadrat fieldwork method; for Schuster, the cool affective character consigned by the quadrat's "objective and arbitrary" values "gave form to and made legible a series of new ecological problems regarding stability and change, objectification and care, and the uneasy overlap of matters of fact and matters of concern" (vii). In Chapter One, I describe the limitations of the quadrat for both mapping interesting ecosystems and prompting interested thinking and feeling, in comparison with the more comprehensive field work protocols developed by British ecologists, the method of squares and the gridiron method. The quadrat, supporting Clements's superorganism concept, was a single square from which ecologists predicted a landscape's movement towards homeostasis; the method of squares, supporting a

cognitive and affective map of interested ecology in order to recuperate the importance of this ecological pedagogy, and to rescue it from banality. If it has "become cliché" among histories of science and art to refer to notions of complex ecological entanglement (Hovanec, *Animal Subjects* 39), then this study explores why for some audiences it is no longer "interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us," as Darwin wrote in *On the Origin of the Species* (460). As I will narrate in this project, interest was a required and fundamental cognition for perceiving the relationship among these complex forms of life for modern ecologists. And its particular resonances with modernist aesthetics are easily overlooked in part because while interest might be easily planted by various pedagogical strategies, its essentially blooming and wilting nature makes it vulnerable to the ways that teaching and technology might amplify or quell its experience.

Modernist studies might be excused for not attending closely to interest, however; as Paul Silvia suggests, interest has often been trivialized throughout the history of psychology (3).[9] Nevertheless, in the late nineteenth and early twentieth centuries, interest was a keystone varietal of cognitive work designed to deal with precisely that complexity of ecological and aesthetic

burgeoning ecosystem theory, was more interested in mapping the fragmented, ongoing, and never-stable movements of plant life. In conversation with aesthetic modernism, these forms of fieldwork offer very different documentary relationships.

9 Silvia points towards the fact that while theorists of interest like John Dewey and Felix Arnold, whose work is featured prominently here, were writing about how to understand and facilitate interest in the early twentieth century, the turn towards behavioral psychology punted a wide-spread institutional effort to understand this cognitive and affective experience until the 1960s for psychology writ large and until the 1980s for educational psychology (3). This might explain why articles as recently as 2016 appear to be continuing to trod this 150 year-old path in quite familiar terms; interest is, once again, finding itself somewhat in vogue. See, for example, "Interest Matters: The Importance of Promoting Interest in Education," by Judith M. Harackiewicz, Jessi L. Smith, and Stacy J. Prinisk in *Policy Insights from the Behavioral and Brain Sciences*, 3.2 (June 2016): 220-227.

form that typifies Darwin's entangled bank. Interest was theorized as the germination of cognition itself: drawing on and advancing earlier pedagogical works by Johann Friedreich Herbart, works in European and American progressive education and pragmatist psychology understood interest as the mechanism of information processing, the force that turned inchoate instinct and perceptual stimuli into organized systems of knowledge. Felix Arnold, publishing his thesis in 1910, frames interest's cognitive work as

> a budding fringe of meaning or perhaps a dim awareness of the future moment which is to be realised. There need be no distinct image or thought of such a future state. The impressions carry with them, as it were, a wavy, blurred outline of what is to come, a kind of iridescent halo of possibility. When the interest exists, the object is looked at in another light. It means more to the individual. It lingers longer in the center of the attentive field. More often, however, the interesting object or situation excites an image or a train of ideas which point to the future moment which is to be realised. These images or ideas are present at times only as fragments, only as piecemeal signs to point the way. (208)

Here, interest's knowledge work begins as a vague feeling that directs attention (and thus also facilitates distraction), opening onto the act of making knowledge from fragmented images, ideas, and associations. Interest encourages us to linger with something that appears unusual, even if we are not sure why: it slows down the pace of perception and information processing so that feeling might turn into knowing. As Sianne Ngai has suggested in her analysis of interesting aesthetics, interest can be understood as "modest flickers of affect activated by successive encounters with minor differences from an existing norm," a response to informational novelty that inspires the viewer to grapple with new, if only slightly surprising, informational patterns

(133). As knowledge work, interest attends to what is remarkable within a pattern, and encourages us to associate and build new knowledge from that affective encounter.[10]

It is easy to see why interest—a budding, if not always blossoming, experience, liable to focus as much as to stray—might have been easily dismissed within a modernity defined by attentive regulation (and other states of subversive experience like "absorption" and "contemplation") and speed.[11] But the theorization of interest helped psychologists, educators, novelists, and scientists negotiate a tangle of still-pressing nineteenth-century inheritances that gathered steam among an increasingly information-rich twentieth-century. Within William James's schema, and largely within psychologies of interest as a whole, interests *selectively* associate the data of perception and sensation, designating categorical containers, linking some things with other things, and closing down some potential associations. If information is a representation of "the degree of choice exercised in the selection or formation of one particular symbol, message, etc., out of a number of possible ones," then interest *is* this very process of selecting what matters (OED). *The Principles of Psychology* articulates interest in precisely these terms. James defines interest within his reckoning of association, or, the "mechanical conditions on which thought depends, and which, to say the least, determine the order in which is presented the content or material for comparisons, selections, and decisions" (553). Here, James describes cognition as a code that establishes order by comparing, selecting, and deciding among data (554). Moreover, while associations can be made through a variety of mechanisms, including

10 Contemporary experimental psychology corroborates this reading; the seminal work of Daniel Berlyne collates the conditions of interest as complexity, novelty, uncertainty, and conflict (Silvia 33), while J.C. Nunnally's work in the 1970s and 1980s associated interest with "information conflict"—that is, "competing information relative to identifying, labeling, remembering, categorizing, and otherwise encoding the stimulus" (cited in Silvia 48).

11 See Jenelle Troxell's "Shock and 'Perfect Contemplation': Dorothy Richardson's Mystical Cinematic Consciousness." *Modernism/modernity,* vol. 21, issue 1, Jan 2014, 51-70 and Anna Jones Abramson's "Beyond Modernist Shock: Virginia Woolf's Absorbing Atmosphere." *Journal of Modern Literature,* vol. 38, issue, 4, Summer 2015, 39-56.

habit, similarity, timeliness, emotion, and vividness (563-578), "the law of interest" is unique in its ability to override these other rules. "*In no revival of a past experience are all the items of our thought equally operative in determining what the next thought shall be,"* James emphasizes, *"Always some ingredient is prepotent over the rest…* In subjective terms we say that *the prepotent items are those which appeal most to our* INTEREST*"* (571, emphasis original). Interest is so powerful, in James's hands, that it can even prompt "*action elsewhere"* (572). We can thank interest, then, for the ability to associate—to organize—seemingly disparate things, even across time and space.

These works by James and Arnold suggest that interest found pedagogical vogue as a method of managing information abundance, a particularly resonant problem within the modern life sciences as for modern knowledge work more generally. Facilitating interest in a particular thing encouraged students to then build successive knowledge in relation to that thing, as opposed to attempting to recreate a perfect knowledge of modernity's increasingly thick archive. Interest and its related pedagogical strategies—preferring hands-on participation; reframing the "work" of learning in terms of "play;" direct observation; low-stakes assessment; and interdisciplinary lesson-planning, to name a few—come to the aid of Catherine Aiken, a girls' school teacher whose *Methods of Mind-Training: Concentrated Attention and Memory* (1896) laments the difficulty of designing a general educational curriculum "in these days of extravagant demands" upon a teacher's and student's attentive capacities, including and especially "the varied and multiplied subjects which the study of the sciences includes" (5). Rote memorization models fail to build lasting conceptual knowledge in an era defined by archive fever; what was wanted was an epistemological model that could keep up with a modernity defined by the "endless revaluation" of the archive, "which both preserves and produces

memories far in excess of the interpretive capacities of any one archivist or 'market maker'," to use Paul Stephens's recent description (31).

An issue of agency and subjectivity emerges here: if, as both Stephens and Jonathon Crary have argued, the regulation of attention subsumed individual knowledge work in favor of collective knowledge formation (and, thus regulation), then interest and its pedagogies encouraged the individual to create not a knowledge of the collective archive, but to create his or her own body of knowledge (31). Importantly, this requires space and leisure in ways that often exceed the structures of school days: as John Dewey notes, "I have argued in all seriousness that a child kept after school to study has often acquired an interest in arithmetic or grammar which he didn't have before, as if this proved the efficacy of 'discipline' *versus* interest. Of course, the reality is that the greater leisure, the opportunity for individual explanation afforded, served to bring the material into its proper relations in the child's mind—he 'got hold' of it" (24). Pedagogical techniques for facilitating interest, for example, avoid assessments of a student's archived content knowledge—a key feature of interesting pedagogies is their lack of high stakes, formalized examinations—in favor of prompting a quiescent mode of associative inquiry (Ostermann 100). Indeed, interest pedagogies tend towards a variety of strategies that ease the pace of learning: hands-on participation, experimental design and set-up, play, handicraft, interdisciplinary exploration, and physical education were all critical interest-based teaching tactics.[12]

Interest can be easily mistaken for distraction, then, in a society emphasizing attentive consistency; indeed, within Crary's now-canonical argument, distraction, always tethered to attention, serves as the primary mechanism for the individual to reassert agency within attentive

12 See Wilhelm Ostermann's *Interest and its Relation to Pedagogy* (1899) for a thorough listing.

economies. But Crary overlooks, understandably, the work of interest as the *function* of this attention/distraction toggle. Crary falls prey to the slight misnomer that is Théodule Ribot's *The Psychology of Attention* (1903); grounding his study in Ribot's voluntary attention, he overlooks the author's summative claim "that the immediate and necessary condition of attention in all its forms is interest—that is, natural or artificial emotional states" (105). Ribot's spontaneous attention—notably, an expression of interest, if not interest itself, which is rather more difficult to observe—situates this knowledge affect as central to the development of subjectivity, the very center of the self:

> Man, like animals, lends his attention spontaneously only to what touches and interests him; to what produces in him an agreeable, disagreeable, or mixed state. As pleasure and pain are only signs that certain of our tendencies are being satisfied or crossed; and as our tendencies are what is deepest in us; as they express the very depths of our personality, of our character; it follows that spontaneous attention has its roots in the very basis of our being. The nature of spontaneous attention in any person reveals his character, or, at least, his fundamental tendencies. (7, translation mine)

If interest is concerned with the formation of the modern subject—indeed, is the lone agency of a subjectivity whose cognition was understood to be increasingly mutable and thus manipulable—then the suggestions throughout these passages that interest is materially engaged speaks to a further wrinkle in the ontological relationship it inscribed. Although debates about the nature, varieties, and provocation of interest abound within psychological literature, theorists of interest in this moment agree that to be interested is to occupy a distinctive middle ground—thus its roots, inter esse, meaning "to be between,"—between the self and the world, encouraging

the entanglement of mind and matter. As Dewey puts it, "In the first place, interest protects us from a merely internal conception of mind; and, in the second place, from a merely external conception of subject-matter" (81). It is no mistake that Ribot correlates interest with touch in the preceding passage; interest was often understood to be provoked by and registered as a range of subtle, if noticeable, tactile experiences: tickling, pinching, poking, prodding, caressing. Interesting pedagogies, then, often feature touch and manual work with the aim of bringing mind and matter into close contact, allowing each to shape the other through response. Indeed, for Dewey, interest is often present in "the manual side of inquiry, the collection of materials for study, the management of apparatus, the sequence of acts required in carrying on and in recording experiments" (81). A science that foregrounds the epistemology of interest, then, allows us to understand its experimental protocols not so much as an anthropogenic enframing of matter, but as a responsive openness to a materiality that alters the shape of the self.[13]

Understanding cognition as a function of this kind of interest, then, reframes the modern subject, and often the modern experimental subject, with whom this dissertation often engages, as a thinker existing between Enlightenment categories, especially idealism and materialism, emotion and intellect. Indeed, interest's emotional quotient, what theorists of interest commonly refer to as "the motor attitude"—that vague, lingering spark of attachment prompted by an interaction with a lively thing—is critical to knowledge work (Arnold 186). Among theorists of interest, the precise nature of the relationship between interested thinking and feeling is an erotic one: feeling interested brings forth interest's knowledge work through a sensuously, if subtly, felt attachment. Interest is "the warm soil of feeling" as Ostermann states (148), that allows

[13] As I will demonstrate in my second chapter, notions of experimentation in this project are indebted to, but not derivative of, Phillip Erchinger's very careful historicization of the concept in *Artful Experiments: Ways of Knowing in Victorian Literature and Science*, Edinburgh UP, 2018.

knowledge to develop, judgements to be made, systems of thought to be established and ordered—or "controlled" to use Arnold's terms (210).[14] And often, if not always persistently, interest is desirous, "a striving, a conation, an appetition, a tendency towards something," as Arnold suggests, "called forth" by an object and inspiring "a desire to come into closer contact with an object" (183). If unchecked, interest's tendrils will grow around an object, a lively and developing emotion that can overtake the object itself. This is a desirable circumstance for Arnold, who hopes unbridled interest will develop into a more organized and lasting system of knowing (183). But if interest takes the form of a particularly voracious vine wrapping sensuously around the objects that invite it, Dewey's writing suggests that interested feeling does not always attempt to overpower "objective subject-matter," but can characterized by the ways "in which the self is engaged, occupied, taken up with, concerned in, absorbed by, carried away by" the things to which interest attaches (91). The desires of interest, then, are not simply inscribed by the self's desire to organize a new object, perception, or observation into its world view, but to become entangled with and overcome by new information as the vitality of the world takes hold of us.

Dewey's interest appears to be articulated precisely within "a modernity where the animation of the object world, the voice of things, or the indistinction of object and subject does not constitute a general (or generalizable, theorizable) condition but irrupts as a discreet event" to use Bill Brown's recent terms (20). Dewey's word choice for describing the interesting

[14] As Ostermann goes on to state, interest and intellect are not at all inharmonious: "And is it not the observation that this is actually done in many cases opposed to the statement that *interest only* has motive influence over the will; interest with whose warmth of feeling "cold intellect" evidently has nothing in common? Our answer, in the first place, will be that interest, though in the beginning identical with feeling, changes by degrees into the form of the *judgement of value*, and that this judgement of value, though growing out of feeling and having motive power only for that reason, yet is no longer original feeling, but already an intellectual function of the mind, which in this judgment sums up and comprises all the single impressions of value upon feeling. In this respect interest and intellectual activity do not absolutely exclude each other" (67).

thing—"objective subject-matter"—echoes Brown's analysis of the modern thing, which is both an object of attention and a subject that "grasps" us (Brown 23). Matter, in Dewey's syntax, subjects—that is, it creates subjects: "Genuine interest. . . simply means that a person has identified himself with, or has found himself in, a certain course of action. Consequently he is identified with whatever objects and forms of skill are involved in the successful prosecution of that course" (Dewey 43). Interest, then, appears critical within Brown's exploration of modernity's fascination with matter and materiality: indeed, the "interobject relationship" Brown theorizes enacts, as he states, citing Roland Barthes, "'an intense mutation of my interest'" (23).[15]

Brown's *Other Things* tends to focus on interest as intensely felt; as he asserts, "my concern is not with whether you succeed or fail to grasp things-in-themselves, objects as they are. My concern is how objects grasp you: how they elicit your attention, interrupt your concentration, assault your sensorium" (24). But interest is not always intensely mutated via surprising assaults. It is often only mildly affecting, and thus, its care and keeping is a consistent theme throughout educational texts on the subject. Interest's lively emotional and cognitive force can be pruned by a variety of factors, both internal and external. For Arnold, "a check or disappointment" on interest's development impedes the "condition of rest, ease, satisfaction, or pleasure" that accompanies the interested "manipulation" of things (197). While interest pedagogues agree that interest must be carefully cultivated, they differ widely on how best to do so. Arnold, for example, claims that ensuring pleasure within learning experiences—and

15 Barthes's take on the photogenic within film, too, appears rather interested, as Christian Keathley's recent analysis of cinephilia suggests: "Until now, the look of the spectator has been that of someone lying prone and buried, walled up in the darkness and receiving cinematic nourishment rather in the way a patient is fed intravenously. Here…I am on an enormous balcony, I move effortlessly within the field's range, I freely pick out what interests me, in a word, I begin to be surrounded" (Barthes in Keathley 47).

avoiding negative corporeal punishments—is critical to interest's continued growth, while Ostermann relates the limitations of material rewards for developing a lasting intrinsic interest.[16] But Dewey suggests that the most fundamental impediments to interest's development are not surface-level physiological prompts or suppressions, although those might sometimes serve to encourage interest's blooming or waning, but a structural misunderstanding concerning the nature of interest *as* vitality:

> At bottom all misconceptions of interest, whether in practice or in theory, come from ignoring or excluding its *moving, developing* nature; they bring an activity to a standstill, cut up its progressive growth into a series of static cross-sections. When this happens, nothing remains but to identify interest with the momentary excitation an object arouses. Such a relation of object and self is not only *not* educative, but it is worth less than nothing. It dissipates energy, and forms a habit of dependence upon such meaningless excitations, a habit most adverse to sustained thought and endeavor. Where such practices are resorted to in the name of interest, they very properly bring it into disrepute. It is not enough to *catch* attention; it must be *held.* It does not suffice to arouse energy; the *course* that energy takes, the results that it effects are the important matters. (Dewey 91)

The question, for Dewey, is not whether interest can be artificially prompted via administrations and manipulations—undoubtedly, it can—but how best to care for interest once planted. Interest is not served by the indiscriminate administration of stimuli for the sheer purpose of arousal here,

16 "One who works under the threat of punishment will not be impelled to continue such work or to renew old associations with it," Arnold states (204). Mere material reward is also not enough to secure a genuine interest for Ostermann: "when. . . some piece of scientific work void of interest is executed merely for the sake of gain" for example, no "intrinsic interest" is prompted (47).

and techniques such as these ignore the fact that interest, to be educationally valuable, must be sustained, held carefully, and given a space and direction within which to grow. Dewey emphasizes that interest can seldom be cultivated by conscious efforts to be interesting; rather, interest must be prompted by setting up "the conditions that lie back of it, and compel it. . . if we can supply an environment or materials, appliances, and resources—physical, social, and intellectual—to direct their adequate operation, we shall not have to think about interest. It will take care of itself. For mind will have met with what it needs in order to *be* mind" (96). Interest pedagogies tend to be subtle hands-on, hands-off practices, that allow an individual's interests to form their distinctive pattern of thought. To put it differently, interested pedagogies are in essence ecological: they provide environments, tools, and social protocols that allow interests to sprout, grow, and develop.

Critically, Dewey's language is inflected with references to technologies of representation, echoing the suggestion that interest might be cultivated not only within proximate physical encounters but also across spatio-temporal distances, in this case, created and bridged by representation and mediation. Arnold outrightly states this point: "the motor, visual, tactile, and other impressions" of an interesting object "will leave traces strong enough to excite interest even when the toy or other object is not before the child. . . the mere mention of the object, its name, a picture of it, etc., will excite an interest in the individual strong enough to impel attempted control" (210). Dewey's word choice leads us in a more precise direction here, implying that certain *forms* of representation might be more amenable to this task than others. The contrast between the ontology of photography and moving image appears particularly strong in Dewey's description of interest as "moving and developing" here, and his description of pedagogical practices that cut, conscribe, and still interest are difficult not to associate with these

technologies, as well as the practices of experimental image-making that cut apart and dissect specimens. Interest doesn't thrive among representations that fail to invite it to grow, as a cognition, as an affect: interesting representations invite both an ongoing engagement and a direction for that engagement, a means of associating the information presented therein, but without excessive prescription.

Moreover, if interested cognition is an index of the vitality of the things that we encounter, as Dewey suggests elsewhere, then interesting representations might also strive for an indexical relationship with the movement of things in which one aims to seed students' interest: film, as Dewey's language seems to suggest, overcomes the problem of stasis by capturing movement as modus operandi, but as this dissertation demonstrates, forms of field mapping, drawing, painting, literary description, and even certain photographic practices also solve for stasis by practicing a form of indexical mimesis. In this light, Ostermann's rather trite explanation of how to secure interest via historical narration, takes on a more radical project by insisting on the power of maintaining movement within interesting aesthetic pedagogy: "relating" the facts of history "with animation," Ostermann suggests that "the teacher, however, like a poet," might "make a graphic sketch of the event" (Ostermann 118). But Ostermann takes aesthetic education seriously, and suggests that certain drawing practices "which emphasize the representation of dead, elementary forms (drawing of lines, geometrical figures, ornaments, etc.,) to such a degree as to render drawing disagreeable to children" miss the fundamental potential of drawing to cultivate interest in lively things (Ostermann 135). Ostermann goes on to relate this thorough, fundamental emphasis on form to certain modes of musical and scientific training as well, which "weakens the interest" by ignoring the "practical end" of art and science education (136). Notably, Ostermann's issue is not with form itself, but with form as extracted from

motion. Rather, he argues for drawing instruction, musical training, and scientific pedagogy that "renders real objects," that not only represents, but *makes* lively things (136). Interesting aesthetic pedagogies, then, aim to teach image-making as not simply reflective of materiality, but as active, generative things that mimic matter's in-forming.

This representative practice finds practical application in Ostermann's writings in connection with natural historical study, which "promotes a more genial conception of nature by leading pupils to see, as far as is practical, the connections and relationships existing between objects in nature" (129-130). Here, Ostermann echoes a series of contemporary debates in botanical science that were foundational to the establishment of an ecology defined by a phytogeography, a story that the next chapter recounts in detail: Ostermann argues for a way of documenting nature that puts the study of unique organisms and their forms (morphological botany) into connection with "those natural relationships of mutual dependence and coherence which present themselves in the reality of living nature," a description which echoes phytogeographical study (129). For Ostermann, the interest of nature resides in putting static particulars into conversation with dynamic generalities, the kind of information processing that defined modern ecology's fieldwork methods. "We would by no means condemn a careful investigation of small particulars in nature, a thing which is often quite indispensable for an intelligent conception of the workings of nature, which quickens the powers of observation and promotes their aesthetic development," Ostermann suggests (127). But as he goes on to state, this kind of documentary work should not only consist of "the technical names of each and every minutest feature" but should also take the form of a "sympathetic study of all of the modes of nature's manifestations" in the field (128). "What an abundance of suggestive material, appealing, too, to the hearts of children, is offered in the habits and development of animals,

even of the smallest of them," Ostermann contends, "Think, for instance, of the bees and ants; and yet how much, as a rule, is this genial part of nature-study neglected in favor of a dry description of form" (128). Under the influence of Sir Arthur Tansley, whose work grounds the next chapter's exploration of ecological epistemology and aesthetics, phytogeography became the central methodological impetus of early ecological research, and both secured and produced interest in the patterns of motion and behavior of charismatic and noncharismatic species alike. Indeed, ecology's interested educational objectives and techniques included visual pedagogies for mapping such relationships between organisms and environments, and its popular works often cultivated interest not only as an educational paradigm, but through many "pleasing pictures" that documented ecological variation and relation (Ostermann 130). This interesting approach to nature study adopted an aesthetic of interest—that is, picturesque aesthetics—to do this work, a narrative that *Interest and its Relation to Pedagogy* begins to suggest:

> This form of nature study leads quite naturally to a treatment of the objects of nature in the form of complete pictures, as the woods, the field, the meadow, the heath, the sea, the mountains, etc., and thus brings into due prominence also the aesthetic side of nature. In this respect, such study closely resembles the descriptions of nature in geography, which likewise are intended to produce an aesthetic effect. (Ostermann 130)

In this passage, art and science collide to solve the complicated task of mapping both particulate information and general relationships, as nature changes shape over time; as theorized in this introduction, interest's cognitive, affective, and aesthetic experience is critical to this descriptive task. In what follows, I articulate how the representative protocols of picturesque aesthetics and ecological fieldwork methods rely upon the planting and cultivation of interest among its

practitioners and viewers, teaching the knowledge work that allows ecologists to put information and in-formation into connection. An entangled experimental practice, the ecological picturesque registers the lively ways in which mind and matter form each other, in science, fiction, and film. In tracing its circulation, the project uncovers the nuances of modern ecological subjectivity, showing its variegated performances across scientific and aesthetic institutions, and among professional and amateur practitioners. This story lingers among petals and fields, dabbles with tide pools and treeline; in doing so, it reveals how the many technologies of representation that have taught this critical modern science create undocumented, but no less important, branchings and bendings of ecological knowing.

This short history of interest helps my readers begin to see the ways in which this project contributes to the environmental humanities' exploration of aesthetics and media, by positioning this modernist history of ecological thinking and representation as useful in understanding contemporary efforts to reimagine aesthetics' role in shaping theories of the posthuman. As a scientific enterprise, ecology has taken up a precarious position within the environmental humanities; its representative techniques and technologies have tended to be understood as reinscribing a distanced, disinterested, and deanimating position in relation to more-than-human agency. Jane Bennett hopes, for example, that her vital materialism will "interrupt both the teleological organicism of some ecologists and the machine image of nature governing many of their opponents" (*Vibrant Matter* 112) by constructing an ecology within which "everything is, in a sense, alive" (117). Timothy Morton, too, has suggested that an ecology without his static, dead Nature, might not live within this science's theoretical models, particularly the ecosystem concept which "becomes an immersive, impersonal matrix" against which the agency of "critical anomalies" falters (*Ecology Without Nature* 103). And if, for Bruno Latour, "the point that

material subjects, no longer understood as either human or nonhuman, are at work everywhere is much more obvious to many scientists than it is for most other people," then methods of science communication and the habits and postures of "objectivity" that we have been taught to read within them also often obscure the actions and agencies that register themselves within—and thus actively shape—scientific meaning-making ("Agency in the Time of the Anthropocene" 14). The history of interested ecological thinking and documentary practice that I offer here encourages readers within the environmental humanities to attend to nuanced and multi-layered histories of science for models of thinking, feeling, and representing that underscore and help to rework theories of the posthuman.

Indeed, the seeds of interested ecological thinking and documentation linger within many of these accounts. Chapter One's picturesque landscapes and ecological field maps, for example, echo the aesthetically interesting form of the "field" in which Jane Bennett invites her readers to wander at the conclusion of *Vibrant Matter: A Political Ecology of Things* (2010): neither jaggedly and hierarchically articulated nor "uniform and flat," these fields provoke a kind of thinking that is "protean and diverse" and challenges "philosophical categories of life, matter, mental, environmental" (Bennett, *Vibrant Matter* 117). This kind of thinking is interest: indeed, Bennett's vital materialism shares some textual history with the interest theories I have drawn out, including the empiricist and pragmatist psychologies of William James and John Dewey. But in claiming that "vital materialism also recasts the self in the light of its intrinsically polluted nature and in so doing recasts what counts as self-interest," Bennett fails to take into account the broader theorization of interested cognition within these writings that has always been concerned with the "intrinsically polluted nature of the self"—albeit in less blighted, more verdant, terms (*Vibrant Matter* 116). Interest is the energetic force that encourages a mind to bloom in response

to the life that exists within and around it, and was thus a critical cognitive and affective experience for dissolving the parameters of a defined, metaphysical subjectivity.[17]

As a powerful experience for dissolving subject-object dualism, interest also figures prominently in Donna Haraway's notion of visiting in *Staying With the Trouble: Making Kin in the Chthulucene* (2016).[18] "Visiting is not an easy practice," Haraway argues, "it demands the ability to find others actively interesting, even or especially others most people already claim to know all too completely, to ask questions that one's interlocutors truly find interesting, to cultivate the wild virtue of curiosity, to retune one's ability to sense and respond" (127). In each chapter, explorations of experimental, ecological field work make the argument that interested ecological science does precisely this: in visiting subjects "in their homes" as Tansley insists, ecologists allow other, often mundane, things to provoke interest, to respond to their intellectual/physiological stimulations, and to thus to make and recuperate knowledge "off the beaten path" (Haraway 130).[19] Chapters Two and Four, for instance, show how interested ecology's specific field work practices and representative protocols "render" the activities of both ecosystem and environment "in ways not written into preexisting scripts, but invented or provoked, more than simply shown, in practical research:" Virginia Woolf's "Kew Gardens" and Jean Painlevé's cinematic poesis offer critical case studies of this kind of kinship (Haraway 128).

17 See Judith Ryan's *The Vanishing Subject: Early Psychology and Literary Modernism.* U of Chicago P, 1991.

18 Although Haraway tends to mask interest's subtle power with curiosity's more established charisma, often using the terms interchangeably, as the chapter's title, "A Curious Practice," suggests. More should be said on the relationship between these affects in contemporary science writing; I handle their relationship within the project's historical scope in Chapter Four.

19 As Tansley states: "In its most general sense ecology may be defined as the study of plants and animals as they live *in their natural homes*, and this implies the study of all they are and do when they are 'at home.' In the case of mobile animals 'home' must be extended to include all the places they are in when they are feeding, seeking food, escaping, sheltering, migrating or breeding-in fact the whole of their behaviour during life" (Tansley, *What is Ecology?* 6).

Indeed, throughout this dissertation, fieldwork methods and their representative schemas are not simply "showing" relationships, but *making* them: each chapter explores how the "behavior" of ecosystems and ecologists are in "dynamic, moving relations of attunement;" and thus are "made, but not made up" by research design and execution, by choice of media and aesthetics, and by the liveliness of ecosystems themselves (Haraway 128). Chapter Three's exploration of interested ecological feeling showcases the distinctive eroticism that inheres within this scientific affect, making its rules of behavior and comportment in respectful, responsive conversation with the organisms and environments that beckon to it. This is an eroticism—and an ethic—defined by distance as much as by proximity, by the fastening and loosening of affective attachment, and both mimesis and difference between researcher and field. And it thus evokes on ontic relationship between experimenter and environment that echoes Jean Luc-Nancy's "being-singular-plural. . . putt[ing] essence itself in the hyphenation. . . a mark of union and also a mark of division, a mark of sharing that effaces itself, leaving each term to its isolation *and* its being-with-the-others" (37). It is not for nothing that Nancy heralds interest as the cognition and affect that makes this hyphenated notion of community thinkable: "we are interested in the sense of being intrigued by the ever-renewed alterity of the origin and, if I may say so," Nancy interjects primly, "of having an affair with it" (20). Interested ecological science and its aesthetic pedagogies—particularly *Secrets of Nature*—are marked by "punctual and discrete spacings" that forge loose erotic attachments, respectful of the ever-renewed entanglements *and* distinctions among life forms as we grow (Nancy 19).

Interested ecological documentation thus aims to make possible the "the impossible project of rewrit[ing] the default grammar of agency, a grammar that assigns activity to people and passivity to things," and it does so by teaching us to read science writing and image-making

differently: as practices that do not simply provide information concerning organisms, ecosystems and environments, but which are in-formed by these living entities (Bennett, *Vibrant Matter* 119). The case studies I bring to bear here serve as models for the kind of science literacy for which Bruno Latour argues in "Agency at the Time of the Anthropocene" (2014), an essay that aims to recuperate the capability of science writing, and indeed, language more generally, to register the vitality of nonhuman life by reinscribing the relationship between representation and actuality. For Latour, this relationship is indexical, a form of representation that points towards "the shape" of "unknown actants" as they move, develop, and grow (12). If science writing fails to suggest the liveliness of material subjects, then this is not only an issue of grammatical performances of objectivity among scientists, but also a misunderstanding of the fundamental entanglement of actuality and representation. Together, these reading and writing habits smooth over the uneven, interesting nuances that generate scientific knowledge work with the veneer of causality, thus encouraging the "eventfulness" of material being to "disappear"—and boring the reader in turn (13). "Do you remember learning the facts of science at school? If you were often bored, that's why!" Latour states emphatically (13). What is wanted is a science literacy that understands the relationship between representation and actuality to be predicated on growth, wherein "the presence of agents in search of their existence," as Latour describes it, underscores meaning itself, and thus makes representation possible (12).

Indeed, throughout this study, interested ecological documentation can often be understood as a kind of living representational process that opens the documents—and, of course, by default, the work of scientific minds—to more-than-human networks of meaning making. I join Latour and his critic, Eduardo Kohn, in an effort to "rethink what it is that we take representation to be" (Kohn 41). As I argue throughout, interested ecological documentation—*by*

means of its specific cognitive and affective character—is a "sign process" that "'[does] things' in the world," and thus lives and evolves in and among a multiplicity of life-forms' efforts to signify and interpret meaning and thus celebrates representation as a way of dismantling mind-body, human-nonhuman, animate-inanimate dualism (Kohn 34). Throughout this study, the patterns of motion and response that indicate nonhuman life leave traces within the grammar of field documents: these documents inform readers about the movements and comportments of plant communities, bees, snails, birds, mosses, fish, and octopi, but they are also in-formed by the scales, temporalities, and patterns that these beings make within their homes. Modern ecology is the study of growth as movement, development, habit and disruption, and its interested cognition is particularly flourishing in this regard. After all, as Kohn suggests, living thoughts are, quite technically interested, in that they aim to make sense of aberrations among pattern: "growth requires learning something about the habits around us" Kohn contends, "and yet this often involves a disruption of our habituated expectations of what the world is like" (62). In the early 20th century, psychologists and educators understood interest in precisely these terms: as an energetic force of growth that shaped the mind—and the self—thus inscribing thought as a living being responding to the growth of other living things, including humans, nonhumans, environments, texts and images.

If a lively understanding of representation leads to a feeling of enchantment, as Kohn suggests, then modern ecological science and its aesthetic practices might be understood as a "mode of enchantment," in Jane Bennett's terms (*Enchantment* 174). The nature of interest as a living, and thus vulnerable, cognitive and affective experience echoes Bennett's more charismatic vocabulary: interest, like enchantment, "is a precarious concatenation. . . require[ing] a delicate balance of forces, a set of fortuitous circumstances, and some practice in order to

develop the somatic habits conducive to it. It is such a complicated assemblage that one wonders how it ever occurs" (*Enchantment* 104). Throughout this study, interest is also an "uneasy combination of artifice and spontaneity," both prompted and practiced, but never with too much force, and this is where interest postulates a powerful environmental ethic within modernist ecological science and aesthetic modernism (10). The ethical value of interest "resides in its ability to persuade without compelling, to structure experience without insisting that this structure is the one that must be duplicated again and again:" indeed, it is precisely the vulnerability of interest—to be both powerfully affecting and only mildly so—that grounds the environmental ethics of ecological documentation presented here (Bennet, *Enchantment* 27-28). While Chapter Three explores the tangling of this affective experience and its ethical potentials most specifically, each case study suggests that the often mild affect of modern ecology might not be simply a brand of scientific disenchantment, but is itself the grounds of a distinctly modernist environmental ethic that respects and cares for a more-than-human actuality. In this way, I take seriously Sylvan Goldberg's call for an attention to the "quieter range of affective engagements" with environments that "deserve as much [critical attention] precisely because they don't draw that attention so noticeably" (57). Interest certainly lacks the sparkle of enchantment—and terms like wonder, surprise, fascination, and joy that Bennett uses to define these affective phenomena—but interest's sensitive affective attachments and its generative cognition lead us to understand the lively epistemological, aesthetic, and ethical history of modern ecological thought as one that might prompt—but does not presume to ensure—care for others beyond the human (Bennett, *Enchantment* 132).

In reviewing this literature, I do not aim to argue for interest as a mode of environmental thinking, feeling, and ethics *par excellence*: prescription, as the interest pedagogies featured here

claim, is decidedly uninteresting. Moreover, I do not aim to suggest that we might understand the whole of the environmental humanities as an inheritance of modern ecology, for such a view makes the variations and nuances of these diverse fields necessarily boring. Rather, this project joins efforts on the part of the affective and material turns in ecocriticism to "identify the emotions that circulate around environmental issues. . . to clarify how that circulation works," and "to acknowledge the powerful role environments themselves play in shaping affective experience," as the editors of *Affective Ecocriticism: Emotion, Embodiment, Environment* (2018) state (3). I do this work, however, through a historicist understanding of affect, cognition, and aesthetics to document ecological thinking in its time and place, such that we might recognize it and its unique vulnerabilities lingering among today's efforts to rethink relationships among life forms and environments. Interest lives among and blossoms into a variety of cognitive and affective experiences, and thus tells us only a fraction of the story when it comes to understanding the long and varied history of ecological thinking: Chapter Four's exploration of interest, curiosity, and marvel within Surrealist ecological science writing and filmmaking is an effort to perform this ecosystemic method of cognitive and affective historicism.[20]

My final intervention, then, is to articulate a fresh method for developing a critical relationship between modernist studies and the environmental humanities. To be sure, "modernism and ecocriticism become powerful interpretive partners when we acknowledge the balance they strike between a self-conscious formalism that foregrounds epistemology, and a commitment to the natural world's ontic presence" as McCarthy claims (39). But modernist studies need not apply theories of posthumanism to illuminate the "ontic presence" of nature among modernist literary and visual culture (39). For modernist studies has long been exploring

[20] I reference, of course, Donna Haraway's "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective." *Feminist Studies* 14.3 (1988): 575-599.

modernity as a historically situated, if varied, cognitive and affective event, consistently mapping the diversity of the modern experience as wrought by the interrelation of intellectual trends, markets, aesthetic experimentations, and technologies of communication, transportation, and representation. An historically-informed affective ecocriticism could do worse, then, than to draw upon the rich archives of thinking and feeling that modernist studies has created while exploring this cultural phenomenon, with its indelible role in shaping how we perceive and live on our planet today. In situating ecological knowledge within a modern history of science, psychology, aesthetics, and media, *Fieldwork: Ecological Pedagogy in Modernist Fiction and Film* suggests a productive and entangled relationship between modernist studies and the contemporary environmental humanities that brings to the surface of environmental history the subtle attachments we are constantly forging and severing among the nonhuman lives that we touch.

CHAPTER ONE—Fieldwork: Modern Ecology's Picturesque Attachments

An entry in a series of pocket-sized texts published by the British Field Studies Council, *Oaks and Oakwoods* (1952), is not a particularly groundbreaking work within the history of ecological science. Written by the founding father of British ecology and the co-coiner of the ecosystem concept, Sir Arthur George Tansley, and illustrated by Phyllida Lumsden, this slim volume reiterates for non-academic readers many of the finer points of oak forest growth and community from Tansley's larger scientific and popular *ouevre,* compellingly illustrated in pen-and-ink and watercolor by Lumsden. It does not forward a fresh methodology, nor does it suggest a new way of measuring ecological relationships; it appears nowhere among histories of ecological science as an important disciplinary document. It serves a rather more humble, but essential, disciplinary aim: to introduce ecological research and theory in a way that appeals to "the student, to the older school child, to the teacher, to the general reader interested in country life and its ways," as the series' editor, E.A. Ennion writes in his editor's note (v).[21] Generically, the series sits somewhere between scientific manual and popular science publication: it "bridges the gap between the text-book, with its studied phrase and technical details, and the book—however charming—that presents wild life and country matters in a frankly superficial vein" (Ennion v). The powerful affective register of popular books which "may rouse enthusiasm, only to leave the reader dangling in mid-air" is quelled by the series' scholarly aims; at the same time, however, the series doesn't fall into the trap of textbook style, wherein a "lack of imagination"

21 Dr. Eric Ennion was a medical doctor in Burwell who assisted in the development of the Field Studies Council in a post-war effort to revitalize nature study. In 1943, he abandoned medical practice to do just this. Ennion hoped he might "widely exercise his quiet but superb talent as an artist and, at the same time, introduce to others some of the wonders, beauty and consuming interest always open to naturalists" (Barrett 32).

leaves little affective response to "the story of the countryside" intact. The text is designed to spark knowledge work, but not command it, encouraging its readers to allow their bodies and minds to be directed and redirected by the slight touches of leaves, insects, and wind patterns (as its editor often did).[22] It defines ecological thinking as operating somewhere between rigorous observation and acts of imagination, neither deadening affective attachments to country places nor allowing that warm soil of feeling to grow fallow. Rather, "These FIELD STUDY BOOKS, amply illustrated, simply told but fully alive to current theory and research, are designed to pave the way" towards a more advanced ecological knowledge by provoking interest's mild flicker of affect and its facilitation of knowledge work (Ennion v, emphasis original).

If *Oaks and Oakwoods* is not immediately legible as a document of institutionalized ecological methodology or theory, it does serve as a case study in the enduring, if unremarked, relationship among interested thinking and feeling, modern ecology, and picturesque aesthetics that I identify as critical to the construction of modern ecological subjectivity, and which circulates among the contemporary art forms and media environments that this dissertation explores. In the first instance, Ennion's word choice and his generic aim for Field Studies Council books participates in the wider articulation of ecological thinking within British modernity that this chapter recounts: as ecological science developed disciplinary prominence and widespread public understanding in the first half of the 20th century, ecological thought was consistently framed as interested thinking and feeling. Secondly, the book teaches this cognitive and affective experience by harnessing a picturesque landscape aesthetic. The book's images, in both language and visual art, echo John Ruskin's definition of the picturesque as a method of

22 As John Barrett states in his short early history of the Council, "They say that local babies sometimes arrived in this world without any assistance because of the attention of Dr. Ennion, on his way to help them, had been distracted by the songs of birds or the glittering movement of dragonflies" (32).

drawing that, like other interest pedagogies, revalues the relationship between data and form, and indeed, makes material in-formation a matter of "outward and apparent fact" (*Modern Painters IV*, 502).[23] Unlike the perceptual habits of the "careless observer" of nature who fixates on the "cragginess and granulation of surfaces, just as he would rather draw the bark and moss of the trunk," Tansley and Lumsden bring to the forefront of ecological knowledge a careful examination of what makes the ranges of Chamonix so picturesque to Ruskin: the governing formal lines that "like the grain of the wood in the tree trunk. . . rule the swell and fall and change of all the mass" (Ruskin 502).[24] Tansley's description of branch pattern formation in *Oaks and Oakwoods* is a descriptive example, accompanied by this illustration:

Figure 1: Pen and Ink: Illustration of oak branching patterns in Oaks and Oakwoods, by Phyllida Lumsden (11)

Notably, Lumsden's heavy shading of the trunk points us towards the characteristic zig-zag pattern of the oak, brought to the forefront of a loosely sketched leafy crown (as opposed to

23 As John Dixon Hunt notes, the Ruskinian picturesque is also distinctively multi-modal, operating at the intersection of image and word (195). See Hunt, John Dixon. *Gardens and the Picturesque: Studies in the History of Landscape Architecture.* MIT P, 1997.

24 Ruskin extends the negligence of the careless observer to the medium of photography here, a point to which I will return.

craggy textures of bark and moss). And Tansley's description emphasizes the illustration's shading, noting that this distinctive pattern of branching Ys is a coded feature of oaky genetics altered and manipulated by forces from without. The pattern is roughly produced, formed by cuts made from within and without the plant: "The frequent repetition of growth by laterals and the abundant formation of dwarf twigs" on the common oak, for example, encourages the branches to make abrupt directional shifts in search of light, a result of both the shading of lower branches by upper canopy, but also by the closeness of planting encouraged both by acorn fall and foresters (11). This image aims to shore up Tansley's description of branch patterning at the cellular level, the process by which the plant alters its form towards the searching of light, creating a "clean trunk" that drops its nonproductive, young offshoots. The decaying branches, conspicuously without leaves on the lower trunk, are "actively cut…by forming a 'separation layer' across the base of the branch. In this separation layer the cell walls become corroded so that the tissue loses coherence and (usually in autumn) the branch is detached when there is a wind" (11). What catches our eye most clearly here is the rift in the formerly "closed" canopy, the product of a dying branch—which here, simply means to fall out of form, to "lose coherence"—opening up the oak to some new composition. The resulting architecture of the tree remains continuously under construction, a never finished series of branchings and cuts. Tansley's caption highlights this formal rupture, of course, in that he points us towards the aesthetic of the tree, its breaking of symmetry. What the image registers, then, in conversation with Tansley's description, is the "*becoming* outward and apparent" those facts "which bear upon the growth or the make of the thing" to use Ruskin's words (*Modern Painters* 502). It is an image attuned to the life *form* as it comes into being, in each moment new.

Lumsden's indistinct inking of canopy evokes this sense of ongoingness, of things coming into and moving out of being, the sense that the tree is living in this space and will certainly change long beyond the image's production. Throughout the text, Lumsden's images persist in making room for forms to shift, to change, to respond to what is within and without the frame, blurring compositions at the edges of closely detailed images (Fig. 2). They are often quite characteristically interesting in this way: the illustrations of variation among oak leaf structure in Figure 2, for example, are repetitious, if slightly nuanced, studies in leaf form. Like the open canopy of Figure 1, these leaves remain open at the edges, loosely sketched and shaded to evoke their attachment to larger, unpictured bodies. And Lumsden's landscape images reiterate this interesting, unfinished character, marking pathways into and out of larger landscapes (Fig. 3). At the foot of the broken oak tree in Figure 1, a country path winds up the crest of a hill, scaled for our eye by the rugged fence marking the horizon line. For Lars Spuybroek, the picturesque aesthetic is a particularly lively one, "never balanced or finished, subtly provoking you to take another step:" this image appears to operate precisely in this way, as its winding path, echoing the form of the "never balanced or finished" zigzagging oak branches, leads us into the field (220). The picturesque aesthetics of the images in *Oaks and Oakwoods*, then, echo the generic and pedagogical parameters of the series itself, which is designed to "pave a way" towards a more thorough, but inevitably incomplete, because never entirely mappable, ecological knowledge base, generated by and generating interest. Indeed, Lumsden's drawings teach readers that ecological thinking *is* the ongoing, incomplete process of making meaning among fragmented observations, perceptions, and associations that interest is.

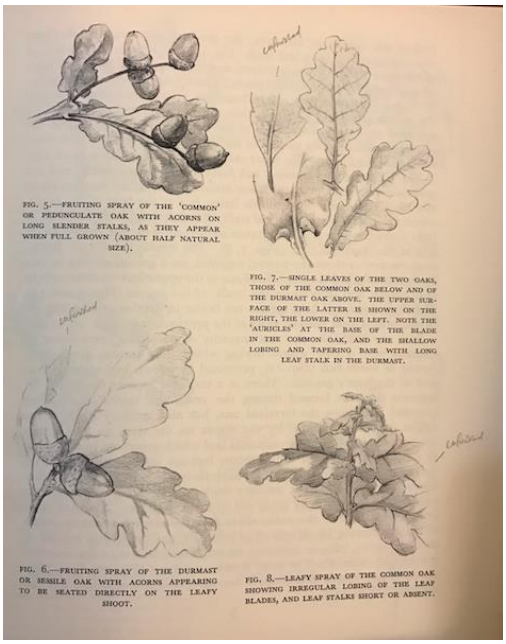


Figure 2: Pencil illustration: Detailed views of variation in sessile and durmast oak leaf structure in Oaks and Oakwoods, by Phyllida Lumsden (7)

The relationship between the interesting and the picturesque, then, is rather more than a commonality between aesthetic categories that "overlap" in their commitment to the "anti-classical" and the "non-beautiful," and were "invented to embrace aesthetic irregularity, particularity, and variation," as Ngai argues (138). Rather, the nature of this overlap is an epistemological and ontological similarity concerning the observation of materiality and how we understand and observe the coming into being of the material world. In this chapter, I argue that while Tansley's deployment of this aesthetic extends the picturesque's reach to the field of ecological science, a close examination of ecological epistemology reveals the relationship between the interesting and the picturesque to be not only about a shared form of fieldwork documentation. In conversation with ecology's educational and disciplinary history, this chapter draws out the nature of this documentary practice, suggesting resonances among the contemporary modernist aesthetics that are brought to bear in later chapters. This *ecological picturesque,* produced with and producing the warm soil of feeling that allows mind to evolve in

concert with materiality, registers traces of ecosystems within its documentary apparatus not only as bits of information, but also as an in-formative representative agent. This fieldwork attends not only to the textures of bark and moss, but to the guiding lines that break and bend the architectures of trees, plant communities, ecosystems—of life itself, as it creates and (variously) inhabits cellular patterns. Taught widely among ecological classrooms of all kinds, the ecological picturesque was couched in popular ecological texts like *Oaks and Oakwoods*, as well as among experimental science, filmmaking, and fiction. The ecological picturesque is thus a critical interdisciplinary nodule linking modernism to ecological science, both via textual record and historical situation.

At first blush, the picturesque appears to be an odd aesthetic to square with an ecological new materialism, on the one hand, and the fragmented, indexical, and documentary impulses of certain modernist aesthetic impulses, on the other.[25] But voices from both fields have regarded the picturesque as a distanced descriptive paradigm that is *not* attentive to action and motion (human or more-than-human), and indeed, grounds neither an understanding of human culture and politics nor an ontology "that better accounts for the agency of things as they exist beyond the human gaze" (Marran 56). Like modernism itself, criticisms of the picturesque as an ecological aesthetic struggle to see this tradition as a document of material change and agency,

[25] Christine Marran, for example, has recently called for an ecocritical film practice that does not consider landscape, and mise-en-scene generally, as objects of "picturesque" contemplation, but "that is more attentive to the vibrant materiality that has been rendered moribund through film theory's historically humanistic approach to landscape" (56). Aaron Ellison has argued that a certain trite, static picturesqueness does not readily square with more contemporary notions of the ecological, and has perhaps even stilted scientific methodologies. Ellison's assessment of the "suffocating embrace" of picturesque aesthetics (via the Hudson River School) on American ecological methods makes an intriguing argument for modern and postmodern art as more properly "realistic" ecological representations (80). To that end, Joshua Schuster has also recently echoed these remarks in sketching out the American modernist response to nineteenth-century models of nature and environmental consciousness: "with the ubiquity of nature kitsch in advertising and sentimental art" Schuster claims, "the avant-garde turns toward a starker realism that eschews the overly framed picturesque" (10).

positioning this aesthetic as a *nature morte.*[26] However, ecological science teaches us to understand the picturesque in terms that resonate within new materialist frameworks as well as certain modernist values of experimentation, fragmentation, material vitality, indexicality, and complexity. This chapter revives the picturesque by identifying its entanglement with an ecological science that likewise registers material agency through its experimental impetus: indeed, makes use of the picturesque to *teach* this experimental fieldwork protocol.

In this way, I read against the grain of *both* the history of the picturesque and modern ecology, challenging this science's often-narrated commitments to anthropocentric and biopolitical values and aims.[27] In understanding the centrality of interested thinking and feeling to both forms of fieldwork, the chapter breaks and bends the history of ecological thinking with close attention to the shape of its thought and the art that it wrought. Focusing closely on the values of modern ecology in this chapter, I bolster recent efforts to understand the picturesque as a radical ecological aesthetic, reconstructing a long-standing relationship between these art and

26 See Lukacs, "Narrate or Describe?" *Writer and Critic and Other Essays*. Ed. Arthur Kahn, Merlin: 110-148 and Epstein, "Magnification and Other Writings," *October* 3 (1977): 9-25. For Lukacs, literature which "simply picturesquely describes" via an observational, distanced and static perspective is far less "interesting" than a narrative literary practice that attunes readers to characters, plot, and thus politics via the cultivation of proximity and an emphasis on action (111, 123). And Epstein, of course, has condemned what he suggests is the distanced, observational, and descriptive perspective of the picturesque—"the recommended points of view, the horizons of the Touring Club"—as "a big zero. . . The picturesque in cinema is zero, nothing, negation" (11). Accounts of the picturesque's regulatory history abound within this field; see, for example, Nancy Armstrong's reading of the picturesque as a visual pedagogy in *Fiction in the Age of Photography* (2002), Ann Bermingham's "System, Order, and Abstraction: The Politics of English Landscape Drawing around 1795" (1994), and Stephen Copley's *The Politics of the Picturesque: Literature, Landscape and Aesthetics Since 1770* (1994).

27 Ecological historians have often focused on this fact in well-researched accounts of the field; anthropocentrism is of course a presiding value of the field, and controlling the futurity of human well-being is (and remains) one of its most compelling pleas for funding throughout the 20th century. See, for example, Sharon Kingsland's *The Evolution of American Ecology* (2005), Frank Golley's *A History of the Ecosystem Concept: More Than the Sum of its Parts* (1993), and Greg Mittman's *The State of Nature: Ecology, Community, and American Social Thought, 1900-1950* (1992), all of which frame the methods and theories of ecological science as distinctly linked to environmental control and regulation. Peder Anker's *Imperial Ecology: Environmental Order in the British Empire 1895-1945* (2001) also participates in this vein, in the only extended treatment of Britain's specific contributions to the science. In the environmental humanities, ecological science has been largely understood in these terms, and seldom dissected: Morton's quick dismissal of ecological science in *Ecology Without Nature: Rethinking Environmental Aesthetics* (2007) as a reinforcement of anthropocentric holism is a case in point (102).

science histories.[28] These efforts have not paid close attention to the aesthetic and educational commitments of ecology as it defined its parameters and popularized its field, making use of twentieth-century media environments to diffuse ecological thinking among varied audiences. To grasp what is going on here, we need to take a more considered look at both traditions' intellectual values, cognitive prompts, and methods of fieldwork, as well as the modern media environments that undoubtedly shaped this confluence.

The chapter makes this case in two parts, focusing on Arthur Tansley's archive. First, I identify interest as the critical ingredient to Tansley's formulation of the ideal scientific thinker, putting his treatises on ecological education and his first major work, *The New Psychology and its Relation to Life* (1920), into conversation with each other. Published during Tansley's hiatus from ecological research following a disciplinary dispute that I will outline in the following section, *The New Psychology* "obtains its material from the whole field of mental life," as Tansley describes it (14), mapping the author's interpretations of the rangings of psychoanalysis into a text that became popular among modernist circles, including the Bloomsbury Group (Anker 205).[29] For while Tansley brought ecological thinking to Britain thanks to his translations

[28] Lars Spuybroek, for example, labels his picturesque as *ecological* by grounding the Ruskinian tradition within the vitalist materialism of Henri Bergson, William James, and of course, Charles Darwin, but his work remains situated within Ruskin's nineteenth century, and does not explore the presence of the picturesque within a specifically ecological science. See Chapter Four of Spuybroek's *The Sympathy of Things: Ruskin and the Ecology of Design* (2011). Heidi Scott's *Chaos and Cosmos: Literary Roots of Modern Ecology in the British Nineteenth Century* (2014) has come closer, suggesting that the ecosystem concept is a "picturesque" inheritance of romantic poetry's squared-off, parcelled-out views, citing the work of William Gilpin, the eighteenth-century popularizer and theorist of the picturesque (96). Scott's "ecological picturesque— the framed, synergetic system rendered beautiful by its diversity" is apt in that it also notes how ecosystemic thinking is defined by both real and imagined landscape isolates, and ecology thus operates somewhere between material observation and experimentation and theoretical exploration (180). Even still, Scott's focus on romantic poetry doesn't quite allow us to see how a series of debates surrounding information processing in the theorization of the picturesque echo the data processing and collection methods of a modern ecological science as it struggled to define its experimental fieldwork.

[29] Modernist studies readers will be quick to associate Tansley's surname with Virginia Woolf's omphaloskepsistic house guest in *To The Lighthouse*, Charles Tansley, and Laura Cameron has suggested that this character is a cunning caricature of Arthur Tansley ("Histories of Disturbance" 11). However, the archival record doesn't quite confirm this link; Arthur and Charles share, however, a sense of thwarted intellectual ambition, particularly at the time of *To The Lighthouse's* publication. As I will argue in Chapter Two, Arthur Tansley's influence is more keenly

of Eugenius Warming's work, he was also incredibly influential in bringing Freudian psychology to Britain and its universities.[30] The fields of psychology, in which Tansley considered himself "merely an amateur," and philosophy, in which he was "not even an amateur, but an ignoramus" were lifelong intellectual pursuits, and positioned him in conversation with a variety of important modernist thinkers in this regard, including Freud, with whom he studied, the Nobel-prize winning neurologist Charles S. Sherrington, and more out-of-the box theorists of mind, including Frederic Myers, the aesthete Vernon Lee, and the occultist Dion Fortune (Violet Mary Firth) (Tansley, "The Temporal Genetic Sequence 614).[31] *The New Psychology* allows us to see the importance of interest to Tansley's model of cognition, providing critical context to the consistent, if easily overlooked, appeal to interest-based teaching and learning throughout his writings and speeches on ecological education.

In the second section, I identify how both modern ecology and picturesque aesthetic history share a set of information processing practices that require and produce interest, namely, by attending to plant life not only as data points on a map, but as active agents of material becoming. As we will see in the sections that follow, ecological science's earliest disciplinary debates reiterate the very question of aesthetic training that defines Ruskin's notion of picturesqueness. Is ecology concerned with capturing the minute particulars of individual organisms, postulating their function, or does it document the general formation of the field? The

felt in the articulation of women's cognition in this novel, and their engagements with environments and ecosystems.

30 See Laura Cameron and John Forrester's *Freud in Cambridge* (2017) for a thorough history of Tansley's involvement in Freudian psychoanalysis.

31 I defer to and thank the one existing biography of Tansley by Peter Ayres, *Shaping Ecology: The Life of Arthur Tansley* (2012) for these insights, although archival research revealed both the Lee and Fortune connections. A small, hand-written note in Tansley's archive suggests that he was reading Lee's *Proteus, or The Future of Intelligence* (1920). See also Dione Fortune's *The Machinery of the Mind* (1922) for which Tansley wrote the introduction; he judged the book "not only substantially sound and accurate, but essentially sane and well-balanced" (7).

documentary methodologies of ecological field work and the picturesque put particular informational data points into conversation with in-formational "guiding lines" within plant communities and ecosystems, achieving this association by prompting interest in both researchers and viewers. I situate the picturesque, then, within the history of ecological data collection, suggesting its position as a progenitor of modern ecological thought. Indeed, many of the eighteenth and nineteenth century texts noted by modern ecologists as representative of a turn towards the ecological point of view, including Gilbert White's *Natural History of Selborne* (1887) and Alexander von Humboldt's *Personal Narrative* (1814), also participate in the picturesque project of generating interest in environments as they change over time. When Tansley harnesses picturesque aesthetics to teach ecological epistemology, then, he does so as a modern thinker in conversation with modern scientific, psychological and educational paradigms, as well as a reader and viewer steeped in the long-standing attachments of environmental documentation to picturesque aesthetics.

The chapter concludes with a return to *Oaks and Oakwoods* and the popular edition of Tansley's celebrated master-survey of British vegetation, *Britain's Green Mantle* (1949) to propose one reason why this history of ecological thinking has often remained unnoticed. I suggest that certain habits of information processing associated with mechanically reproduced image-making threaten to decenter the ecological picturesque's in-formational orientation. How different media animate information differently becomes a critical question here, as documents describing ecological change secure, and fail to secure, our precarious interest. But if some forms of mimesis fail to secure ecological interest, I also show how Tansley's experiments with mimetic representation solve for this problem by adopting practices consistent with those of aesthetic modernism. Consciously or unconsciously, ecology updates the picturesque as a

descriptive practice suitable for documenting modernity's environments in ways that become legible as aesthetic modernism, and which will also find their way into select modernist circles.

New Phytology, New Psychology: Interest as Ecological Thought

Ecology would look very different without the figure of Arthur George Tansley, the celebrated British ecologist whose work as a field researcher, translator, educator, and organizer helped define the field as the study of "organisms in their homes," to use his consistent and humble phrasing ("What is Ecology" 6). Despite his stature within the discipline as the "shepherd" of modern plant ecology and the co-coiner of the ecosystem concept, to use Peter Ayres words, Tansley's work remains relatively unknown to modernist studies, despite the fact that his own wide-ranging intellectual interests—and the science for which he tirelessly advocated—were situated within a familiar, if diverse, network of modernist and late Victorian thinkers. The product of a liberal education at Highgate School, University College London, and eventually Trinity College, Cambridge, Tansley was also exposed to the progressive pedagogies of the Working Men's College of which his father was a very active patron; the senior Tansley took drawing lessons with Ruskin during his tenure at that institution (Ayres 25). Within the sciences, Tansley's social and intellectual circles included the Huxley and Darwin families, Herbert Spencer, for whom he provided editorial assistance on the late-coming and much-labored *The Principles of Biology,* the colorful Ray Lankester, whose teaching he encountered at UCL, and Bertrand Russell, a life-long friend with whom he boarded while at Cambridge.[32] As a botanist, Tansley worked to bring together ecologists from all over Europe and America—

[32] I am indebted to Peter Ayre's rich and solitary biography of Tansley's life, *Shaping Ecology: The Life of Arthur Tansley.* John Wiley and Sons, LTD, 2012.

indeed, his pre-war International Photographic Expeditions were critical in introducing ecologists to each other, and in circulating teaching and research strategies.[33] After the publication of his *Aims and Methods in the Study of Vegetation* (1926), Tansley was appointed as Sherardian Professor of Botany at Oxford in 1927, a post that he held for ten years, giving him the platform to significantly shape an ecosystemic approach to plant science among Oxbridge institutions. Upon his retirement, Tansley continued to publish popular ecological syntheses of his academic works, serve on the board of the Field Studies Council, and advocate for landscape conservation. Knighted in 1950, Tansley was heralded as "the pioneer of the modern ecological approach to nature conservation" (Scheail n.p.).

Historians of ecology and biographers tend to note Tansley's socially-oriented vision for scientific research as his primary legacy, demonstrating his role in linking ecological science to imperial projects abroad and careful land management practices at home. His work undoubtedly contributed towards these efforts, as Peder Anker has carefully shown.[34] But he also advocated strongly for the "disinterested pursuit of knowledge" that, if it "were to cease the structure of science would cease to grow and the springs of all fundamental advance in technology would be dried up," as he states in his Herbert Spencer Lecture, delivered at Oxford in 1942 ("The Values of Science to Humanity" 22). Within the context of the Herbert Spencer Lecture, this reference

[33] Tansley was corresponding with American ecologists Federic Clements and Henry Cowles in organizing the 1913 American Phytogeographic Expedition, for example, which started at the New York Botanical Garden and then traveled Northwest by train to Chicago, the Great Lakes, Minnesota, the Rockies, Salt Lake City, Seattle, Yosemite, San Francisco, and then finally the Carnegie Desert Laboratory in Tucson. Many participants then traveled home to New York via a southerly route, passing through the American south as well. See Arthur Tansley: Papers: International Phytogeographic Excursion, USA, August and September, 1913. File G, item 4. Arthur Tansley papers, Cambridge University Archives.

[34] Anker has worked to redefine Tansley's ecological project within the social psychology and political theory of his moment, interrupting a common historical misreading that his ecosystem concept was an effort to lend the precision of hard sciences like physics, chemistry, and mathematics to ecological science (8). Rather, Tansley's ecology was influenced by psychology and social psychology, and he envisioned a future for the field that would solve problems of global land management at a variety of scales (110). His imperial ecology was as much about directing a social program of environmental conservation and awareness as much as it was about organizing a scientifically-sound program of resource use across the British empire.

to the "disinterested pursuit of knowledge" should be understood in specifically economic terms, for as Tansley's biographers consistently suggest, he was a staunch believer in the productive potentials of a scientist's interests, attachments, desires, dreams, experiences, prejudices, and environments in scientific knowledge work. As this chapter recounts, Tansley was deeply skeptical of the performance of disinterested, scientific objectivity, even suggesting that objectivity "is really only an aggregate of subjectivities" ("Value" 8).

In many ways, interested epistemology and interesting aesthetics underpin Tansley's educational and psychological documents, if not always overtly. The Spencer lecture, for example, makes an effort to recuperate *curiosity* as a powerful scientific affect, rescuing this experience from its associations with power and control—"'curiosity is a sublimation of the desire for power' is just psychological nonsense," Tansley proclaims—by attaching it to the subtle word choice and epistemological patterning of interest: "curiosity is the most general concept under which both types of scientific interest—interest in environment and in working mechanisms—may be brought," he goes on to say ("The Values of Science to Humanity" 18). Moreover, curiosity "must be regarded psychologically as part of the primary effort of the organism to put itself into a satisfying relation with its environment. . . . Curiosity is itself a primary instinct and antedates any possible manifestation of the 'desire for power'" (19). There is more to unpack concerning the relationship between interest and curiosity here, and I parse their unique attachment in Chapter Four; here, as in the work of Jean Painlevé, interest slows and loosens curiosity's attempts to organize and amass data. For now, I simply want to assert my contention that Tansley's understanding of the ideal scientific, ecological thinker is an *interested* thinker. This claim is suggested if not directly addressed by Tansley's historians. Both Ayres and Anker describe Tansley's epistemological and ontological values with some characteristically

interesting markers; Tansley is consistently framed as an "odd mixture of idealist and materialist," as Edith Clements, the wife of American ecologist Frederic Clements described him, and his forays into philosophy and psychology throughout his life echo this description (Ayres 23).[35] Indeed, Tansley's articulation of the knowledge work of "pure science" appears distinctively interesting, taking on a vital, vegetal quality: "Science indeed resembles a living organism more than a fabric: it is like a vigorous tree, constantly making fresh roots and new shoots, while some branches die and are cast off" ("The Values of Science to Humanity" 10).[36]

Ecology's attachment to interested thinking and feeling, however, is much more evident within the discipline's first attempts to establish itself as a distinctive methodology within plant science in the early 20th century, and particularly, how to define the unit of measurement of a properly "ecological" analysis. Scholars agree that although the term, *ecology*, was coined by Ernst Haeckel in 1866, it wasn't until the Danish botanist Eugenius Warming adopted the term to describe botany that it became attached to any specific scientific enterprise.[37] Warming's text prompted two competing interpretations of ecological study. On the one hand, ecology was adopted by the school of morphological botanists, reinforcing the physiological examination of plants largely without surveillance of the habitats and landscapes from which they were

35 Tansley was particularly active in the Magdalen College Philosophy Club at Oxford, as he was developing the ecosystem concept; at the time, the club was comprised of a group of intellectuals debating the nuances between idealism and materialism, including the Nobel winning neuroscientist Charles Sherringham as well as J.R.R. Tolkien and C.S. Lewis. Tansley tended to fall on the side of materialism, but as his archive suggests, this particular orientation was not altogether strict (Anker 137).

36 Tansley goes on to describe science itself in similar terms: "As scientific knowledge and theory become increasingly complex all sorts of cross-connections between different departments reveal themselves, new branches arise, occupying hitherto unexplored ground between older fields, and others cut across the old boundaries and take their material from several such fields" ("The Values of Science to Humanity" 13).

37 This observation is so well-rehearsed within ecological histories that it scarcely bears noting here; Kingsland, Mittman and Anker all note this trajectory, and Ayres places Tansley at a crucial position within this history, as a primary translator of Warming's texts (17-19). To this list, I would add Gregory J. Cooper's comprehensive philosophical analysis of the term, ecology, *The Science of the Struggle for Existence* (2003), which features a careful narrative of ecology's conceptual roots in the nineteenth century. Cooper, however, doesn't assess plant science, an odd move as British ecology developed first as a botanical fieldwork practice.

collected. On the other hand, and especially under Tansley's influence, ecology was attached to the new approach of plant geography, which developed surveying methods for observing how plants operated in communities and in response to topographical, geological, and meteorological change. Was an ecological study focused on the minute physiological detail of a particular organism, or was ecology concerned with the general form of the field? The competing translators of Warming's text in Great Britain—Tansley and the Scottish morphologist, Isaac Bayley Balfour—began a brawl over this question that lasted throughout the early years of the discipline and briefly banished Tansley from professional advancement as an educator and researcher in the Oxbridge biology departments. And this debate positioned notions of interested thinking and feeling as critical to the discipline's knowledge work and practices of documentation.

"The Reconstruction of Elementary Botanical Teaching" published in the December 1917 issue of *The New Phytologist,* the journal Tansley founded to forward a geographical approach to botanical study, suggests that interested thinking and feeling played a critical role in the terms of this debate.[38] The article—now famously nick-named "The Tansley Manifesto"— makes a bold, and at the time, acutely controversial claim: "We must put an end to the divorce of elementary training in the study of function from the general study of plant life," the authors argue, "a divorce which will necessarily continue while general courses in elementary botany are planned primarily on morphological lines" (243). These were provocative words among the plant science community, and the paper gets even more prickly from here. The authors suggest that morphology's curricular prominence endangers the discipline for two related reasons. First, by failing to put specialized physiological observations into relation with other important aspects of

[38] A co-authored document signed by a handful of botanists based at University College, London.

plant life, including climate, habitat, and competitive species, morphological study confuses the matter of what knowledge is essential botanical knowledge—or "vital" as the Manifesto authors describe it—and what is useful only for the specialist (243). It doesn't approach the many important questions of plants as they live in the world, instead focusing on "the endless facts of structure and their interpretation from the phylogenetic standpoint" accompanied by a "discussion of function which is often limited to a crude Darwinian teleology" (242). At its worst, morphology and its instruction, "suffers from a sharp isolation from the general study of plants, and tends to become excessively academic—often a somewhat dreary catalogue of the results of inconclusive experiments, and in the laboratory a series of exercises in test tube reactions and in the use of standard pieces of apparatus" (243).

The Manifesto authors' word choice—"endless facts" and "dreary catalogues"—suggests that this issue of ecological data collection and management is also an issue of precarious interest. Morphology, per the authors, was attractive only to a few, and difficult to advertise as an exciting and diverse field of study, the practical ramifications of which they are quick to note.[39]Pointedly reproving a small group of morphologists, including Balfour, who took much issue with this attack, and held a life-long grudge against what he termed Tansley's "botanical Bolshevism," the authors suggest that while morphology could certainly be interesting and useful, its focus and instructional style was not applicable to the majority of botanical inquiries (Anker 22). But appeals to interest (and accusations of boredom) were not simply marketing

39 The authors cite the all-too-familiar problems of academic funding that accompany low enrollments: a too-specialized content area, presented in a lackluster way, fails to recruit the variety and quality of students to plant science that the field craves, and the lack of attention to practical application leaves those who do study botany dangerously under-prepared for work outside of the university. In turn, university departments retain less funding, and professorships are sparsely compensated ("Reconstruction," 241). Peder Anker has helpfully illuminated the labor issues surrounding the Tansley Manifesto in *Imperial Ecology*; couched within the context of the Bolshevik Revolution, the manifesto took advantage of this political context to challenge morphology's curricular prominence (21).

ploys designed to draw students away from morphological botany and to challenge its role in the university, although this was certainly on the mind of phytogeographical botanists. Throughout Tansley's writing, the cognitive and affective experience of interest is critical to understanding ecology as an "attitude of mind" invested in documenting the in-formation of plant communities and landscapes (Tansley and Evans 32). More importantly, morphology didn't produce the kind of thinking that ecology-as-plant geography, the future of plant science, required: "Morphological botany does not attract the type of mind that wants a deeper insight into the working of plant processes or into the part which plants play or can be made to play in the economy of the world," the Manifesto authors assert, "and it does give an unfortunate bias to the type of mind whose activities can be turned with equal success to the tracing out of an obscure phylogeny or to the solution of a problem in ecology or biochemistry" (243).

Here, ecological thinking is the ability to examine a particular object's detail *and* to attend to how an object is formed within the confluence of forces from which it emerged. It should not be at all surprising then, that at its core, the morphology/plant geography debate can be understood as a disagreement about information in reference to both quantity and quality. The authors put it this way: "The content of modern botany has become so vast that the student's attention and energy are dissipated and he gets very little thorough knowledge of anything. On the other hand it has been held that one of the great virtues of the subject lies in these very qualities of variety and extent, which provide freshness of interest and breadth of outlook" ("Reconstruction" 241). If information abundance is the blessing and the curse of botanical study in general, then the purpose of the Tansley Manifesto is to handle the increasingly expansive scope of the field by reorienting its values concerning what information counts as "ecological" as well as how to harness this revaluation for the purposes of instruction and marketing. Producing

interest among students and the general populace is not only critical to the field's survival as a discipline, then, but required *by* field work itself. New phytology required interest's ability to attend to data and form, to particularity and generality, in order to map the form of the field.

The Tansley Manifesto was not good for Arthur Tansley's career in the short term: the ensuing debate prevented his advancement through university appointments until Balfour's retirement in the late 1920s (Anker 22). In the meantime, he continued to edit *The New Phytologist*, while pursuing his secondary interest in psychoanalysis, producing *The New Psychology and its Relation to Life* (1920).[40] The text, a bestseller printed twice upon its release in 1920, provides some insights into Tansley's references to interest throughout the manifesto, and indeed, positions interest as critical to associational, relational knowledge work—the core of ecological epistemology. The evocatively titled section, "By-ways of the Libido" makes this plain, articulating how interest guides the development of complexes, or, to put it differently, the infrastructure of psychoanalytic cognitive modeling. In Tansley's view, a complex is a "well-known fact of association between mental elements, a fundamental condition of all psychical processes" and includes a characteristic, if evolving, architecture within which the actions of memory and reasoning operate; indeed, it is only through the established pattern of complexes, that we have the "capacity both to act appropriately and to think systematically" (47). The larger network of complexes, then, is both enduring and protean: complexes are "shifting, overlapping, and often continuously extending groups of mental elements, though they have fixed cognitive and affective centres" (56).

[40] Tansley's role in bringing psychoanalysis to Britain has been carefully drawn out by John Forrester and Laura Cameron in the recent volume, *Freud in Cambridge* (2017). Tansley studied with Freud in Vienna between 1922 and 1923, prompted by a dream—as well as his troubles advancing through the hierarchies of university science (16-17). In addition to publishing *The New Psychology* and undergoing analysis, Tansley also undertook a short foray as a practicing analyst (Forrester and Cameron 25). And Tansley was an influential founder of the Psychoanalytic Group at Cambridge in 1925, serving as an organizer and host for many of the research group's meetings (Forrester and Cameron 426).

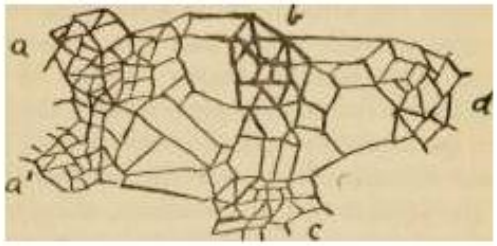


Figure 3: Pencil illustration: “Surface” View of Mental Complexes, illustrated by ecologist Arthur Tansley

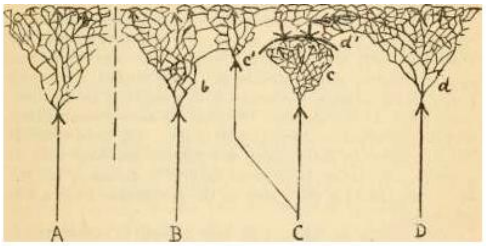


Figure 4: Pencil illustration: “Sectional” View of Mental Complexes, illustrated by ecologist Arthur Tansley

Figure 3 maps a section of complexes, a, b, c and d, the structure of which we can see more carefully in Figure 4. The pattern is highly irregular, if characteristic; Tansley’s complex is imagined as sets of three- and four-sided shapes, simultaneously set within and branching out from each other. Tightly packed complexes are shaped by the meddling of triangles and quadrilaterals, the edges of which connect to create uneven pentagons and heptagons. It is both characteristic—the pattern operates throughout the image—but irregular, in that no two shapes are symmetrical. These dense tangles loosen at the edges, reaching towards other complexes, or towards nothing at all; the edges of this pattern are also frayed, sending runners into other (unpictured) sections. We should note the caption carefully; this image demonstrates a section at one moment in time, the implication being that this pattern will change, and even before its drawing is finished. In Figure 4, we see the lateral view, denoting the roots of the loosely linked branching pattern of Figure 3, the inchoate instincts that, attached to external stimulus, generate this canopy. Here, we see a life form that grows because it has roots: it takes up sustenance, it

photosynthesizes, and it bends in response to the matter of the world with which it is always in touch. Tansley means this quite literally: "In the creation of complexes, the instincts in some form or other are the creative forces, the perceptions are the materials with which instinct work, and the complexes are the resulting mental structures" (Kindle Locations 877). Complexes are formed via an exchange between instinct and stimuli, and like interest, encourage the perception of a material actuality to mingle with the shape of our thought. Mind is matter here—it has mass and takes up space—but it also, and essentially, *lives*: it grows into new, if coded, forms, always familiar, but never the same.

Tim Armstrong's suggestion that Tansley's complexes appear to pattern the mind upon notions of biological complexity is apt here; in his reading, notions of biological complexity "displace[d]. . . the human into what might be called context," and thus rearticulated human perception and being as related to environment, particularly in the 1920s (226). But the complexes themselves echo the epistemology of interest here—and take on characteristically interesting aesthetic forms, composed of subtle reiterative variations on a familiar thematic structure—suggesting that one key to a modernist decentering of anthropocentrism lies in the experience of being interested, cognitively, affectively, aesthetically. Indeed, Tansley even makes room for interest in this discussion of libido, citing Claparedé's suggestion to Jung "the use of the word *interest* as an equivalent" (75). "This is a useful and appropriate word," Tansley suggests, "but it suggests rather an attitude of mind towards the goal of a conation than the actual psychic energy involved in conation, and is therefore not wholly suitable to replace libido, which gives the suggestion of *force.* Both terms may be retained in their appropriate uses" (75).[41] While Tansley echoes the language of other theorists of interest here in defining this cognitive and

41 The title of this section—"Psychic Energy and the Libido (Interest): The Equilibrium of the Mind"—does just this: loosely connecting these terms, but keeping their difference parenthetically marked.

affective state as an "attitude of mind" that leads specifically towards the achievement of a goal, his later word choice pairs this goal-oriented attitude with a more fluid and foundational understanding of interest operating in his theory of mind, positioning interest as a forceful interlocutor that creates a complex's bendings and branchings.[42] As Tansley states, "The very large and important class of complexes formed by our occupations and intellectual interests will probably form the centre of one of the most marked of his mental complexes" (67). Interests organize structures by channeling affective attachments, weakly or strongly bonded. Tansley puts it this way: *"*The character and conditions of the work itself contribute the specific element which every complex-affect carries with it. A man's hobby often carries an affect of much higher intensity than his work, because it is taken up and continued of free will and the associated complex will generally have a strongly pleasurable affect. Consequently hobbies are likely to be dominant complexes, continually annexing alien elements and penetrating more and more of a man's life" (67). Interest, then, is critical within Tansley's theory of mind, and his vegetal, cellular representations of its handiwork encourage readers to attend not only to the mind's surface textures, but to the guiding lines of cognition, emotion, perception and material stimulus that root the branching architecture of the living self.

Patterned in this way, interest comes to define Tansley's ideal scientific mind, what he terms, "constructive scientific thinking" (152). This definition comes in an unexpected location, a subset of the chapter I have been exploring titled "Dreams, Mind-Wandering, and Crystal-Gazing:" indeed, Tansley articulates interest's power in shaping scientific study not by appealing

[42] Arnold, for example, describes interest and attention as attitudes in a psychosomatic sense, that is, as a physical posture and a cognitive and emotional orientation. Notably, these physical and emotional attitudes tend to take the shape of stimulus itself, as it leaves traces in the physical and mental body: "Situations which excite an emotion leave traces which are readily revived when the emotional attitude is again taken even if for different reasons. Revivablity may be caused by reappearance of the situation itself, or, according to the law of association. . . by any other situation which has common elements, or which is objectively or *formally* connected with it as suggested in the forms or relations of association outlined in a section above (130, emphasis mine).

to strict rationalism, which he argues is "a great deal rarer than most people imagine," but by noting the automatic, unconscious, and affective character of scientific inquiry (68). Here again, interest sets the mind down "side lines of association which branch off from the main thread which it is our object to maintain. . . Especially if greater interest attaches to these side lines it is difficult to prevent consciousness from wandering down them" (149). But quality scientific work, and also "all artistic creation," is not about regulating attention as much as it is pursuing the branching pathways towards which interest directs our footsteps (152). "In original or quasi-original thinking," Tansley states, "the exploration of side lines is often exceedingly useful or even essential to progress, but that is rather a different case, for there is often no sharply defined 'main track' to which our purpose is confined" (149). Indeed, these flashes of inspiration are "arrived at by allowing the mind to wander freely around the points of the problem to be solved," which must then be "related to all the relevant knowledge available to consciousness" (152). Provoked by the branching pathways of cognition that interest generates, scientific knowledge work first and foremost partakes of a *dérive* through the fields of the mind.

The New Psychology reveals a wrinkle in ecology's intellectual history that positions its educational objectives as committed to a knowledge work embracing the wandering, if also occasionally arresting, cognitive and affective experience that interest is. Ecological historians have tended to understand *The New Psychology* as a source for Tansley's later contributions to ecological science, positioning it as fertile ground for the generation of ecological field work methods and theoretical concepts. Anker has suggested, for example, that Tansley's Jungian model of energy flow is predictive of the ecosystem concept (23-28), and Laura Cameron has also suggested that the methodological techniques of psychoanalysis influenced Tansley's research methods on Wicken Fen, noting how the series of cuttings conducted in order to better

perceive plant succession mirror the psychoanalytical probing of repressed psychosis ("Histories of Disturbance" 12). But reading *The New Psychology* in conversation with Tansley's educational documents demonstrates a consistent pairing of interested cognition, what Tansley describes as a fluid, if also focused, "attitude of mind" in *The New Psychology,* with the pedagogical methods and outcomes of ecological teaching and learning. As Tansley and his collaborator, secondary teacher E. Price Evans, remind their readers in their 1946 text *Plant Ecology and the School*, ecology is "much more than a branch of biological science: it is an attitude of mind, which should inspire both geographical and biological teaching" (32). Upon the success of *The New Psychology* and Tansley's triumphant return to plant science in the late 1920s, Tansley situated an interest-based pedagogical program at the center of modern ecological science. His 1927 speech to the Oxford Department of Botany is a case in point. In this speech, Tansley finds little pedagogical value in traditional lecture-and-reading strategies that focus on delivering big-picture botanical and ecological concepts, a method which "is hostile to the true spirit of research, because it saps initiative and tends to kill that aggressive curiosity which is the driving force of all effective investigation" ("The Future Development" 15). On the contrary, he insists upon an opposing stratagem: that a truly ecological knowledge base begins by allowing students to cultivate interest in the unique organisms and entities that touch students in the field, developing a basis of biological knowledge upon which larger concepts can be subsequently mapped:

> If, on the other hand, we make no effort to cover the whole or even the larger part of the vast field, but content ourselves with comparatively few topics, striving always to penetrate as deeply as may be into the subject, leading our pupils, as has been finely said, along the border-line between the known and the still unknown, then we are doing the

> best we can for them—we stimulate enthusiasm and curiosity, we bring out latent powers, we educate in the proper sense of the word. It matters little from this point of view what subjects we teach, so that we are really interested ourselves and succeed in interesting the students. ("The Future Development" 16)

Here Tansley reiterates Dewey's constructivist account of interest's knowledge work, and proceeds to define the ideal ecological classroom as one that includes many of the pedagogical techniques designed to prompt interest circulating throughout the institutional educational psychology of his moment.[43]

Interest's uniquely tactile character is a distinctive marker across Tansley's pedagogical edicts, particularly in the 1946 manual for secondary school instructors, *Plant Ecology and the School*: "Teach always about the things you can see and handle, not about 'subjects,'" Tansley admonishes, "this gives a useful concreteness to teaching and is most likely to interest pupils" (Tansley and Evans 15). Good ecological study, according to the authors,
"should retain the best features of the best 'nature study' teaching. These are spontaneity, general lack of school conventions, and the intense interest often aroused in the pupils" (90).[44] Indeed, the instructor's ability to "create such lively interest" is critical to ecological study, and the

[43] The extent of his reading among institutional experimental and behavioral psychology is more difficult to trace than his psychoanalytical influences, but by his own admission, Tansley's interest was arrested (if only loosely) by the pragmatist theories I have brought to bear here. Of William James's *Principles,* Tansley states: "I was mildly enthused by the work of William James, particularly by the *Principles,* and I read or dipped into various other psychological works, but I made no serious study of the subject" ("Temporal," 614).

[44] See, for example, Tansley and Evans's suggestion that interested ecological thinking can blur the lines between leisure and work, a rhetorical move that undoubtedly aims to prompt more interest among nascent ecologists in this field of study, and thus, to help conduct the massive amount of work required in ecological survey: "In the study of the local area, much of which has often to be done in spare time, the teacher's real interest in nature is indispensable. The local area must be a playground as well as a working ground. Pupils have been known to give up much of their leisure to help in the completion of a local survey, simply because they wanted to. Others, interested in farming, have made surveys of the weeds of arable land on the home farms. Others again have bought one-inch ordnance maps of a district to be visited during holidays, and have returned with notes. // In one or another of such ways real interest in the countryside may lead, and has led, to spontaneous simple research work on the part both of pupils and teachers" (90).

authors feature a number of specific interest-based pedagogical strategies: hands-on, experimental praxis;[45] reframing the "work" of learning in terms of "play"; direct observation; a general disregard for both standardized testing and textbook-based instruction; and, of course, training and hiring teachers who are also deeply interested in their material (Tansley and Evans 90-91). The consistency of interest-based pedagogy across Tansley's field notes, professional publications, popular manuscripts, and public lectures is remarkable: interest-based learning is the basis of *all* ecological study, including vocational and amateur nature study. Foresters, for example, benefit from ecological training especially when taught complex concepts in relation to "some type of vegetation about which even the beginner knows something" ("Ecology in the Training of Foresters" 1-2). For younger learners, Tansley suggests that harnessing the sheer curiosity of childhood, often characterized by an attachment to "things," as opposed to "subjects," is an essential educational strategy for securing a biological knowledge base. Plants and animals are especially useful "things" with which to begin study, because "they are alive and they have personalities, so that they are far more vividly attractive to children than lifeless things. Teaching about them will thus have a different kind of appeal—emotion is involved, especially with animals, and this must influence the approach in an important way" ("The Teaching of Science in Rural Schools" 3).

For many early ecologists, then, to think ecologically was to be interested: to grow new knowledge in touch with the lively beings who, if only momentarily, arrest our roving curiosities with subtle allure. Visual pedagogies were critical to this project, as is suggested by the preface

[45] On experimentation, the authors state: "Field experiments should be undertaken for the definite purpose of *solving particular problems and not for the sake of performing experiments.* To make a fetish of individual experiment is merely to abuse a vitally important thing" (9).

of *Plant Ecology and the School.*[46] Tansley and Evans emphasize ecology's role in understanding and solving problems created by humans' interaction with their environment and its resources, as is evidenced by the authors' positioning of ecology as compatible with the geography curriculum (11). But aside from understanding the use-value of natural resources, an ecologically literate citizen will also be able to note "the inherent interest of the whole country scene" as well as the "incomparable beauty of much of it" (7). This statement might appear to separate a scientific project from an aesthetic one, suggesting that understanding problems of human activity within ecosystems and aesthetic appreciation of rural landscapes are separate concerns. But the following section demonstrates that this interesting aesthetic judgment, subtly attached to a description of ecological literacy, is critical to the long history of ecological field work methods: indeed, "if the work on vegetation is to find its proper place within the framework of local geography," the authors emphasize, "it is necessary first to envisage, as it were, the whole countryside in which a school or camp is situated and to distinguish within it the geographical regions into which it naturally falls….This picture represents a sufficiently diversified region affording wide scope for ecological work" (Tansley and Evans 33). Learning how to see the countryside as "sufficiently diversified" requires the ability to perceive slight nuances in pattern and form such that distinctions among arable lands, pasture, semi-natural woods and wooded monoculture, marshes and heath can be marked and their movements traced. An aesthetic that teaches interest, then, is a useful field work pedagogy for understanding ecology as the study of life forms' change over time.

[46] Shrewdly published just after the passing of the Education Act of 1944, which universalized secondary schooling and thus reached a much wider audience of potential British ecologists, this text argues for a "widened and deepened knowledge of rural things" if "future citizens are to become more intelligently conscious of our British countryside" (7).

In the next section, I argue for picturesque aesthetics as one such ecological category, positioning this long-standing visual pedagogy as critical for teaching scientists how to create ecological pictures. In reading Tansley's field work methods texts in conversation with seminal debates in the theorization of the picturesque, I identify a shared response to similar information processing issues in both sets of texts; in this way, modern ecology teaches us to see the picturesque as an ecological, documentary aesthetic, on the one hand, and an important modern ecological pedagogy, on the other. Putting particulate data into conversation with formal patterning, the ecological picturesque is an inherently interdisciplinary, experimental method of field work that emphasizes both the vitality of living landscapes and the handiwork of the researchers who document them. Marked by fragmentation and incompleteness, it is an aesthetic of biological complexity that, as Tim Armstrong has suggested, grounds a modernist commitment to "a form of environmental mapping; a place of dynamic interactions and a response to the human positioned between totality and local knowledge" (228). In this way, the ecological picturesque is a document of material becoming, and a document of how field workers wended their way (and dabbled) among forces both tiny and grand, forms both nuanced and generalized. For readers searching for answers about the role of humanity in the increasingly complex, varied, and nuanced picture of nature, the ecological picturesque taught an ecological subjectivity attentive to the unevenly colliding beings—human, animal, vegetal, mineral, meteorological—that shape British modernity.[47]

[47] Tansley and Evans are alert to the fact that landscapes, as signifying markers of modernity, defy nature/culture binaries and are thus composites of many collaborating agents: "Apart from the towns and factories or works which have locally destroyed the vegetation, the plain itself will be mainly occupied by pasture or arable with semi-natural woods or plantations here and there and fresh-water marshes and ponds (though many of these have probably been partly or entirely drained) in the lowest lying areas. The overlying sands, being less fertile, are likely to be waste or common land, occupied by heath or heathy grassland. The lower slopes of the hills are probably enclosed and devoted to pasture or arable crops, but different from those of the clay plain. These are very likely to be interspersed with semi-natural woodland, while the upper slopes are open pasture (rough grazing), either limestone or siliceous grassland, with heath or moorland" (Tansley and Evans 33).

Branchings: Interest, Ecology, and Picturesque Aesthetics

In addition to rooting modern ecology's turn towards phytogeographical study, interest and its precarious reputation was also couched among debates concerning the design and appearance of fieldwork methodology. How to frame plant geography as a professional, experimental science, and thus to make fieldwork compelling to a university system defined by a taste for experimental laboratory science, was a pressing issue for ecologists on both sides of the pond, as they worked to repackage their observational protocols as experimental frameworks. As Robert Kohler has argued, to obtain university funding, turn-of-the-century botany needed to develop a way of experimenting with nature's design (Kohler 34). But as Kohler also recounts, this effort was in part a project to rebrand the look of botanical field study, and the people who engaged in it (20). Like morphological botany, ecology also depended upon data collected by amateur natural historians, sportsmen, and writers and artists, wandering through fields and recording observations, guided by the productive vacillations of a sometimes secure and sometimes fickle interest. Often looking more like leisure than study, fieldwork needed to appear standardized, formalized, and able to control observational praxis, a task that seemed especially disconcerting to old-school botanists, whose "naturalist souls" were stirred by the contingency and surprise of unstructured, if detailed, field observation (Kohler 20). The 1904 article, "Methods of Surveying Vegetation at a Large Scale," published by Arthur Tansley and his mentor, F.W. Oliver in *The New Phytologist,* brings the flickering and sustained interests of field researchers into line with an experimental way of observing ecological change, while keeping the field itself as the primary site and agent of documentation.[48] It can be read as an effort to pin

[48] This article is a very early methods text, published just before Frederic Clements's seminal *Research Methods in Ecology* (1905).

down—but not to quell entirely—the enthusiasms of fieldworkers whose attachments made fieldwork both a powerful tool and an epistemological liability within university research communities.

In teaching this experimental field work methodology, producing and emphasizing interest, the article also helps to recuperate the information processing practices of picturesque aesthetics as ecologically engaged, and thus a form of ecological pedagogy. For modern ecology shares, and even in some cases clearly inherits, the questions of perception and representation that surround earlier aesthetic conversations among theorists and practitioners of the picturesque; namely, how best to document the detailed particulars and formal movements of nature. In many ways, the picturesque arose as a program for the perception and representation of information gathered in the field. As Nancy Armstrong has noted in her history of realism, for example, picturesque painting and drawing evolved as a way to train others how to perceive, experience, and design rural landscapes (52). Of course, ecologists and picturesque practitioners approach landscape observation and experimentation with different agendas: experimental ecologists were attempting to map and test how plant communities moved, shifted, and responded to each other and to other environmental factors, while picturesque practitioners turned to the forms, colors, and textures (and thus plant and animal communities and geological features) to define aesthetic experience beyond the art object. Looking at the history of the aesthetic, however, suggests that the distinction between mapping environmental characteristics and aesthetic experiences was often hazy for its practitioners, and particularly among debates about how the picturesque image handled information. As Nancy Armstrong has argued, the picturesque image brought notions of mimesis to the forefront of aesthetic theorization, as writers like William Gilpin, William Marshall Craig, and Uvedale Price debated about how closely a picturesque image should echo

the particular characteristics of its object: does this realism correspond with an ethos of mirroring, wherein the image's signs echo its signifieds? Or might this realism abstract the sign from the signified in order to generate something else, both in paint and in life (32)? These debates took on the language of scientific empiricism as Walter John Hipple has suggested (310).[49] And indeed, Gilpin's model, which is characterized by an attention to the "general shapes and relations which the several intersections of a country bear to each other" (Gilpin 64) was criticized by Craig for its "scientific" and "abstracted" instructional model (Bermingham 89). Gilpin's images are roughly hewn and loosely outlined, lacking in detail but attending closely to *form:* in the case of trees, for example, "the different shapes of the leaves, and the different mode of spreading its branches, give every tree, a distinct form, or character. At a little distance you easily distinguish the oak from the ash; and the ash from the beech. It is this general form, not any particular detail, which the artist is instructed to get by heart" (Gilpin 25). Form is the valuable data here, the precise rendering of which accomplishes the image's goal: the reproduction of the experience of happening upon a deliciously picturesque scene in the field. Moreover, some experimentation was encouraged in service of this goal: the artist can feel free to alter the foreground of an image, to "take up a tree here, and plant it there…pare a knoll, or make an addition to it…remove a piece of paling—a cottage—a wall—or any removable object which I dislike" (68). In making these concessions, Gilpin "does not mean to exact a liberty of introducing what does not exist," but simply argues for "making a few of those simple

49 The psychological inquiries that defined seventeenth-century explorations of aesthetic taste, for example, were defined by an "empirical" methodology that identified and defined aesthetic categories, including the beautiful, the picturesque, and the sublime, in conversation with both art objects *and* landscapes. "Since nature is prior to art both in our experience and in creation, and since nature is simpler," as Walter John Hipple explicates, "we begin with nature. . . In nature then, and increasingly in natural scenery—in the gilded colors of sunsets, the tangled intricacies of wooded glens, the formless might of stormy oceans, —we find our problems and data" (309). It is only after assessing how nature's forms structure aesthetic category that we can then begin to suss out the particulars of aesthetic "design and fitness" in comparison with nature's design (310).

variations, of which all ground is easily susceptible, and which time itself indeed is continually making" (68).

In contrast, Craig's strategy was characterized by strict mimetic standards, and "would be impervious to manipulation, change, and misunderstanding because it would be locked in a mirror-like relationship to the thing it represented" (Bermingham 92). For Craig, Gilpin's (slightly more) democratic perceptual pedagogy introduced a bit too much artistic fluidity—or scientific experimentation—into the articulation of British landscape, at the expense of its traditional beauty (Bermingham 92). Here, the valuable information of the picturesque scene to which the artist must attend is not the loose generality of form, but "those little details of circumstance, in which so much of picturesque beauty consists" (Craig 18). Indeed, it is getting these little details into the scene that produces the knowledge-work of this aesthetic experience: "imparting a perfect knowledge of the subject" (Craig 19). At issue here is the observational praxis of the artist, and the linked concern of how that praxis influences the intellectual work of the image: a focus on form structures an affect, while imparting detail structures knowledge. Should an image provide a "perfect knowledge" of a scene to remember it by, including all of its little informative details, or should an image make viewers feel as the artist felt, a feeling structured by its loose, mutable, in-forming?

Theorists of picturesque aesthetics debate, then, about how and whether to combine information and in-formation, thought and emotion, mimesis and abstraction in a documentary praxis that turns, always, to the field as a means of cultivating aesthetic experiences: critically, these debates are also about how to map the field in such a way as to enable that cultivation. Uvedale Price's landmark essay on the picturesque aims to unite these seemingly competing

aims, and it does so by suggesting that picturesque experiences echo the cognitive and affective character of interest. The following description of a picturesque tree is a case in point:

> Take a single tree only, and consider it in this point of view. It is composed of millions of boughs, sprays and leaves, intermixed with, and crossing each other in as many directions; while through the various openings, the eye still discovers new and infinite combinations of them; yet in this labyrinth of intricacy, there is no unpleasant confusion: the general effect is as simple, as the detail is complete. Ground, rocks, and buildings, where the parts are much broken, become fantastic and trifling; besides, they have not that loose pliant texture so well adapted to partial concealment: a tree, therefore, is perhaps the only object where a grand whole, or at least what is most conspicuous in it, is chiefly composed of innumerable minute and distinct parts.//To show how much those who ought to be the best judges, consider the qualities I have mentioned, no tree, however large and vigorous, however luxuriant the foliage will highly interest the painter, if it present one uniform unbroken mass of leaves; while others, not only inferior in size, and in thickness of foliage, but of forms which might induce some improvers to cut them down, will attract and fix their attention. (262-263)

Price responds to both sets of informational, epistemological, and representational concerns here: the tree that roots this passage is valuable, is *interesting*, precisely because its "general effect is simple, as much as the detail is complete." Importantly, the painter's attention to particularity and generality imbues picturesque images with interest by documenting how life forms change over time: Price's tree, like Tansley's oak, is one that comes into being and falls

out of form, which is interesting because its form is mutable and variable.[50] Moreover, the picturesque image is a vital object in its own right, operating as a visual standard for both perceiving and thus documenting this mutability, but also creating landscapes that contain it. Producing interest is, as both Gilpin and Craig suggest, a matter of tinkering with the design of the image, in paint, in earth. Planting a tree in either medium possesses a "great power of correcting monotony. . . so that even a dead flat may become highly interesting" (Price 262).

Critically, however, as Gilpin reminds his readers, this kind of tinkering should attend to and anticipate the potential changes that a landscape may experience. Picturesque images, then, feature forms at one point in their life, at one moment in their growth; they do not attempt to render the final word on a scene's actuality, because what makes it so affecting is its changing *form* over time. In other words, long before the coining of the term and the development of experimental mapping methods within ecological study, picturesque practitioners were documenting and creating speculative models of plant *succession*—or, the process whereby plant communities colonize territory in response to geological and meteorological change—in the paintings and drawings that taught many British citizens how to explore the field.[51] Tracking succession was critical work for modern plant ecology, and the fieldwork methods developed by Oliver and Tansley echo the epistemological and representational commitments of picturesque aesthetics in their design. "Methods of Surveillance at a Large Scale" is a case in point. The

50 Ruskin's noble picturesque— "the epitome of all that makes the Continent of Europe interesting" (28), operates in a similar vein: Hence, in a completely picturesque object, as an old cottage or mill, there are introduced, by various circumstances not essential to it, but, on the whole, generally somewhat detrimental to it as a cottage or mill, such elements of sublimity—complex light and shade, varied color, undulatory form, and so on—as can generally be found only in noble natural objects, woods, rocks, or mountains. This sublimity, belonging in a parasitical manner to the building, renders it, in the usual sense of the word, 'picturesque.' (40)

51 First tracked by Henry Cowles's experiments on the sand dunes of Lake Michigan, succession is one of ecology's earliest analytical objects, and indeed, gave plant geography its particular ecological bent. See Cowles, Henry Chandler. "The Ecological Relations of the Vegetation on the Sand Dunes of Lake Michigan." *Botanical Gazette* 27 (1899): 95-117.

article describes a mapping protocol—the method of squares and its more detailed counterpart, the gridiron method—that was designed to solve for problems of accuracy and data management caused by off-set mapping techniques, which over large, complexly populated areas struggled to track both the locations of distinct organisms as well as general geological and topographical formations.[52] The method of squares and the gridiron method remain accurate across a vast field, in that they map individual plots of 100 square feet as they are connected to each other. Researchers (two to three for this method, including one Surveyor, whose job it is to set the lines squarely in the ground) use grid paper (corresponding to 5 square inches per 100 square feet) to map each individual square, drawing first the physical features of the landscape with solid lines and then penciling in the dotted lines of plant associations or even individual organisms, if using the more minutely scaled gridiron method (25 square feet per 5 square inches). Errors can be easily corrected by the eye because the field is broken into a system of squares, points relative to each other, as opposed to a simple, and more easily interruptible centerline; should a stake be removed, it is much easier to replace in coordination with the rest of the grid. In short, the methods forge an identification of small individual spaces within their larger network: it is a "method of self-contained, but connected, units of area" (Oliver and Tansley 231).

The methodology articulated by Oliver and Tansley also shares an attempt to map and record change with Clement's quadrat, but these tools operate altogether differently for one essential reason: they examine a different landscape. While the quadrat was developed and tested

[52]The article also attempts to correct the foibles of off-set mapping, a strategy for larger-scale surveillance than the quadrat's 5x5 square, which fails across large, dense spaces, if for different reasons; this strategy establishes a baseline across the center of the area to be mapped, and then measures the distance between that centerline and external points by triangulating that point using right-angles to the centerline. It is accurate for small areas, but loses accuracy across large, complicated spaces, quickly devolving into a confusing nest of lines and angles. This is especially a problem when tracing succession, which requires mapping both physical features of landscape and plant populations: distinguishing elevation, for example, versus plant community becomes difficult in the geometry of lines that emerge. The centerline, too, can shift in the weather or simply be moved by the whims of "mischievous persons," an issue that a squared grid prevents (230).

on the rocky and sparsely populated terrain of the Rocky Mountains, the method of squares and the gridiron method were created on the salt marsh of Brittany's Bouche D'Erquy, a "flat or gently undulating" ground closely planted with a large variety of consistently successive grass populations. This salt marsh defied the quadrat's compartmentalized methodology: too much valuable information persists outside any one mappable square. And a salt-marsh is a much more protean landscape than a rocky mountainside, in that the coast's faster erosion and accretion patterns make succession a much more visible, and difficult to map, phenomena (Tansley, *Britain's Green Mantle* 230).[53] A single quadrat, then, would not be representative of the entire space, or even of a portion of a community. What was wanted was a method that could capture the salt marsh's minute, but significant particulars by allowing researchers to connect small mapped parcels at the correct scale, covering a large amount of space in a reasonable amount of time. The entirety of a landscape's botanical patchwork emerges in time, as opposed to after the fact and off-site, opening up room for errors in memory and scale. Here, ecological information emerges from data as fast as it is recorded. "The data surveyed at once take shape as a map in the field," Oliver and Tansley claim; these methods quite literally in-form data by building processing into collection.

53 The quadrat, developed by Clements at the University of Nebraska, is a case in point: a square plot, set over an expanse of space, the quadrat is "merely a square area of varying size marked off in a formation for the purpose of obtaining accurate information as to the number and grouping of the plants present" (Clements 162). the quadrat is primarily a tool for counting detailed bits of information. Observed over time, it also allows a researcher to track an area's gradual in-formation, the "alternation and zonation" of plant communities as they succeeded and receded (162).# Indeed, without the quadrat, "Changes, which would be otherwise unobserved and imperfectly recorded, are followed in the minutest detail and recorded with perfect accuracy" (163). The benefit of the quadrat was its transportability; easily plotted anywhere, on any terrain, the quadrat, a 5 foot square plot, could show small spaces without significant distortion caused by sharp elevation gains, and is especially useful for rocky, steep hill and mountain sides. Some of the most characteristic studies using quadrats are done on just this kind of elevation: the Colorado Rockies, and especially at or just below treeline, where vegetation is sparse, but where hardier plant communities push the limits of respiration (Clements 198). The quadrat faltered, however, on large scales and especially in closely-planted plots with several varietals working with and against each other. Clements got around this difficulty by arguing that a single quadrat was "representative" of the entire formation, but it remained inaccurate for mapping succession on more densely populated ground (163).

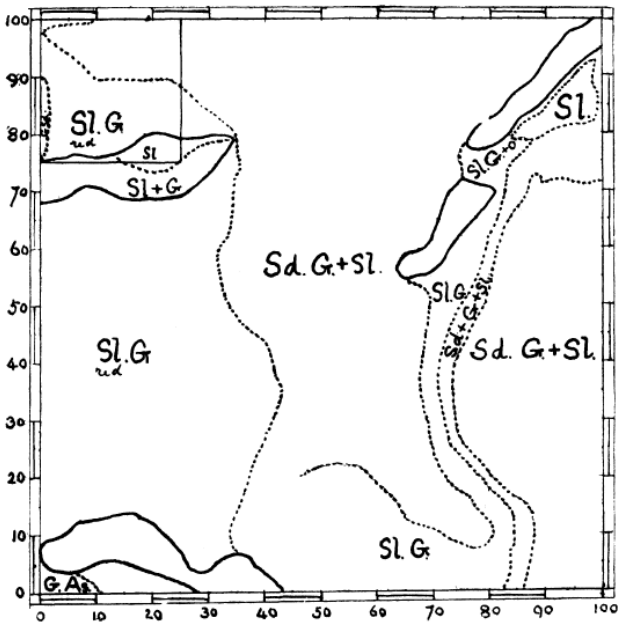


Fig. 78. Map of a square with 100-foot side on a scale of $\frac{1}{20}$. The small portion ruled off at the top left-hand corner is represented on a large scale by the gridiron method in fig. 80. The boundaries of the plant-associations are represented by dotted, the physical features by continuous lines. The scale round the edge of the map is marked in lengths of 10 feet.

Figure 5: Map: Excerpted map square from "Methods of Surveying Vegetation at a Large Scale," featuring branching lines indicating community boundaries and topographical features

Importantly, fieldworkers achieve this data processing by remaining attuned to the form of the landscape in advance of the mapping. Oliver and Tansley make this caveat: "it is probably not worth applying except in such cases as that illustrated, where there is a definite and considerable variation of the vegetation in the space of a few feet, in correlation with a similar variation of some one or more physical features" (236). As I have been suggesting, the method of squares and the gridiron method map aesthetically *interesting* landscapes: a "definite and considerable" variation must exist within both the plant community and the physical features, and the possibility that this variation might be produced through the confluence of these forms (plant community and topography) is essential. This method doesn't work on extreme topographical

variation, but on the subtly variable elevation of salt marsh. And it fails, too, on flatter ground that is populated by a single species. Mountainsides and pine plantations, for example, are equally inappropriate sites for using this apparatus. In the case of the mountains, jagged topography distorts one's ability to properly draw the square and thus distorts the data it captures. In the case of monoculture the apparatus is pointless, because it is tuned towards variability. The form at hand must undulate gently, with many species closely planted, like the Bouche d'Erquy. Here, an interesting form generates its descriptive methodology; the salt marsh interferes with the visual apparatus that registers it, forging it, defining it, justifying it.

These fieldwork methods create a series of isolated images of form and data, loosely connected; as Oliver and Tansley remind readers, the images they offer as an example of this method in the paper are not, in fact, useful unless fitted again into the map from which they are extracted (232). With lines running into and out of the frame, squares are consistently open to paratextual information, both within and without the bounds of the paper; they map forms that are succeeding, that are "invading and ousting," other forms, that are coming into or going out of being (Tansley, *Britain's Green Mantle* 60). This is precisely the relationship between what Lars Spuybroek describes as the picturesque *form*—an object that, in characteristically interesting terms, is "continuously growing and changing, an occurrence as much as a thing, making us intuitively act to try to grasp what is going on"— and the picturesque *image* that attempts that grasping (221). Spuybroek describes these images in this way:

> Picturesque images are never balanced or finished, subtly provoking you to take another step. The picturesque has little to do with picture postcards, they are merely a derivative of it. The main notion was that the image provided an impulse for movement and travel—not the reverse, in which travel precedes the image, as

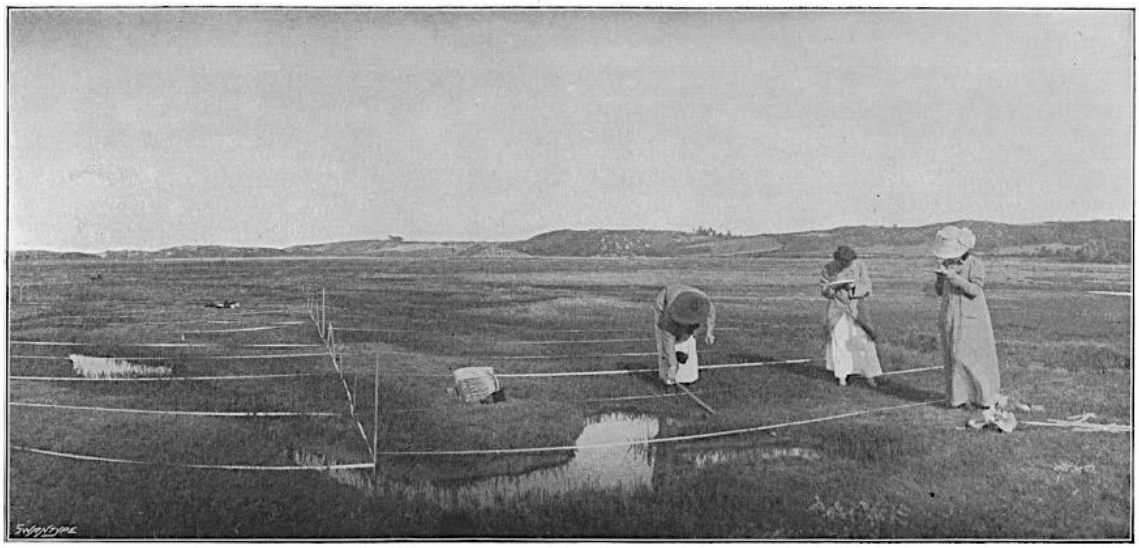
> in tourism. One would either see one's path but lack a landmark or see a carefully designed object but not the way leading to it—*there was always something missing.* … Therefore, the resulting plan cannot be organized as a sequence of finished perspectives on the ground but only as a mosaic of views that are necessarily fractured. (219 emphasis original)

Here, succession is not at all a "comforting form of progress," as Caroline Hovanec has described this concept, but a fractured mosaic emphasizing an ongoing, incomplete, and necessarily fragmented—if also ambitiously comprehensive—effort to understand the relationship between particular organisms and general patterns of growth and development (39).[54] Like the images in *Oaks and Oakwoods,* which leave open borders and introduce fresh pathways in order to suggest responsiveness on the part of the image to material change, "Methods of Surveillance" emphasizes the fragmentation involved in efforts to document living—that is, interesting—forms. Indeed, interesting forms teach the cognitive and affective experience required to analyze their always changing, never completed movements and patterns.

Epistemologically and aesthetically, then, ecological fieldwork methods and picturesque aesthetics share a common way of putting organisms and environments into relation, in the field. And both fieldworks also emphasize the role that knowledge work—in this case, the attachments of human interest—plays in the formation of landscapes and ecosystems. The article's final image, a photograph of women field workers, gleaning data, reminds us that part of the movements and alterations recorded by field mapping include the interests of the scientific field

[54] I take issue with Hovanec's reading of succession here because she has conflated theories of succession as always "admiring plant associations as holistic 'superorganisms,'" while suggesting that "looking at population flux and trying to calculate the cycles of growth and die-off" in communities was primarily the work of animal ecologists (39). On the one hand, Charles Elton's field methods grew out of those articulated among Tansley's plant ecology; on the other, Tansley was not at all a proponent of the superorganism concept, as Anker has noted (2).

worker herself, as she imprints her own habits of attention, vision, movement, and thought upon the landscape at hand.



OLIVER AND TANSLEY.—METHODS OF SURVEYING VEGETATION.

Photograph of part of the Bouche d'Erquy. The gridiron under survey is the one represented in Fig. 80. The rest of the square shewn in Fig. 78 lies behind, away from the observer. The system of grids to the left is not shewn in the Figures.

Figure 6: Photograph: Attached photograph of women fieldworkers, in the Plates section of The New Phytologist 3:9

Oliver and Tansley use this image to orient their readers within their mapping practice, to bring their abstracted visual standard into line with seeing fieldwork from the more recognizable perspective of the landscape orientation. The authors mention the photograph in the text as a supplement to the map's abstracted perspective; "shewing the characteristic vegetation of the Bouche d'Erquy," the image "is taken near the extreme corner of the square and grid represented in Figs. 78, looking over the square with the grid in the foreground. Most of the features shewn in the figures can be identified in the photograph. The G. Sd. Association is on the higher ground and appears lighter, while the G. Sl. is on the lower ground and appears darker" (236). The image orients readers, then, within the mapped space, lending the camera's photo realism to the

map's fragmented and abstracted perspective.[55] Echoing Price, for whom the picturesque is both a way of perceiving environmental particularity and a way of teaching others how to value that particularity, Oliver and Tansley addend this image not to present more data concerning succession, but to provide a more perfect knowledge about its generation. In this way, the photograph is not a record of data, but another tool for processing it, a tool that makes its appearance specifically within the public circulation of *The New Phytologist*.

Notably, however, due to its straight-on perspective, the photograph does not attempt to capture the data mapped by the surveyed space. In detail, too, the photograph defers to the map; we can see only rough outlines of shaded difference in the photograph, whereas the map outlines with clarity the edges of species groupings. This is a curious use of the medium, particularly considering that camera work was being touted as an especially valuable experimental and observational device in ecological research; Clements makes all the familiar appeals to the camera's mechanical objectivity in his field research text, and as particularly useful in mapping quadrats (188-195).[56] The image differs from photographs that map quadrats in its landscape orientation (as opposed to overhead images, shot from on top of a ladder), and it also differs in its inclusion of field workers and their (currently secured) interests in the scene. What I want to mark here is how this image displays "a form of environmental mapping; a place of dynamic interactions" that doesn't only respond to the struggle of humans to make sense of "totality and local knowledge" as Tim Armstrong claims, but which *positions* them in a visual and scientific attitude to do this knowledge work, while echoing both the epistemology and aesthetic

[55] We could bear in mind Nancy Armstrong's suggestion here that the photograph serves as a "counter to the picturesque, an attempt to get in touch with the very people, things, and settings the picturesque displaced;" to be sure, this photograph makes it clear that when we look at the map's fractured mosaic, we are looking at a material location, populated by material bodies, both human and nonhuman (72).

[56] See Lorraine Daston and Peter Gallison's *Objectivity* (2007) for a discussion of mechanical objectivity's commitments to photorealism. Chapter 2 of this dissertation takes up photography, and especially aerial photography, in fieldwork methods in a more detailed way.

experience of the picturesque (228). The image echoes efforts upon the part of picturesque traditions to render the *work* that exists in the field as a concatenation of human and environmental actors, as they act upon each other over time. Ruskin's noble picturesque is after all, distinguished by its attention not simply to the decay of an object or landscape, but to the work it continues to do, however altered: picturesque objects, like Turner's famous windmill, are "useful still, going through its own daily work" (27). Indeed, this work is most visible in this photographic attachment, which echoes a more painterly tradition while also emphasizing that there are in-formational devices that persist outside of the frame of the mapped grid impacting the site's succession: the hands of fieldworkers, counting, measuring, harvesting, making scientific information through their interested, dabbling handiwork.[57] It reinforces Tansley's insistence on accounting not simply for matter, but for the human interests that shape a scene: "we must not forget," he has famously remarked, "that our creations are concepts of the human mind imposed upon the facts of nature" (Anker 30).

There is more to unpack here concerning the researchers depicted in this image: the postures, paces, and gender of these researchers is the subject of the following chapter. As I conclude this chapter, however, I want to emphasize the intention of this photograph as reaching out to and provoking readers of *The New Phytologist* towards ecological study by recreating its affective and aesthetic experience. The image typifies interesting aesthetics: set against a very subtly rolling ground, three figures conduct similar work in slightly altered ways, punctuating the

[57] Readers in art history will see comparisons between this image and Jean-François Millet's *The Gleaners* (1857), a work in the Barbizon school of landscape painting which figures three women field workers taking their second cutting, and which also contributed to the theorization of the picturesque. See John William Mollett, in his *The Painters of Barbizon: Corot, Daubigny, Dupré* (1890); there are very clearly resonances between this image and the Barbizon's efforts to define picturesqueness as "an intimate affinity" with nature's "mood life," "discover[ed] in her atmospheric life, in her element-flooded brilliance"—in the gentle undulations of life lived in the field, rather than in the entangled bank (99).

image with subtle variations of ecological thinking and feeling at work. Human bodies echo the gentle undulations and nuances of the field they map; interesting forms and interested thinking and feeling collide. As a document of ecological system, however, the photograph falters: its perspective and distance don't quite provide a picture of ecological relation as a complex dance among data and form, organism and environment. "Methods of Surveillance at a Large Scale" suggests that media matters, then, in how ecological field work is taught, and that Tansley thoughtfully deploys media difference to revitalize this practice. A concluding examination of his popular manuals articulates the nuances introduced into ecological epistemology and aesthetics by media difference, an issue that remains at large throughout the uptake of the ecological picturesque among modern fiction and film.

Bendings: The Ecological Picturesque in Circulation

To suggest that media matters in the depiction of picturesque images and the modes of thinking and feeling they enable is to tap into a long-standing conversation concerning the precarious interest of picturesque images. Translations of picturesque aesthetics across media often challenge the uniquely living, breathing formal work that a picturesque image accomplishes: in a photograph or a novel, for example, the in-forming of matter that these images aim to register is lost; in-formation is flattened into bits of data. As Spuybroek argues, referencing Ruskin, the unique aesthetic vitality of the category is "threatened" when confronted with the camera, the recording modus of which "fully overtak[es]" the very generative work that the picturesque object does by flattening out the registration of protean forces that picturesque aesthetics document (208). "The picturesque needs constant updating," Spuybroek argues, "if we are to save it from the clean, purified image and restore it to its original unfinishedness"

(208). The camera, in other words, reduces the aesthetic to imagery, dissecting the succession it records from the images that it creates.

This problem persists within the interesting as an aesthetic category as well, and particularly, how this aesthetic presents information. Sianne Ngai has thoroughly noted the effect of photography on the interesting, via Susan Sontag's account of how the camera and the novel skew the informative role of the category away from variation and towards theme: the interesting, through the eye of the camera and the pen of the novelist, becomes increasingly associated with the "standard/generic" as opposed to the "individual/particular" because these mediums make it possible to see homology clearly (141). The effect of this is that the interesting—like the picturesque—becomes almost pejorative, an ascription of mere-ness (Ngai 141). In this way, the interesting becomes associated much more with "minor differences from an existing norm" and much less with the refracted wildness that the picturesque registers (151). Tellingly, here again, the debate about what registers as valuable information from Gilpin and Craig persists, if flipped on its head: merely interesting photographs register generality over particularity, but without any attention to the becoming of the picturesque object. Devoid of in-formation, the interesting and the picturesque in photograph and word are flattened into information, a collection of "nice to know facts" (154). Note, here, how the medium affects our understanding of information: the vital, cosmic forces that shape reality are reduced to a list of informative facts.

This is an issue for the picturesque—and the interesting—throughout their branching histories, as media bend the way in which the aesthetic treats information. We can see, for example, this problem in Michael North's discussion of Pictoralism's interpretation of realism in *Camera Work*. In attempting to push against the camera's mechanicity, its ability to bring all the

relevant data into the scene in favor of challenging the flattening effect of the camera, "Photo-Secessionists often exploited the tendency of rain, snow, mist, or darkness to soften outlines and blend tones, so that their works often resemble the most hackneyed efforts of turn-of-the-century picturesque art" (North 45). It is striking that these images' attempts to challenge the medium's careless, indiscriminate recording practice are flattened nonetheless: what is left is a boring, outdated visual norm for seeing nature that, in modern hands, is no longer fresh because no longer in-formative.

Nor is the camera the only medium that falters in translating the picturesque's work: for Lukacs, the (specifically modern) novel appears to have the same issue. Georg Lukacs takes picturesque aesthetics to task as uniquely boring, because *descriptive*; "The autonomy of details has varied effects, all deleterious, on the representation of men's lives," Lukacs argues, "On the one hand, writers strive to describe details as completely, plasticly and picturesquely as possible; in this attempt they achieve an extraordinary artistic competence. But the description of things no longer has anything to do with the lives of characters" (132). This is the particularly boring feature of descriptive novels, in Lukacs's account, in that "the descriptive method results in compositional monotony, while narration not only permits but even promotes infinite variety in composition" (144). In writing, interest is generated by narrative's ability to form attachments among reader and character, to forge an identification between the patterns of their lives. Whether or not we agree with Lukacs particular take on the modernist novel (I happen to disagree, a point to which I will return in the next chapter), I want to note here how the picturesque's work as the register of interesting information falls away, leveling off into the boring, serial listing of minutiae. Indeed, Lukacs seems attuned to this particular medial issue, noting how boring novels are "when description is the dominant technique, and writers attempt a

vain competition with the visual arts. When they are portrayed through the descriptive method, they become mere still lives. Only painting has the capacity for making a man's physical qualities the direct expression of his most profound character qualities" (138).

Understanding information as the serial listing of data, as opposed to the in-formation of living things, bears epistemological, ontological, and ethical consequences. Epistemologically, grasping information no longer requires an associative, relational, and responsive way of thinking, but simply a mechanism for documenting facts. This epistemological shift corresponds with an ontological shift: the world is no longer seen as the product of comings and goings, created by a variety of actants, but as a set of facts to be mastered, a series of data to be recorded, standing over and against an observer. And finally, it erases the sense of responsive responsibility that is inherent in encountering the world with interest. If information is only to be gathered, collected into baskets of "nice-to-know" bits, then the observer plays no part in making it, and is thus not responsible for how it is gathered or what is done with it. What is at stake in the weakening of the picturesque, of the interesting, then, is a series of orientations towards the nonhuman that challenge Cartesian dualisms and the systems of power that reinforce them. This is why, for Spuybroek, it is reclaiming the picturesque's interesting work—what he describes as its radicality—that is so essential in understanding it as an ecological aesthetic (222). The final close-readings of this chapter explore the vulnerability of the picturesque among its manifestation in ecological writing and image-making. Both *Oaks and Oakwoods* and the widely-read, picturesquely-packaged *Britain's Green Mantle: Past, Present, and Future* (1949) demonstrate the effect of media on ecological epistemology and Tansley's deft deployment of media difference to address the mischief introduced by different instruments for making ecological pictures.

Figure 7: Pen and Ink illustration: Conclusion of Oaks and Oakwoods, by Phyllida Lumsden (50)

The pen-and-ink and watercolor images of *Oaks and Oakwoods* work hard to retain the haggard unfinishedness of the ecological picturesque, a form that works its way into the text's written description as well. Notably, this slim volume, mapping only the relationship of oaks to the formation of oakwoods, doesn't really conclude, leaving us with a sense of work left to be done, and with only a picturesque scene to which to attend. Tansley's narration—or is it description? the distinction isn't quite clear—simply stops. The oak-birch-heath community of southeastern England he describes in the final paragraph of the text, composed by a series of human and nonhuman interferences, ends thusly: "It [the "varied and characteristic" landscape of southeastern England] is, however, now seriously threatened, because the light, well-drained soil is very suitable for building estates and also for the establishment by the Forestry Commission of extensive plantations of conifers, particularly pines" (50). Nothing more beyond this statement: Tansley makes no judgment about the environmental shift, no economic argument for the continued preservation of this oak forest, and he sings no love song to its beauty. And this is because the form of the landscape itself—Britain's "green mantle"—is always being sewn, loosely cohering in communities in one moment to be unraveled the next. It is the work of the ecologist to watch it move: indeed, this is a very useful way of understanding the concept of

plant succession. Instead, the text leaves us gazing at perhaps the most loosely sketched image yet, a gathering of oaks, what might be either a thick plush of hazel or a downy cover of bluebell, a small smattering of characteristic branching peeping through the foliage (Fig. 7). An invitation, *Oaks and Oakwoods* entices us to step into the field.

Oaks and Oakwoods, however, takes much of its source material from the previously published *Britain's Green Mantle,* a much more comprehensive effort to map British vegetation.[58] The reading experience of the two texts is also quite different. Despite attempts to secure the interests of a colloquial readership, the reading experience of *Britain's Green Mantle*—"fully illustrated" with over 150 images, mostly photographs—doesn't always persist in keeping readers engaged, an issue which is in part the fault of the camera. Indeed, unlike *Oaks and Oakwoods*, the abrupt unfinishedness of which provokes readers towards the field, *Britain's Green Mantle* attempts to bring a vast amount of ecological information to the reader by harnessing the camera's ability to record, if not process, data. Photography is valuable in this text as a means of illustrating the sheer breadth of ecological information it covers, particularly in that photographs of discrete sites are easily and quickly produced. Indeed, the table of contents and list of figures reads as a nice list of species and community names, serially listed, easy to navigate in response to readers' interests. Read cover to cover, however, the amount of data is untenable; there are too many of "those little details of circumstance," as Craig might describe them, to put into place.

[58] *Britain's Green Mantle* is the popular version of Tansley's masterwork, *The British Isles and Their Vegetation,* Cambridge UP, 1939. Much of the writing, and several of the images, are repurposed from this larger scientific survey.

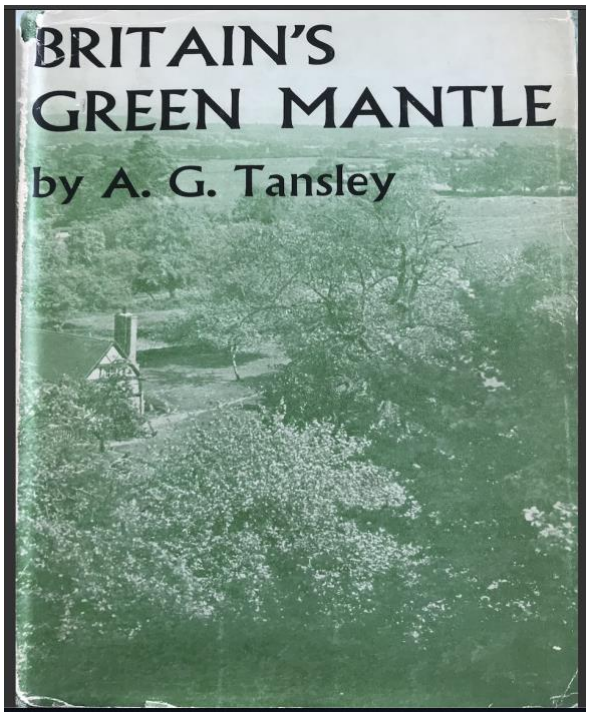


Figure 8: Tinted photograph: The cover of Britain's Green Mantle (1949), photograph uncredited

Often, the photographs in this text falter in representing what is, for Tansley at least, compelling about ecological research: the inherently interesting specifics of succession, the *life* of the green mantle itself. Observing the specifics of growth pattern and succession is incredibly difficult in the photograph, a document which can so easily be read as simply a collection of equally valuable, nice-to-know facts from which uncountable relationships could be produced. The following image of the Killarney oakwoods is an illustrative case in point:

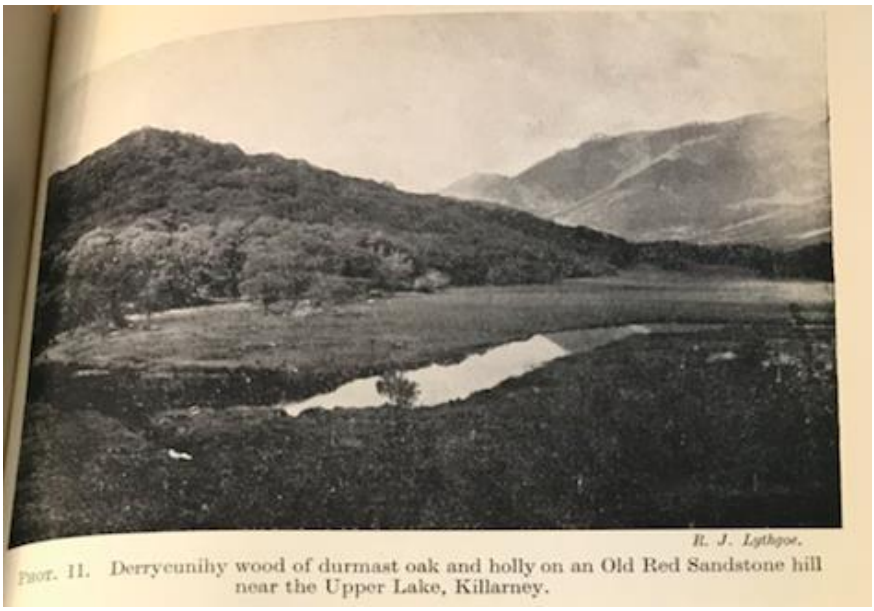


Figure 9: Photograph: Killarney Oakwoods, Britain's Green Mantle, (90). Photo credited to R.J.

Through the "careless" lens of the camera, to use Ruskin's phrasing, the interesting variations and movements of the oakwood—described in-text as "of great interest"—are indistinguishable; the image captures a lovely view, but shows us nothing of the variety of moss and lichen species that dabble with the canopy, or the described pedological forces that shape their contours (90). Indeed, Ruskin's observation that "Photography either exaggerates shadows, or loses detail in the lights, and, in many ways which I do not here pause to explain, misses certain of the utmost subtleties of natural effect" seems apt here, as the image struggles to handle the exaggeration of shadow throughout the image that reduces the variation of the canopy on the hill to simply two shades, and which washes out any sense of vegetational variation in the foreground entirely (*Modern Painters IV,* 189). Rather, Tansley's description fills in for the lack of detail the image offers:

> They are based on Lower Devonian sandstones and shales, and the soil shows different stages of podsolization.//The best grown woods, on but slightly podsolized soil, are dominated by sessile oaks with the trees nearly 70 feet high and just far enough apart for

> the crown of each to be spreading but in contact with neighboring crowns. Other trees (birch and mountain ash) are sparse or rare, but yes 50 feet high are scattered thinly throughout the oakwood. These two continuous strata of foliage reduce the light reaching the ground to a point at which no well-developed field layer can exist. (90)

I could go on, as Tansley does for another two pages, listing the species of this wood here, but will refrain: what I want to mark is that this image, rather than illustrating the in-formation of landscape that succession is, devolves simply into a list of anatomical knowledge of the landscape itself. That which makes the scene live is lost, and neither camera nor description account for it. Camera work bends, or more specifically, flattens, the ecological picturesque here: the form of communities moving through space disappears, bringing any data within the frame into potential focus, and, ironically, obscuring our ability to perceive it accurately. The snapshot of a lovely scene prevents us from looking at the relevant data, which is not, in fact, the stream which captures our attention, or the pleasing mirror image of the mountain peak in its surface, but the structure of the soil, or a detailed rendering of the march of oakwood up and down hillside that soil quality allows for. The result? The inherent interest of ecological succession, its particular picturesqueness, fades into a list of anatomical facts in the description, supported not at all by the image with which it is paired. The long debate among picturesque painters reappears with a vengeance here, but with a twist: highlighting neither form nor detail, the careless photograph allows neither informational preference to emerge.

Britain's Green Mantle is not the only instance in which a low, hackneyed, boring picturesque becomes attached to a program of ecological education; it has become an enduring aesthetic trope across texts aiming to teach ecological consciousness. Leanne M. Avery and Bryan J. Haines, for example, in their recent arguments for including rural, non-academic

ecological knowledge work in science education, make heavy use of a photographed picturesqueness to evoke a sense of place, to position their readers within the Catskill mountains within which their case study takes place (137, 140, 146). Beautiful, sweeping panoramas of Catskill hillsides reflected in lakes, the images offer nothing in terms of the ecological data that Avery and Haines are attempting to re-value here, to draw interest to: the meteorological, agricultural, and medicinal knowledge of Catskill natives (143). Crucially, what the images construct is not at all a better knowledge of ecological information, but a loosely understood "sense of place"—which could almost be *any* rural place—as opposed to a specific representation of the life that is lived there (134). Indeed, a careless picturesque empties out the meaning of ecological knowledge work entirely, leaving us with no better sense either of what is particularly ecological, or particularly worth being conscious of. Everything is not related to everything else within the ecological picturesque as I have been describing it here, an ontological position that the photograph, as Sontag suggests, underwrites: as in Tansley's narration of oak branching, ecological relationality is generated by specific interferences of things with other things, of some elements coming together to create a particular life form. The eye of the expert draws us to these interferences, and accounts for its own dabblings with that information, a task for which the photograph is particularly unsuited. This is perhaps the reason why *Oaks and Oakwoods,* published three years after *Britain's Green Mantle,* makes such heavy use of Lumsden's careful paintings and drawings: a picturesque attachment, *Oaks and Oakwoods* revitalizes the information of *Britain's Green Mantle.*

In the chapters that follow, I trace the circulation of the ecological picturesque—as an aesthetic that teaches ecological epistemology, ontology, and ethics—in the aesthetic experiments of modern fiction and filmmaking. The unique forms of modernist experimentation

I bring to bear here—Virginia Woolf's fiction, the avant-garde underpinnings of popular science filmmaking, and Surrealism's multi-media and multi-genre contributions to natural history—also teach readers and viewers to perceive ecology via interest's cognitive and affective lessons. Their experiments with the indexical nature of descriptive media rescue ecological thinking and feeling from banality, and argue for certain forms of mimesis as fully capable of capturing the complexity of movements and relationships that both scientific and aesthetic modernism understand life to be. Modern takes on the ecological picturesque "update" this scientific aesthetic in response to a nature understood as increasingly mutable and responsive to modernity. Two final compelling images from *Britain's Green Mantle,* located in its frontispiece, portend some of the arguments to come, as Tansley experiments with photographs that might secure readers' interest and encourage them to develop it in an ecological vein.

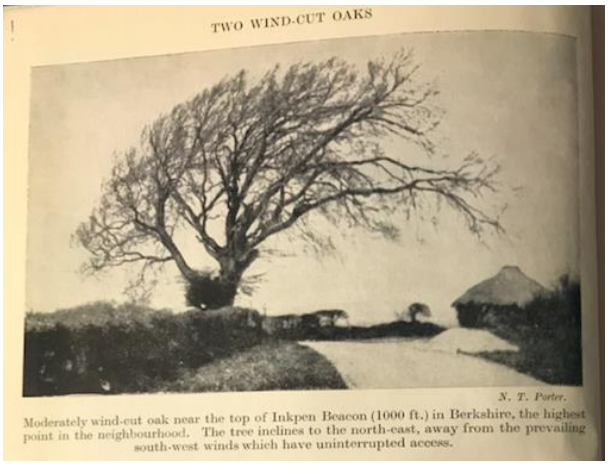
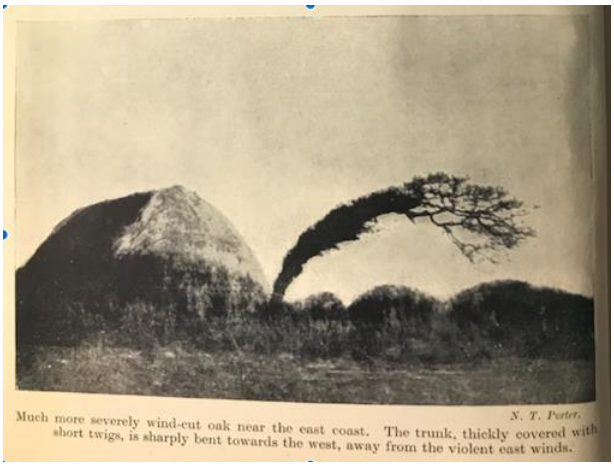


Figure 10: Photographs: Two Wind Cut Oaks, Frontispiece to *Britain's Green Mantle: Past, Present, and Future* (1949), by Arthur Tansley, photos credited to N.T. Porter

Figure 10 (cont'd)



Much more severely wind-cut oak near the east coast. The trunk, thickly covered with short twigs, is sharply bent towards the west, away from the violent east winds. *N. T. Porter.*

Striking photographs of the effect of wind on oak formation, these images listed, one after the other, begin Tansley's foray into *Britain's Green Mantle.* Highly irregular, and "severely cut," in the case of the second image, these oaks' branching patterns are the register of in-formational data that is difficult to render: wind.[59] But we can see its effects as it encourages a tree to bend away from it, to thickly fill its trunk with smaller, hardier twigs as opposed to longer, reaching branches. The pairing is important: if readers don't quite register the mild variation of the upper image as an effect of wind on cellular matter, the second image "updates" the first image and makes this particular material agency visible. An unusual extreme, the formation is lent credibility by the camera's careless eye, which, in this instance, sets the tree's branching into high relief. Here, the medium's shadowing draws an in-formational participant into relief, and amplifies the first image's affective experience to one of more-than-mild surprise. To put it differently, the second image opens up the first image's picturesque landscape, replete with cozy

59 Special thanks to the Director of MSU's W.J. Beal Botanical Garden, Frank Telewski, for the observation that the second wind-cut oak would be able to withstand significant winds of over 70 mph. See Telewski, Frank W. and Mordecai J. Jaffe, "Thigmomorphogenesis: Field and Laboratory Studies of *Abies fraseri* in response to wind or mechanical perturbation." *Physiology of Plant.* 66 (1986): 211-218.

cottage, to a rough and vital material agency. Photographic mimesis, then, need not always squelch the vital growth of interested ecological epistemology, but might also fertilize its development.

For modernists dabbling with both institutional and popular manifestations of interested ecological thinking, forms of descriptive mimesis across media become a critical documentary protocol for understanding the complexity of life, and the human role in crafting it. Echoing and often outrightly participating in the ecological picturesque, these modernist experimentations with documentary form reveal a close companionship between modern aesthetics and ecological science that is supported by historical proximity and textual lineage. Seeing and handling the history of ecology helps us perceive this science's prevalence among modernist representations of human/environment interaction. And modernist takes on this knowledge work also help readers of ecology to see the variations and potentials of modern ecological thinking more clearly. I step into a field in which modern ecology teaches its practitioners to become aware of the tiny and significant ways in which humans alter landscapes over time, and to be responsible for those alterations. Via modernist aesthetics, I map a modern ecology that teaches its practitioners to manage the force of their attachments—that is, to care for—the nonhuman lives that touch upon their interests. And I document how this ecology persists among us, both grounding and offering up new models for engaging with a planet that changes its form, and our thoughts.

CHAPTER TWO—Garden Work: Prosaic Alightments Among Ecology and Fiction

In her often-cited analysis of the fictitious Mary Carmichael's novel, *Life's Adventure,* in *A Room of One's Own* (1929), Virginia Woolf brings together a set of issues concerning science, fiction and gender that shapes the trajectory of this chapter. Positioned in the center of the narrator's literary analysis of this imaginary novel, a reading deeply attuned to prose form, Woolf's narrator offers a judgement of Carmichael's novel that suggests that the relationship between the documentary practices of modern ecology and her own modern fiction converge around the aesthetics and cognition of interest. She states:

> Mary Carmichael, I thought, still hovering at a little distance above the page, will have her work cut out for her merely as an observer. I am afraid indeed that she will be tempted to become, what I think the less interesting branch of the species—the naturalist-novelist, and not the contemplative. There are so many new facts for her to observe. (87)

In the figure of Mary Carmichael's literary genius—and, of course, Woolf's narrator, who peers down, hovering, still, upon the passages of text, attending first to form and then to data— we can also see the bending and stooping naturalists-turned-ecologists who dabble among the plots of the Bouche d'Erquy, women caught somewhere between the hobby of natural historical classification and ecological documentation.[60] Clearly in the tradition of Victorian women naturalists, a tradition that Woolf would herself have been very familiar with, the gleaners of Oliver and Tansley's photograph were learning and practicing an entirely new way of

[60] "I am going to get the hang of her sentences first, I said, before I load my memory with blue eyes and brown and the relationship that there may be between Chloe and Rodger. There will be time for that when I have decided whether she has a pen in her hand or a pick-axe" (79).

documenting scientific information in the field, creating not lists of details useful for creating classifications and taxonomies, but maps of lifeforms' change over time.[61] Indeed, the issues of information processing that accompany the ecological picturesque are reiterated in Woolf's description of Carmichael's observational position: Carmichael risks preferring information—the many new facts for her to observe—over in-formation, a close look at the form that women's lives take. This more "interesting," because "contemplative," form of prose fiction, for Woolf, reiterates the very information processing methods of interested ecological knowing, suggesting a curious connection between the process of documenting plant succession and the life of women's minds: there is something about these forms of life that has often been recorded in ways that flatten their contours into boring lists of facts and details, shoring up an archive of data at the expense of tracing the form of women's thinking, knowing, and feeling.

In marking this comparison between the information processing concerns of the ecological picturesque and Woolf's meditations on writing by and about women, I do not mean to deploy an analogical reading, wherein the issues of science or fiction are brought to bear in order to illuminate problems of documentary practice within the other. To be sure, documenting plant succession and the lives of women is not an overtly comparable task. But this chapter proposes a thought experiment that suspends an analogical reading in order to think about how Woolf renders a feminized, widespread scientific epistemology in her prose fiction, thus participating in the recording of modern ecological history. As an often undocumented part of women's lives, scientific epistemology is crucial not only for understanding the perspective, form, and content of women's fiction and the pitfalls that might befall it, but for creating a prose

61 That Woolf participated in many natural history related hobbies is now a commonly cited fact, particularly in Woolf studies in the environmental humanities: the most thorough investigation of Woolf's relationship with natural historical field work is Christina Alt's *Virginia Woolf and the Study of Nature* (2010).

that can document women's thinking, learning, and feeling about the world. Simultaneously, in registering this cognition, Woolf's fiction teaches us about the nuances and ambiguities of ecological knowing that are not often visible within its historical record. I suggest some degree of influence, then, in the relationship between modern ecology and Woolf's modern fiction. But this relationship is primarily one of origins. For ecology and fiction developed documentary practices that arose out of a common epistemological and ontological center: an interest-based cognitive and affective history that women of science and women of fiction (often the same women) share.

Indeed, if the fictitious novelist Mary Carmichael is a conglomeration of the women novelists filling up shelves with new fiction on the stuff of feminine life, then we can take her cognitive pattern, one distinctly indicative of interest, as a peek into the mind of women writers more generally: "She had a sensibility that was very wide, eager and free," Woolf's narrator describes,

> It responded to an almost imperceptible touch on it. It feasted like a plant newly stood in the air on every sight and sound that came its way. It ranged, too, very subtly and curiously, among almost unknown and unrecorded things; it lighted on small things and showed that perhaps they were not so small after all. It brought buried things to light and made one wonder what need there had been to bury them. (*AROOO* 91)

An apt description of interested thinking and feeling, Carmichael's "sensibility"—a feeling that is a making of sense, a knowledge affect—evokes interest's responsive tactility, its ability to associate ideas and things widely, and, crucially, its innate relationship to value and justification, re-assigning value to the small, the insignificant, the unknown, the buried and forgotten. In

"lighting on small things," interested novelists, like interested scientists, can re-organize informational value by re-figuring, even re-vivifying, what matters in the map of the square.[62] But in being thus responsive, interested novelists, like interested scientists, run the risk of losing sight of formal trends in the fever of creating an archive of data. And this is not the only risk: the symbolism here, of an insect flitting from flower to flower, also suggests a certain lack of focus and discipline which is easily dismissable as distraction, even from the perspective of the writer herself: "even a woman with a great turn for writing has brought herself to believe that to write a book was to be ridiculous, even to show oneself distracted" (*AROOO,* 62). Interested knowledge work, then, doesn't just put prose at risk in its twined informational/in-formational tack, but is easily dismissed from the record of ecological thinking, falling out of form and into the chaos of a distracted mind. It is no great wonder, then, that lives of women's minds have so often failed to be recorded; another trivialized handiwork, nothing of interest remains in framing women's writing and thinking as distracted non-knowing.[63]

This passage's portrait of the trivialization of interested cognition evokes a historical narrative of women's knowledge work at the intersection of science and fiction that has not been recorded, either in histories of ecological thinking or in Woolf studies. Aside from a handful of pages in Peder Anker's *Imperial Ecology,* there is no thorough history of women's role in conducting, gathering, and modeling ecological scientific data, even though their bodies are often documented in the record of men's publications in the field (as in the case of "Methods of

62 We should remember, here, that the re-alignment of scalar value is also at play in "Modern Fiction," wherein Woolf argues, after another passage quite indicative of interested thinking and feeling, even citing the form of Joyce's prose as following "what interests and moves" him, for a novelists to "place the accent"—to place formal markers— differently: "Let us not take it for granted that life exists more fully in what is commonly thought big than what is commonly thought small" (107).

63 This is one way in which Jonathon Crary's discussion of attention and distraction doesn't quite work for figuring questions of gender and gender identity in modernity; the power of distraction is variable, depending upon the body who performs it. See Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture.* MIT P, 2001.

Surveillance") (Anker 106). And while Woolf studies have often turned to her interest in science to think through a wide array of issues related to her theories of prose fiction, these accounts don't often address her work as part of a long and popular tradition of women's scientific knowing.[64] I do not aim to provide a full account of women's work in ecology here; rather, this chapter offers one way in which this history can be brought to light through an evaluation of Woolf's work within the history of ecology with which it is contemporaneous. I contend that Woolf's experiments with prose fiction are in-formed by a feminized ecological cognition, gleaned through a tradition of women's science education that centers around interest-based teaching and learning. Reading "Kew Gardens" and *To The Lighthouse* with a history of women's ecology in place pushes against the tradition of reading these texts' perceptual experiments as motivated by inhuman apparatuses, either animal or mechanical, and instead contributes towards the "mass of information" about women's knowing that has so often been excluded from the record (*AROOO* 45). While it is certainly tempting to read the texts I bring to bear here as participating in what Aaron Jaffe has recently called "the modernist discovery of form without humans," Woolf's theory of fiction, like the contemporary ecological thinking her prose registers, can seldom be understood as disinterested in human life and its form (505). Rather, "Kew Gardens" and *To The Lighthouse* are prose forms wrought by a human subjectivity

64 While Alt tends to read Woolf's rendering of scientific epistemology in gender-neutral terms, she does mention botanical education and natural history instruction as the purview of women and children, often taught (citing Woolf), at a "mother's knee" (23). More recently, Louise Hornby has suggested a relationship between Woolf and the botanist and photographer Anna Atkins, but Hornby, in framing Atkins at the margins of botanical science, doesn't account for the long history of women's formal and informal training in botany, throughout the nineteenth and early twentieth centuries (150). As Patricia Phillips has helpfully argued, girls' science education until the mid-1860s was superior to that of boys,' and women continued to be trained in botany well into the twentieth century, even if their access to institutions of higher education was often limited (235). Even still, women gained Ph.D.s in plant science, often doing formal research work at British universities and research centers. Practicing professionally what had been relegated to "women's work" at least as far back as the Renaissance, women of many backgrounds were learning and doing botanical science (Phillips x). Woolf's narrator in *A Room of One's Own*, of course, reminds us of one reason why this team of women scientists has not often been considered: the fact of a woman working in a lab and going home to her children, as Olivia does in Carmichael's novel, "is a sight that has never been seen since the world began," left in the dark because women have not yet written it into the record (83).

that remains attentive to both its difference and its insignificance—that is, to the difference it makes in the world, and its insignificance among many other active, generative things.[65]

I make this case first by exploring the gendering of ecological study, a point touched on in the last chapter. This history reveals some gender troubles at the center of ecological documentation that assigns a distinctive set of epistemological, ontological, and ethical values to men's and women's ecological science after the success of Tansley's reform of plant biology, particularly in the 1920s and 1930s. Women's ecological work, very often following the Tansley protocol of interest-based teaching and learning, was trivialized by the field as it gathered steam in university departments; even as the associative, interdisciplinary, and field-based epistemologies of Tansley's widespread educational agenda flourished, the branding of interested ecological thinking took a turn away from its often feminized roots. I pinpoint this effort to rebrand ecology in the interwar years as a continuation of the imperial impulse that Anker so carefully identifies at the center of British ecology, and specifically, an application of the British Empire's war machine to ecological study. For the media of transportation and representation exclusive to men's ecology—namely, aerial surveillance and photography—matters, in that it replaces the responsive, responsible thinking and feeling of the ecological picturesque with an observational commitment to land management and control.

In contrast, women's ecological work was also shaped by the media at their disposal, namely, prose and landscape; following in the tradition of the ecological picturesque, these media encourage the positioning of responsibility—and responsivity—at the center of ecological knowing, a point that Woolf's prose fiction brings to light through intimate engagements with

65 I echo Claire Colebrook's recent language here, in theorizing a humanism that minimizes its influence as the primary "differential," the difference that makes the most difference in the documentation and thus the assertion of material ecosystems (19).

the subjects produced by this training. Reiterating the experimental forms of women's ecological education—and *writing*—"Kew Gardens" documents what I call a *lingering* take on ecological science, a scientific aesthetic that pushes against the narratives of speed, control, and order so indicative of Enlightenment modernity, and to which it is tethered. Lingering ecological experimentation "hovers, still, at a little distance" above the plots it tinkers with and explores, a spatio-temporal position that Woolf's fiction embodies and structures. In recuperating this history, I aim to reposition women's knowledge work as one of the many trivial agencies recorded among the snails and flowers, rays of light and stirring breezes, that is "Kew Gardens."

To bridge the experimentation of garden workers and "Kew Gardens," I follow and amend slightly the model forwarded by Phillipp Erchinger's *Artful Experiments* (2018) in understanding the relationship between experimental ecology and Woolf's experimental fiction. Erchinger notes that while the epistemological aims of literature and science remain distinct, both practices share an ontology: "a way of attending to, and learning from, a field of sentience and activity, in the composing and recomposing of which scientific observers participate alongside various sources of movement and action. These may include other humans as well as animals, plants, minerals, technical devices, machines, institutional regulations, social conventions and the forces and energies of physical nature" (2).[66] This model of experimentation is evident in the feminized botanical study—and its rendering in Woolf's fiction—that I bring to bear here; to be sure, the Victorian roots of this experimental practice are alive and well in modern ecological thinking as well as in contemporary science studies, as Erchinger asserts (2).

[66] Notably, Erchinger historicizes Victorian notions of literary and scientific experimentation in order to situate this model as particularly enduring among contemporary science studies; it appears alive and well, too, in a model of experimentation developed by ecologists trained by these Victorian forebears, and particularly, Thomas Huxley. Huxley trained many of the instructors at UCL, including Oliver and Lankester, whose pedagogical modalities echo the interest-based teaching and learning Tansley would eventually institutionalize within ecological science (Ayres 41).

Indeed, this notion of experiment guides the gendering of ecology, as observation becomes disentangled from experimentation via the apparatus of aerial surveillance. It is also reiterated in Woolf's theories of prose, as the discussion of Mary Carmichael's fiction suggests: Woolf's narrator hopes that Carmichael will not simply observe facts, but harness those observations to experiment with the documentation of the form of women's lives.

However, while ecology and modern fiction do not (always) document the same phenomena—which is not the same as possessing divergent epistemological value systems—they do share an experimental documentary practice driven by interested thinking and feeling. Notably, of course, this knowledge affect constructs the ontological "experience of the material world that enables and sustains them both" (Erchinger 13). And this is in part because interested thinking and feeling is associated by interest theorists in this moment as an experimental cognition *par excellence*. As John Dewey reminds us, "In the first place, interest protects us from a merely internal conception of mind; and, in the second place, from a merely external conception of subject-matter" (91-92), facilitating the making of meaning among "various sources of movement and action," as Erchinger suggests. Often facilitated via touch, manual work, and hands-on activity, interest brings mind and matter into a close, if not always sustained, contact, allowing each to shape the other through response. Indeed, for Dewey, interest is often present in "the manual side of scientific inquiry, the collection of materials for study, the management of apparatus, the sequence of acts required in carrying on and in recording experiments" (81). Here, interest allows us to understand scientific experimentation as a responsive openness to a materiality that alters the very form of our thoughts.

The ecological documentation I examine here, from both science and literature, thus also denotes another way in which interested ecological thinking is trivialized: its aesthetic

manifestation, sprouting from its ontological and cognitive experience, often trivializes the researching subject as her thoughts take on the form of the ecosystem she plots. Interest is not only dismissable because of what it appears to be from the outside, but because of what it does as a cognition and a worldview. That it disappears in the written record as a result of its method of documentation is one reason why it has not been identified and registered historically. I bring *To The Lighthouse* to bear, then, as a prose experiment that helps us to perceive the ambiguities and actualities of the experimenting ecologist more clearly: the novel serves as a prose experiment in preserving a subjectivity that is easily overcome by other agencies, including other histories.[67] As a document within the history of ecological thought, the novel is remarkable in its efforts to construct a prose form in which this feminized, often trivialized ecology might linger.

This is a fundamentally different reading of Woolf's materiality than that currently proliferating among writers like Kelly Sultzbach, Derek Ryan, and Bill Brown, readings that don't quite handle the question of gender, on the one hand, and science, on the other, two twined through-lines in Woolf's theory of fiction.[68] If Brown's modernity is identifiable by "the animation of the object world, the voice of things, or the indistinction of object and subject. . . irrupt[ing] as a discrete event, the aesthetic effects of which range from the uncanny to the sublime," then what I suggest here is that this irruption is in part a result of scientific ways of documenting actuality which contribute towards forging the form of modernism's aesthetic response to it (20). At the same time, this aesthetic response helps demonstrate the liveliness

[67] To understand Woolf's relationship to ecology in experimental terms, then, looks quite different from Christina Alt's observational (and also, analogous) reading of Woolf's ecological theory of fiction: noting how Woolf's revisions to "Modern Fiction" echo the values of observation and conservation as opposed to collection-based, natural historical work, Alt's understanding of ecological observation is a hands-off endeavor, wherein life is not captured and pinned, but allowed to fly and escape (190). Ecological experimentation, on the other hand, is often quite hands-on, if not always, and tinkers with its apparatus as much as it lets its subjects be.

[68] See Kelly Sultzbach's *Ecocriticism in the Modernist Imagination: Forster, Woolf, and Auden.* Cambridge UP, 2016; Derek Ryan's *Virginia Woolf and the Materiality of Theory: Sex, Animal, Life.* Edinburgh UP, 2013 and Bill Brown's *Other Things.* U of Chicago P, 2015.

inscribed in scientific prose, including the many bodies and hands who had a part in making it, bodies and hands that have often been relegated to the background of contemporary notions of institutionalized science. It also exposes the difficulty of persisting in this epistemological and ontological value system, where subjectivity is, as Bruno Latour has recently argued, suddenly extended to everything upon the awareness that the world of our making is, in fact, responding to our touch ("Anthropocene Time" 2). Science and fiction collide along this axis, cross-pollinating in Woolf's prose experiments with the genre of the ecological picturesque. In this chapter, the ontological position of this genre is taken to task by Woolf, whose lingering take on the aesthetic refuses to allow either of these issues to fall out of focus. Rather, the ecological picturesque is a genre defined by this gendered history, and the stories that emerged from it. The following section traces its flight patterns.

In Flight: Gendered Ecological Research

Three women, notebooks in hand, stoop and peer over a plot of earth, crouching to document the movement of runners and shoots, seeds and sprouts, across salt marsh terrain. The picturesque attachment of Oliver and Tansley's "Methods of Surveying Vegetation on a Large Scale" suggests a correspondence between ecological field work and gender that allows us to examine the specific vulnerability of interested ecology as influenced by media technology more precisely. This vulnerability materializes along the lines of gendered cognitive and affective experience. What does it matter that the workers in this plot are female? How were women trained to do this kind of work, and what were the epistemological and ontological values associated with this training? Why is it important that men are not pictured in this image, even as their words describe the method documented here? How does men's training, by extension, take

a divergent tack? And how might media, of representation, of connectivity, to use David Trotter's terms, influence this gendering? (8) At stake in these questions is an understanding of how the genre of ecological documentation has not always been seen through the radically responsive cognition and worldview that the ecological picturesque performs, even as this core set of values persists at its center.

In this image, ecological field work bears a distinctive structure: conducted by workers on the ground, the observation and collection of information happens within a consistently stationary apparatus. The perception of vegetational agency, often slow and creeping (at least within the temporal scale of human experience), requires that researchers persist in the space while things come and go, returning repeatedly to map the changes that are wrought by the often inconspicuous alterations made by plant migration and colonization. Attuned to perceive particularly among pattern, field workers move slowly so as not to miss the mark of modest variations. An apparatus designed to record the in-formation of a plot, the grid conscripts a temporality for doing the interested knowledge work that this project requires: observers *linger* in the grid, persisting through multiple returns to the same plot. Feet within the square, workers perambulate through the 100 meter plot, appearing from afar—and by photograph—to move in incremental tip-toes. The photograph, freezing time, fixes their movement even more firmly, catching them stationed in stooping postures while marking something too small to register from the painterly distance, through the photographic medium. Pencil and pen in hand, moving slowly enough to appear stilled, a temporal experience that Louise Hornby suggests is distinctively (and pejoratively) feminized, ecological field workers often appear to be doing little, if anything, at all (8).

Little has been written on the training of these women field workers, by all accounts university students working with Oliver and classmates of Tansley's. In his focus on the imperial iterations of ecological science, primarily a masculine endeavor, Anker devotes a scant handful of sentences to their position in British ecology. As Anker notes, Oliver's department at UCL was especially welcoming of women students and faculty; women even achieved parity with men in the receipt of the Quain Studentship award in the years of his tenure (9). Both Tansley and Frederic Clements married trained ecologists, the Ediths Chick and Clements, respectively, who often assisted their husbands in the field, pointing the camera, sketching in the notebook, looking closely and carefully at the working of time on a particular plot, and looking again.[69] In American ecology, women studied at the University of Chicago with Henry Cowles, the ecologist responsible for coining the concept of plant succession, a point not made clear in the print record, either primary or secondary, but hinted at in the photographic record of field survey. Robert Kohler, for example, includes one image of Cowles "clowning" with students, including three beaming women field workers (81). Documentarians of time passing, of the working of time on things, women researchers were gathering quite a bit of the data used to generate the field of modern ecology. And their work, responsible and responsive to the changes wrought by time, was trained through the prompting of interested thinking and feeling that ecological knowledge work is.

Tansley's outreach efforts provide a glimpse into the training of these women field workers, and into the epistemological, ontological and ethical value system that accompanied women's ecology in the early twentieth century. While it might appear at first blush that the

[69] See Robert Kohler's *Landscapes and Labscapes: Exploring the Lab-Field Border in Biology* (2002): in his chapter titled, "Taking Nature's Measure," Kohler includes an especially funny, almost slap-stick, picture of Edith and Frederic Clements in the field, cameras and notebooks at hand; Edith is stooped behind her husband, whose upper half is lost down a rabbit hole of his own making (125).

women workers in the Bouche d'Erquy are purely invested in observation, their reiterative observations were actually entrenched in an experimental botany. In 1935, from the seat of his Sherardian Chairship at Oxford and in the same year in which the ecosystem concept hit the pages of *The New Phytologist*, Arthur Tansley took the time to write the forward to an unassuming book on plant science education, Lilian J. Clarke's *Botany as an Experimental Science in Laboratory and Garden.* The "record of Miss Clarke's work—her ideas, her plans, her methods, her difficulties, and her successes," is "a story of absorbing interest," in Tansley's words, and is "packed with useful and practical records and suggestions of all kinds" (xv). Clarke, a teacher of botany at the James Allen's Girls' School in Dulwich, "frequently amazed" Tansley—her former classmate—"at the boldness of her schemes" for teaching botanical research practice at the school, which included not only a careful laboratory program, but also the building and maintenance of botanical gardens designed for the ecological study of Britain's primary vegetational communities (xv). By 1935, the gardens at J.A.G.S. would have been operational for almost forty years, begun in 1896 at the very beginning of the turn towards ecology in plant biology. Working quite specifically within Tansley's dictates for ecological interest-based pedagogy, Clarke built a place for this work to be done on the outskirts of London. For girls hoping to become scientists, for girls hoping to become wives and mothers, for girls hoping simply to become, Lilian Clarke created a garden in which to learn the fundamentals of botanical science; in her words, "training in manipulation, in recording results, in comparing individual results with those obtained by others, and in drawing conclusions from a great number of facts. Any results which differ from the majority are not slurred over, but carefully examined, and possible explanations of the discrepancies are often suggested by the girls themselves" (v).

Markers of interest pedagogy abound in Clarke's and Tansley's description of the educational praxis at J.A.G.S: the dexterous handling of apparatus and garden, the precise recording of observation, the ability to mark variations on a theme and to suss out the chink in the pattern, the dictate that girls "*should do things for themselves*," as Tansley emphasizes, all characterize Clarke's scientific training (xv). Experiments were set up and carried out by the girls in the laboratory—questions asked, hypotheses offered, apparatuses designed—and gardens were also placed in the care of students in teams during the year, each team accountable for designing experiments tracking succession, pollination, photosynthesis, light density, and colonization, as well as the gardens' maintenance and keeping (Clarke vi).[70] In doing this interesting work, students and teachers often found themselves lingering in the schools' botanical gardens on holidays and after hours, despite the constraints on time that the school day required (Clark vi). But even within the "one lesson of one hour per week" that was allotted to the schools' most junior botanists, pollination experiments provided opportunities for girls to gather information, to document in-formation, in minutes extended by careful observation and experimentation. For Clarke's students,

> Visits of insects to flowers are a great source of interest. From very early days classes went into the garden to watch insects visiting flowers. The girls noted the kind of insect visiting the flower, the part of the flower on which the insect alighted, the part of the insect dusted with pollen, the number of flowers of the same species visited by the same insect in one minute, and any other interesting facts connected with pollination. (66)

[70] This includes the *aesthetic* design of the gardens; as Clarke notes, garden work at J.A.G.S. was a practice that united scientific and aesthetic ways of seeing, a practice in which scientific inquiry is learned in gardens beautifully, even picturesquely, designed. Indeed, it was the inherently interesting beauty of these gardens that made J.A.G.S. a destination for life science educators from across Europe, attracted not only to the boldness of Clarke's pedagogical experiment, but to the beauty that was wrought from within it (59).

Here, a temporal tension, between the time on the clock and the temporalities of botanical change, requires Clarke to deploy an interest-pedagogy focused on the in-formative work of bees in the garden. Apoidean temporal rhythms come to her aid, generate interest, and teach scientific praxis. The spatio-temporal scale of interesting ecological garden work, then, is slow and small: perceiving the crucial weight of small alightments, Clarke's pollination students perceive the in-forming of life itself.

However, these moments of sustained, interested thinking in the J.A.G.S. gardens produced an immense amount of experimental data; as Clarke relates throughout the text, the data from the experimentation conducted at J.A.G.S. at the time of her writing (4,000 experiments "made to see if pollination is necessary for the formation of fruit;" 300 experiments on the porosity of leaves, to name a small subsection) were impossible for teachers to corroborate, an instructional reality that lends towards the primary ethical work of Clarke's experimental pedagogy: responsibility. "It is good for pupils to have responsibility, and to feel the recorded results must depend on their own unaided work," Clarke states, "It has been found that the fact that they were helping to build up the school records does appeal to the girls' sense of responsibility'" (vi). Here, the circumstances of information abundance caused by interest-based pedagogical practice generates a certain fastidiousness to the archival record. But, as Clarke's account goes on to elaborate, responsibility is also taught as the ability to respond to the tangle of agencies, both human and nonhuman, that garden life is. Clarke's girls learn how to handle contingency: in the design of an apparatus, in the preparation of a microscopic slide, in the introduction of an especially voracious species into a plant community. She notes with humor, for example, the efforts to eradicate the conquering buttercup amongst the school's oakwood, which threatened to choke out all other ground cover: "In 1917, 7,865 plants were

removed in May and July, but in 1918 the number had increased so enormously that a special effort had to be made so that the girls should not have to acknowledge themselves beaten by the plants" (122). Watching succession at work in their oakwood garden, Clarke's students also found themselves called upon to maintain their apparatus, to tinker with it, to handle the result of a lovely thing introduced in a careless way. For many British women and girls, then, the epistemological values of interest-based ecological education generated an ontological and ethical position of responsibility, of responsivity.[71]

The widespread influence of teaching like Clarke's, which by 1935 was prevalent among a variety of secondary schools, as Tansley notes in his forward, helped give rise to the perception of ecological documentation as (a) feminine interest, an inheritance of its roots in botanical study, which has long been understood as a distinctly feminine practice, both in Europe and America ("Forward," xv).[72] The gendering of ecological documentation produced an epistemological, ontological, and ethical divergence within the field. As ecological science became more carefully institutionalized upon the success of Tansley's reform of plant biology, branches of ecological study and application excluded women researchers entirely. Following the

71 Clarke's teaching participated in the production of a slew of modern female scientists trained in gardens to do exactly this. The school produced at least two researchers of note in plant science at the time of the book's publication: Dr. E.M. Delf, whose work on marsh plant transpiration was published in *Annals of Botany* in 1911 and 1912, and Dr. Winifred E. Benchley, a UCL classmate of Tansley's under Frank Wall Oliver, and botanist at the Rothamsted Experimental Station, whose book, *Weeds of Farm Land* (1920) showcases some of the research on pesticide development begun at that complex. But as Tansley reminds us, "there must be scores of others on whom her influence and their experience at Dulwich have left a lifelong mark" (xv). Many thanks to James Allen's Girls' School archivist and librarian, Ellen Curran, for confirming this link; the proximity of Benchley and Tansley at UCL suggests the fascinating possibility that one of the unnamed gleaners of ecological data pictured in "Methods of Survey," could in fact be Benchley. The novelist and paleobotanist, Marie Stopes, was also a student of Oliver at this time—perhaps she, too, is figured in this photograph (Alt 120).

72 See Michelle Boswell's recent essay, "Women and Science." *The Routledge Companion to Nineteenth-Century British Literature and Science.* Ed. John Holmes and Sharon Ruston. (New York: Routledge, 2019): 53-67 and Mary R.S. Creese's *Ladies in the Laboratory? American and British Women in Science 1800-1900.* (Lanham, MD: Scarecrow P, 1998). And Patricia Phillips's longer history of women's scientific training and education, *The Scientific Lady: A Social History of Women's Scientific Interests, 1520-1918* (Palgrave, 1991) provides a nuanced perspective on women's longstanding participation in science—and science's feminization as a discipline before its university institutionalization in the waning years of the nineteenth century.

form of trends in higher education more broadly, ecological science fell prey to the paranoia towards feminization that, as Linda Eisenmann has noted, accompanied the opening up of college access to women and girls in the late nineteenth and early twentieth centuries (8). In Anker's account, botanical ecology struggled to retain serious male students in part because, as Tansley suggested, it was known for its "reputation as rather a girl's school subject." In contrast, zoology, and eventually animal ecology, was much more appealing to the "biologically minded-boy" (Tansley, cited in Anker 105). In the hands of founder Charles S. Elton, animal ecology benefited greatly from the gendering of ecological interests, offering "a way for male botanists to gain entry into a more respected research environment. A broad ecology would be more appealing to Tansley's prospective male students than botany, which was easily associated with the typical female activity of picking flowers" (Anker 106). For Elton, animal ecology was an especially masculine study: his foundational methods text, *Animal Ecology* (1927) uses entirely masculine pronouns, a fact which would not be so damning had he not also refused to admit women into the Oxford program until the late 1940s; even then, his first female student was admitted upon the condition that she do the dishes (Anker 106). Ecology, then, theorized from within botany, suffered from a gender problem that was also a problem of appearances, and specifically, the appearance of interested ecological knowledge *in* gardens and fields: its body was too feminine, its activity too tame, and its cognition too unfocused, driven by the *dérive* of the flower picker, collecting a bouquet.

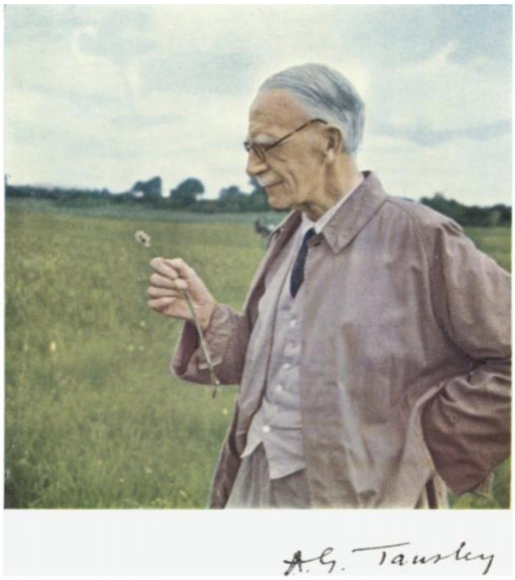


Figure 11: Photograph: A.G. Tansley, flower-picking. Uncredited photograph

In response, ecology became attached to the more masculinized traditions of imperial exploration, upkeep, and economic management, and particularly through Elton, whose influence on the field was extensive. An alumnus of the three entirely-male Spitzbergen expeditions conducted, funded, and organized by a group of Oxford undergraduates in 1921, 1923 and 1924, Elton would also have been an alluring figure as one of several adventurers who, putting scientific interests secondary to exploration, framed their journeys in the north in a distinctively masculinized language of conquest and warfare. These expeditions adapted post-war skill sets and technologies exclusive to men, namely aerial surveillance, to earth observation, developing techniques that would be adopted by imperial ecological research later in the century.[73] One way to understand Elton's exclusion of women from animal ecology, then, is to attend to how the

[73] The expedition publication, written by lead organizer (and eventual naval officer, Hudson Bay Co. executive, and knight), F.G. Binney, is rife with images of men doing the hard work of organizing logistical lines of "attack" and "onslaught" amid the unpredictable Spitzbergen Islands (and amid the whims of their own machinery). As Caroline Pond has noted, in ironically gender-neutral terms, these inter-war expeditions "gradually replaced war and colonization as a young person's chance to demonstrate enterprise, courage, endurance, and organizational ability," and it is true that many of the men recruited to go on these expeditions had military experience, or would go on to earn military experience in WWII (273).

media technologies and technical training available to men and women in the interwar years was embroiled with an implicit bias against women's physical and cognitive ability to do ecological field work.[74] Media matters in how we have understood ecological knowledge and its history, for this turn towards harnessing the observational capacities of technologies of war and surveillance have tended to overshadow—even as they remain rooted in—the lingering research experiments of field and garden.

We arrive at a critical juncture here, among gender, the scale of ecological research, and media: methods of aerial surveillance, an exclusively masculine endeavor, changed the methodology through which most ecologists were trained on the ground. The ecological surveys conducted by Ray Bourne, developed as a tool for colonial forestry management in Rhodesia and later applied in taking a full-scale survey of Britain, are a case in point.[75] Aerial surveillance fundamentally altered the ways that ecological survey could be achieved by allowing surveyors to step back from the object of analysis at the distance of 6,000-8,000 feet. "The Air View," to use Bourne's terms for the human perspective allowed by flight technology, is especially powerful for perceiving large-scale patterns of change—patterns that appear, at this scale, to be distinctly anthropogenic. From the air, a well-trained forester can see how "[u]nder the influence of man the character of virgin forest is modified in one way or another, either directly as a result of clearing for cultivation, or indirectly through the agencies of fire and of grazing animals.

74 Noami Oresekes's observation concerning scientific heroism is well taken here, particularly in reference to the current record of ecological history, which has so little to say about its gendered division of disciplinary labor: "if self-sacrifice is the ultimate way of serving humanity, then women [whose mothering bodies ethically precluded them from self-sacrifice] are denied the opportunity to engage in the most important scientific work. Women are relegated to the inconsequential," she argues, a trajectory she traces among women scientists both well known and unknown (110).

75 See Bourne's "Aerial Survey in Relation to the Economic Development of the New Countries." *Oxford Forestry Memoirs* No. 9 (Oxford: Oxford UP, 1928), and "Regional Survey and its Relation to Stocktaking of the Agricultural and Forest Resources of the British Empire." *Oxford Forestry Memoirs* No. 13 (Oxford: Oxford UP, 1931).

Within the Empire there are still vast areas of forest in various stages of development, both progressive and retrogressive" ("Aerial Survey" 6). Bourne goes on to identify this work as "the special study. . . of the comparatively young science of Ecology," a definition of the field that reiterates ecology's position as a science that responds to the developing awareness of the Anthropocene (6). While ground ecology is often attuned to the consequences of small things—the seeds and shoots of plants, the hands and trowels of girls—then aerial ecology's view attends to larger, more generalized forces, and specifically, the interplay between geological formation and land use that becomes the focus of an ecology conducted from the air.[76]

For while the agencies to which the Aerial View is attuned include man as a species, it excludes the researcher himself, including the personal and subjective attachments to things that typify the pedagogical structure of interested garden work. Observational in nature as opposed to experimental, the Air View has the primary benefit of preventing the particularity of certain landmarks, regions, or features from distracting observers from the entire pattern of a landscape. From this appropriate distance, "the patchwork coloured patterns made by distinct combinations of geology, topology, soil, vegetation, and human usage were plainly visible," but from closer range/lower elevation, "[t]hese patterns are not a striking feature of the Air View. . . because the eye of the observer is continuously liable to be caught by details" ("Forest Resources" 60). Bourne goes on to say that "from a sufficient height detail is lost and the patterns take form and shape" ("Forest Resources" 60). The Air View is, like ground survey, an effort to glean in-formation amid information. But in its emphasis on generality, aerial survey appears to hamper

[76] See, for example, Bourne's description of the Chiltern Hills, which suggests that one reason why the diverse geological sample of the region is so closely planted with grass: the result is not, as Bourne suggests, a result of contemporary market prices for cereal, which would encourage farmers to fallow fields, but the older, longer history of land management put in place by the Acts of Enclosure, which put large tracts of land, regardless of arability, into agricultural production ("Forest Resources" 72).

the cognitive and affective attachment to particularity in service of seeing a larger framework emerge. At distance and with speed, the observer of the Air View is not permitted to linger in a plot: to be sure, his role is precisely to remain outside of the plot, hovering with speed in order to map the general outline of what others before him have wrought.

Viewing the form and shape of landscape from the air—which is not to be confused with the representations of this view via photography and map—constructs, then, a cognitive *disinterestedness* that serves the purposes of economic interests, and especially, the management and control of agencies on the ground. As Bourne reminds readers, aerial survey was adopted by ecologists precisely "to obtain, with relative rapidity, economy, and accuracy, an idea of the distribution of the important forest types an estimate of their marketable contents," as well as to economize the process of conducting science on the ground ("Aerial Survey" 5). Indeed, Bourne argues that aerial survey supplements and economizes a researcher's learned ecological knowledge base by collating ecological knowing on ground and air, so that a researcher might be able to identify, eventually and ideally without setting foot on the ground, the kinds of characteristics that shape a landscape, thus saving time and money on ground survey, if one is required at all ("Forest Resources" 61). "In most cases," Bourne says of his aerially-trained ecological observer, "he should be able to go farther and say what particular surface effect is the most significant in each region" ("Forest Resources" 61). From the air, a researcher should be able to determine among causes of vegetational patterns, human and otherwise, and make decisions concerning how on-the-ground research should proceed in terms of lead discipline (pedology, botany, geology, etc.) and methodology. Primarily, "his" task is to "determine the most efficient and economical method of sampling the regions and select the strips or other areas to be photographed from the air" ("Forest Resources" 61). Choosing what to photograph *in*

advance of ground survey provides "maps for field parties on the ground," and "revolutionizes their work" by paring down the amount of time researchers spend mapping a plot, and by adjusting the focus of their work *away* from noting, plotting, and even creating particular trivialities and towards confirming general trends ("Forest Resources" 61).

David Trotter's argument concerning the airplane as a medium of connectivity is helpful in understanding how the aerial view altered ecological knowing: while field survey required a researcher to remain in one place over time, and crucially, within the frame of representation itself, aerial survey follows "the axiom of connective media" which is to structure the sense of being in "two places at one time. Their [connective media] primary emphasis has always been on instantaneous, real-time, and preferably interactive one-to-one communication at a distance" (8). Here, the aerial view, a product of "time-space compression" does precisely this, advancing the speed of ecological communication by collating and organizing ecological knowing for the purposes of "directness and versatility" in a body that is, effectively, two places at once, both on the ground and in the air (Trotter 219). Photographs used as "maps" now allowed field survey to proceed not only with alacrity, but with less attention to formal contours and more attention to the recording of fact (lists and numbers of species, types of soil, etc.). Indeed, as Bourne suggests, surveyors often traded places, both landed and taking flight, in conducting surveys of colonial landscapes, observations from the air effectively mapped over observations from the field.

The passage also suggests that cutting out the interested cognition of ground surveillance effectively cuts out the personal interests of individual researchers for the purposes of colonial land management, a useful commitment to disciplinary generality that helps researchers deploy specialized scientific knowledge for the purposes of "efficient and economical" data collection;

there would be no experimental reiteration here, as there is within Clarke's garden. From this perspective, the disinterested aerial observer, rather than proceeding with a lingering interest, needs a mobile and fluid working knowledge of a variety of scientific disciplines in order to make recommendations as to how ground survey should proceed; this kind of knowing is both institutional and, crucially, *comparative.* Indeed, the emphasis on comparative scientific knowing offered by Bourne in "Aerial Survey in Relation to the Economic Development of New Countries, With Special Reference to an Investigation Carried Out in Northern Rhodesia" (1928), is fundamental to his claim for the practice's epistemological and economic value: aerial survey provides a common, because generalized, "perspective" from which a variety of university-supported sciences, both biological and economic, can work out issues of colonial land management (7).

The model of the comparative, disinterested male ecologist should not be understood as necessarily at odds with the interested garden worker, but as a mutation of this epistemological history that has come to overshadow its trivial roots. Something unique happens to the framing of interested ecological cognition in Binney's account of Elton's scientific training, for example: within the masculinized environment of the expedition, ecological thinking loses its responsive relationship with particularity and becomes a comparative weapon that establishes generality. The lead scientist on all three expeditions, Elton was valued precisely for his flexible training as an interested ecological thinker; a "comparative scientist," who could "link geology in the workings of his mind with kindred subjects," Elton was the prototype for the kind of researcher that the expeditions, as explorations, required (Binney 35). "On one side of him," Binney states in reference to this ideal researcher, "he has glaciology and meteorology, on the other side he is in touch, through paleo-botany, with botany, and through botany with the wide ramifications of

biology. . . in choosing our staff of scientists 'comparative' was the password, for a staff organised on these lines ensures a network of common interests and a constant interchange of ideas and theories" (35). Here, the language of disciplinary comparativism replaces Tansley's commitment to individual interest, even as interest's associative and constructive work remains crucial to the conducting of comparative science. This is a perspective distinctly generated by men's work and education, and by the technologies of perception to which men had access; at the same time, it allows writers like Binney to upgrade the terms of ecological science as a professional and technologized endeavor that, by nature of being professionalized and technologized, can no longer be mistaken for flower picking. This comparativism, implying speed, efficient data management, and organizational clarity, a perspective attained from the rarified air of university science and its media, looks quite different from the interested thinking and feeling, often so wandering and slow, of field and garden work.

At stake in this alteration of interested ecological thinking is an ethical divergence as well. Via the Air View, the interested tactility of botanical knowing gives way to the disinterested optics of colonial surveillance, in no little part because at this juncture ecology begins to lose its focus on the potential import of the movement of the *things* in which it is interested. Rather, by putting the *researcher* into motion, ecological science risks deanimating this crucial particularity. The world, from the Air View, emerges as pattern and shape, but not motion; it becomes a thing acted upon, and on which to be acted. Note, for example, that Bourne's Air View assigns agency primarily to humans, directly and indirectly (fire, grazing) here; the materiality of nonhuman agency, often too small to register from the air, fades into inert matter. From this fundamental shift in ecological ontology, an ethics of responsivity blooms (or fades, depending upon your perspective) into an ethics of management. From the responsibility

to attend to the landings of bees, to the spreading of seeds, and one's own renderings in an oakwood garden to the imperial control of Other men's uses of landscape, the ecological ethics performs differently at different elevations and speeds, and through different eyes.

In recounting this history of gendered ecological cognition, my aim has been to point towards the ways in which perceptual technologies alter information processing practices, a project that in turn morphs the epistemological and ethical outcomes of the field. Prose presentations of scientific methodology are no exception, particularly as written manuals were key pedagogical documents for teaching ecological knowledge. Comparing the intricacies of Clarke's and Bourne's prose clues us in to the cognitive difference in men's and women's ecology in this moment, as influenced by media. As a methodological text, Bourne's prose attempts to represent the Air View for the reader on the ground, to recreate a sense of spatio-temporal distance—often in conjunction with the photographic mosaics that accompany both of his accounts—that puts the reader in the cockpit alongside the aerial observer. Its prose is distinctively observational: we fly over the entirety of Britain in roughly the same number of pages that it takes to explore Clarke's laboratories and gardens, proceeding systematically through lists of anatomical description. Clarke's manual, however, offers the reader something quite different. Also organized as a listing of "regions" within the J.A.G.S. space and illustrated with photographs, echoing Bourne's organization of "Forest Resources of the British Empire," Clarke's descriptions of the work done in her gardens bring readers back to the same plots, phrases, and experiments, looking for pattern, looking for particularity, time and again. The previously cited description of pollination studies, cited again here, is a case in point:

> Visits of insects to flowers are a great source of interest. From very early days classes went into the garden to watch insects visiting flowers. The girls noted the

> kind of insect visiting the flower, the part of the flower on which the insect alighted, the part of the insect dusted with pollen, the number of flowers of the same species visited by the same insect in one minute, and any other interesting facts connected with pollination. (66)

Deeply reiterative, each subsequent phrase treading ever so slightly on the one before it in listing particulars to notice and record, Clarke's syntax creates space within the description of experiment here for us to linger. In an almost nonsensical repetition of the pattern of observation—insects visiting flowers—Clarke's careful explanation of pedagogical practice participates in the kind of experimental program she desires to teach, a program that returns us to the same space, time and again, to look for particularity. Indeed, it is not for nothing that Clarke reiterates, with a slight difference, the Forward's description of ecological knowledge work here again in the plant pollination section: "The pollination experiments, in particular, afford a training in manipulation, in recording observations, in comparing the results with those obtained by others, and in drawing conclusions from a great number of facts," she echoes, noting, this time, the alignment of pollination with this goal (63). Critically, the comparative work that is done here does not move quickly across general fields of scientific knowledge, but compares the nuances that emerge among experimental data sets, reiteratively collected.

What I aim to mark through this close attention to Clarke's syntax is the extent to which interest's aesthetic form—the slight variation on a theme that keeps interest attuned to difference and pattern—is caught up in figuring ecological knowing on the ground, and how this form structures a kind of sustained looking at a space in time, a temporality that pervades Clarke's seemingly inane descriptions of experimental methodology. We linger, then, as students do, over buzzing plots, marking the alightments of bees as they alter the growth of a flower, a lesson, a

sentence. Indeed, Clarke's prose appears almost overtaken throughout the text by these small agencies, human and nonhuman, as they form the shape of her text. We could chalk this up to Clarke's inexperience as a writer, as Tansley does: "she does not always present her material in a way useful to contemporary teachers who wish to follow her example," he suggests (xvi). But what seems more likely is that Clarke's prose responds, like Bourne's, to the viewpoint of her teaching and study, one that is done on the ground, and with student interest always dabbling in the scene.[77]

This history demonstrates a set of feminized educational objectives at the center of western science that suggests that we need not always understand ecological thinking as yoked to systems of control and regulation, an inevitable effort to enframe matter, making the human the only differential that really matters. On the contrary, Clarke's teaching and text offer many moments for students to see the differences affected by many small things, made otherwise inconsequential by an ecology focused on the human as the primary geological actant.

This history also shows that this alternative genre of ecological documentary has not always been visible precisely *because* of its gendering, on the one hand, and the research media available to those genders on the other. Interested thinking and feeling has often been trivialized precisely because of its attention to significant, if tiny, things, and because of the women whose bodies did that work. At the same time, as Virginia Woolf reminds us, women would not have had access to an airplane, although pen and paper would have been both affordable and accessible (*AROOO*

[77] It should be noted that Clarke's text is not immune to the confrontational language indicative of Binney's text, and manifested in Bourne's state-sponsored use of aerial photography for ecological survey: the phrase "to acknowledge themselves beaten by the plants" comes to mind, in reference to the grand buttercup debacle of the 1910s. In the case of Winifred Benchley's *Weeds of Farmland,* the language of management, control, and warfare is quite prominent, an idea caught up in the very concept of "weed" itself; indeed, in a semiotic twist of the gendering I have just laid out, it is notable that Benchley's weeds attack and are prone to attack (91, for example).

84).[78] Indeed, that Clarke's methodology is billed as a "story of absorbing interest" (Tansley, "Forward," xvi) while Bourne's is framed as a "detailed regional description" ("Forest Resources" 67) suggests that ecological gendering is also an issue of women and fiction, and the ways in which women think, perceive and document their relationship with life through prose. That Clarke's work is primarily experimental, while Bourne's survey is observational, suggests a framing of these scientific prose forms that echoes Woolf's own theories of prose form, a reading that the next sections take up. Here, however, Clarke's experimental narrative, a narrative of lingering attention to particularity, fades into an account of British ecology as an effort to observe and describe, for the purposes of economic gain, a general outline of the entire Empire. There are, then, material concerns presented by media that have contributed to the burying of this history, and perhaps have also shaped how we understand Woolf's fiction as an engagement with ecological experimentation, training, and knowing. With this history in hand, the following sections propose that this feminized ecological experimentation offers a powerful scope for understanding Woolf's prose experiments with cognition, agency, and materiality. In Woolf's gardens, we explore a cognition that experiments with the form of life, and, in doing so, both accounts for and relinquishes its agency through the act of documentation.

In the Garden

Readings of "Kew Gardens" tend to proceed from the (familiar) modernist position of perceptual defamiliarization, framing the story as an experimental apparatus for seeing and recording information that tends towards things too small or insignificant to register within a

[78] Le Corbusier's *Aircraft* (1935) is of course a significant primary source that bears out this link between modernism, masculinity, and the Air View. See also Robert Hemmings's essay, "Modernity's Object: The Airplane, Masculinity, and Empire." *Criticism* 57.2 (2015): 283-308.

particular understanding of realism against which modernism defines itself. Critics and scholars, returning to the short story and landing among its petals and blossoms again, and again, have long lingered with the story's omniscient narrator, a diffuse, if enduringly sticky literary perspective that has encouraged a wide-range of comparisons with defamiliarizing practices attuned to the tiny and trivial. Frank Stevenson, for example, has argued that the story's lingering form, "experiment[ing] with the concept of ourselves looking at a particular circumscribed space or place. . . over an indefinitely extended period of time," is perhaps influenced by quantum theory; within his reading, the famous opening passage of "Kew Gardens"—the sustained examination of the oval garden bed—would have been "suddenly unfamiliar," an odd moment of encounter with the world at close-range (5). Diana L. Swanson, too, suggests that as an architectural apparatus for seeing, "Kew Gardens" reports a renewed subject/object relationality by "twisting the reader's metaphorical neck into unfamiliar positions, asking her reader to view the world from odd angles, and thus to recognize and consider unfamiliar perspectives on what is real" (Swanson 70). More recently, Kelly Sultzbach has understood the story as one moment in Woolf's *ouevre* that, following Christina Alt's analysis of Woolf's work as connected with the field of ethology, "destabilizes the reader's sense of scale, suggesting that there is life worth recording not only from our own perspective, but also from the viewpoint of insects and snails, all interlaced within the world's thick flesh" (97). In these accounts of the story's structure, the unfamiliar and the small are linked concerns, and Woolf's omniscient narrator brings these tiny, but significant details—what Mathilde La Cassagnère terms "heavy nothings"—to the surface of the text (1).

These readings are especially compelling if we consider the predominant viewpoint of modernism as the speedy aerial view, as Sultzbach does, for example, referring specifically to

masculine ecological observation (13). But in framing the viewpoint of "Kew Gardens" as an apparatus of perceptual defamiliarization, critics of this short story have missed the significant, if seemingly tiny, observation that the narrative's perceptual work would not, in fact, have felt so unfamiliar to many of Kew's visitors and workers, and especially its women, trained in gardens like Clarke's to observe a plot's particular detail over time. Rather, its cognitive contours are indicative of interested ecological thinkers trained in botanical experimental praxis. The common epistemological through-line among these accounts of the experimental structure of "Kew," then, and its emphasis on re-valuing the tiny and insignificant, reflects not only a common point of intersection among Woolf studies, but the gendered history of perceiving, collecting, and recording ecological data.

To read the story in this way first requires a suspension of the predominant ecocritical interpretation concerning the narrative's omniscient perspective: I am taking an unabashedly anthropocentric tack here, a move I take in response to Woolf's theories of prose.[79] "Modern Fiction," after all, makes the claim that "For the moderns, 'that', the point of interest, lies very likely in the dark places of psychology. At once the accent falls a little differently; the emphasis is upon something hitherto ignored; at once a different outline of form becomes necessary, difficult for us to grasp, incomprehensible to our predecessors" (108). Reading "Kew Gardens" as a record of scientific experimentation and cognition solves for the seeming incongruence between Woolf's materialism and her insistence on consciousness as the stuff of fiction. To be sure, the short story remains attentive to many simultaneously subtle but powerful non-human

[79] Much of the work reviewed here takes this tack, including Diana Swanson's "Woolf's Copernican Shift, Non-Human Nature in Virginia Woolf's Short Fiction," *Woolf Studies Annual* 18 (2012): 53-74; E.D. Kort's "The Snail in 'Kew Gardens:' A Commentary on Ethical Awareness." *Virginia Woolf Miscellany* 84.17 (2013): 17-18, and of course, Kelly Sultzbach's *Ecocriticism in the Modernist Imagination: Forster, Woolf, and Auden* (2016). See also David Hermann's *Narratology Beyond the Human: Storytelling and the Animal Life* (2018) which features a lucid and lovely reading of Woolf's application of life-writing strategies to capture nonhuman subjectivity in *Flush.*

agents—snails, songbirds, insects, and even light, as Louise Hornby argues—in the garden's making (146). But what these readings don't offer is an understanding of how many of Kew's visitors would have used the garden, ignoring entirely the fact that Kew is a site not only for leisure, pleasure, or healing, but also for scientific research. Kew was, of course, the center of imperial botanical research, as has been well-documented, but I want to suggest that it would also have been consumed by its *visitors* as a place of science.[80] This reading becomes clear when we reconsider the story's formal structure not only as a way of playing among human and nonhuman subjectivities, but as a portrait of the fluid, shifting, but by no means irrational, nature of human cognition, driven by interest.

The vague dreaminess of the strollers through Kew might not suggest the kind of rigorous attention to difference that Clarke's garden work professes to teach, particularly if we read the human element of the story only through the movements and conversations of these strollers. However, far from offering any kind of imagination of non-human consciousness, let alone an indictment of human attentive focus, as E.D. Kort has argued, the omniscient perspective provides evidence of interested thinking and feeling both from within and without, marking the physical manifestations of this cognitive experience (19). The "curiously irregular movement not unlike that of the white and blue butterflies who crossed the turf in zig-zag flights from bed to bed" (Woolf, "Kew" 63) are not indicators of "self-absorption," as Kort proclaims, but instead suggests that visitors reiterate the embodied patterns of nonhuman life, forged by interested attachments (Kort 9).[81] Crucially, the "hither and thither" movement of bodies through space

[80] See Louise Wickham's *Gardens in History: A Political Perspective* (2012): 149. Raymond Desmond's authoritative *History of the Royal Botanic Gardens at Kew* (2007) makes this relationship plain. And Jim Endersby's *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (2008) is an essential history that figures Kew as a central site for the performance of "gentlemanly science" and its imperial motivations.

[81] A point that Oliver Taylor has smartly reinforced by his reading of "Kew"'s typescript, which twines human and nonhuman embodiments much more closely than the published draft appears to allow (7-8).

here does not at all suggest distraction, but in fact echoes Woolf's own descriptions of interested thinking and feeling: the "hither and thither, helter-skelter" research work of Woolf's narrator in *A Room of One's Own* is a case in point (28). Other examples persist in the story's description of humans. An old man's ravaged attention is "diverted" with the light touch of a flower: he responds (Woolf, "Kew Gardens" 73). The "ponderous" woman, encountering the oval flower bed through a shower of verbal static, is pinched awake: "as a sleeper waking from a heavy sleep sees a brass candlestick, reflecting the light in an unfamiliar way, and closes his eyes and opens them, and seeing the brass candlestick again, finally starts broad awake and stares at the candlestick with all his powers" (74). Rooted, momentarily, by the stems and blooms of the plot, she stands, swaying, "looking at the flowers," held for a moment to ponder, then to turn towards her tea (74).[82] And Trissie, whose parasol dabbles with the soil for a moment, is caught "looking vaguely round and letting herself be drawn on down the grass path, trailing her parasol, turning her head this way and that way, forgetting her tea, wishing to go down there and then down there, remembering orchids and cranes among wildflowers, a Chinese pagoda and a crimson crested bird" (77). Often appearing vague and rambling, especially in its embodied expression, interest responds to provocations (no matter how small) that open the eyes to something more powerfully seen, the heart to something more powerfully felt.

On a certain level, reading these garden visitors as distracted wanderers reiterates the reading of women's botanical work as flower-picking; Woolf's experiments with cognitive rendering, in which Jesse Matz, Rebecca Walkowitz and James Harker find something "vague," "evasive" and "inattentive," respectively, also faced attempts to marginalize it based upon its

[82] See Taylor's reading of the typescript draft here: "She came to a standstill opposite the oval shaped bed, and [c]eased even to pretend to listen to what other woman said. After a time 'She uprooted herself: & [she] suggested that they should find a seat and have their tea'" (Taylor 7–8).

appearances.[83] As Walkowitz helpfully relates in her exploration of Woolf's prose as a response to war and nationalism, contemporary reviewers (R.D. Charques, Wyndham Lewis, Q.D. Leavis) "contested that Woolf seemed too various in her sympathies, too distracted in her commitments, and too cosmopolitan in her analogies between the psychology of marriages and the philosophy of treaties, between the world of parties at home and the wars of fascism abroad. The early critics of Woolf's style believed that art should be unwaveringly attentive, that any failure of attention led not only to bad writing, but, worse, to 'nasty,' 'preposterous,' and 'dangerous' writing" (83). The contours of these diverse arguments among literary Impressionism, cosmopolitan style, and cognitive misperception[84] proliferate from a position of recuperating Woolf's apparent cognitive inattention with efforts to reject politicized "models of attention," following in the long tradition of understanding modernism's commitment to distraction as a force of political protest (Walkowitz 83). Indeed, in all of these accounts attention and distraction are cut along the intersecting bias of gender and fiction: associating women's cognition with vagueness and confusion (words that come from Woolf herself), these accounts suggest a kind of formal aesthetic recuperation offered up by vague, inattentive, cognitive states, a corrective to a kind of literary realism that aims to render the life of the mind as an accumulation of orderly, continuous perceptions that generate neatly categorized truisms.

In these accounts, women's thinking and feeling is the stuff of modernist form and politics—and yet, none of these accounts takes into consideration women's educational practices and histories. I want to suggest, of course, that rather than seeming distracted, vague, wandering, or evasive, Woolf's cognitive rendering is merely interested. Interest shares a certain peremptory

[83] See Jesse Matz, *Literary Impressionism and Modernist Aesthetics.* (Cambridge: Cambridge UP, 2001); Rebecca Walkowitz, *Cosmopolitan Style: Modernism Beyond the Nation.* (New York: Columbia UP, 2006), and James Harker, "Misperceiving Virginia Woolf." *Journal of Modern Literature* 34. 2 (2011): 1-21.
[84] The keywords for Matz, Walkowitz, and Harker, respectively.

fluidity with these other modes of cognition, but interest's para-critical operation ties its vague affective register to knowledge work. Felix Arnold, writing in 1910, frames this cognitive work (in surprisingly Woolf-ian terms) as a

> budding fringe of meaning or perhaps a dim awareness of the future moment which is to be realised. There need be no distinct image or thought of such a future state. The impressions carry with them, as it were, a wavy, blurred outline of what is to come, a kind of iridescent halo of possibility. When the interest exists, the object is looked at in another light. It means more to the individual. *It lingers longer in the center of the attentive field*. More often, however, the interesting object or situation excites an image or a train of ideas which point to the future moment which is to be realised. These images or ideas are present at times only as fragments, only as piecemeal signs to point the way. (208, emphasis mine)

Here, interest begins as a vague, "budding" feeling that directs attention (and thus also facilitates distraction), opening onto the act of making knowledge from fragmented images, ideas, and associations. Interest encourages us to linger with something that appears unusual, even if we are not sure why: it slows down the pace of perception so that feeling might turn into knowing.[85] As knowledge work, interest responds to what is remarkable within a pattern, and encourages us to associate and build new knowledge from that affective encounter—no matter how small or insignificant it seems.

From this perspective, the close examinations and descriptions of the garden plots offer a glimpse of interest working from within: the omniscient perspective positions readers carefully within the world of the oval bed, offering a chance to watch for particularity and contingency

[85] See Ngai, *Our Aesthetic Categories*, 133.

among pattern, a way to see as a scientist might. At once both a register of anatomical detail and ecological in-formation, the opening paragraph/plot accounts for the fact of "heart-shaped or tongue-shaped leaves," "red or blue or yellow petals" (68). Some anatomical data is registered here, the conjunction 'or' pointing towards difference. And the passage also marks ecological forces: the stirring wind that moves sunlight, directing its energy hither and thither, "either" towards one thing, "or" towards another, shaping, if ever so slightly, barely perceptibly, the composition of the plot (68). Attached to difference via the same conjunction, contingency dabbles among the petals, ferreting about in either/or structure, in the vague "perhaps" of the hundred-flower count (68). What Woolf's syntax structures is an attention to detail that is also an attention to contingency. The oval plot, then, reminds us that *response* to difference is what garden work teaches; we must also become prepared for the plot to confound our expectations for what it may show. If "one expected" the raindrop to burst under the rays, then "instead" we watch wind illuminate the branching cellular patterns of a leaf, settling, if only for a moment, on the form of interest itself (68). The plot sits with this information, marks its shifts, registering "the air above" that bends and wends the plots' in-formation (69). And then it moves on, turning away to the strollers flitting among the garden paths.

To read the story as the record of interested thinking and feeling, then, alters how we understand its form: a pattern emerges of garden-plot-description and people-watching, a sectional and surface view, so to speak, of what interest looks like from within (knowledge work) and without (affective attachment), to which it returns in theme and variation. Deeply reiterative, the story returns readers to familiar plots, requiring us to linger over subtle similarities and differences, in both plot-descriptions *and* people-watching segments. Like the visitors who straggle, ponderously drawn onwards, by what appear to be affective attachments

between minds and matter, between past and present, readers are encouraged to endure among the many "long pauses" of inhabitants and visitors alike, as they linger over memories, sentences, and decisions, persisting in cognitive spaces just before meaning is made, where pattern and difference, data and form, begin to take shape. And then, often without warning, interest can shed these heavy (no)things, and prompt us to turn towards another touch.

And we do: turning back to the plot, readers are offered again another chance to see what life exists there. The pivot is not extreme, thanks to the reiteration of form across the plot-descriptions; after our first encounter with human visitors, the couple and their children, upon whose "backs in large irregular patches" the sun dabbles and dips (and which we have just been watching move in the first plot-description), the second plot-description begins by tracing its coloring of a snail's shell:

> In the oval flower bed the snail, whose shell had been stained red, blue, and yellow for the space of two minutes or so, now appeared to be moving very slightly in its shell, and next began to labour over the crumbs of loose earth which broke away and rolled down as it passed over them. It appeared to have a definite goal in front of it, differing in this respect from the singular high stepping angular green insect who attempted to cross in front of it, and waited for a second with its antennæ trembling as if in deliberation, and then stepped off as rapidly and strangely in the opposite direction. (89)

Presumably, the narrator here has been counting within a human time-scale, lingering for about "two minutes or so" watching another slow being begin to move. Indeed, this being is the difference registered in this plot-description; missing in the opening passage, the snail emerges here as we have been looking around, about, and within the plot, again. That we are seeing as a

scientist sees in this passage remains evident, in that it retains a little distance, hovering, still, over the plot, a physical position I take to be indicated by the repetition of the verb, "appeared," which evokes the suggestion of a watchful eye over the plot, even though, as Sultzbach has argued, the passage might be understood to be registering nonhuman rationality in marking the "deliberations" of insects and snails (99). To be sure, the *comparison* between the snail and the insect suggests that there is another cognitive position marking this difference. Persisting in the plot despite momentary attachments elsewhere, an eye lingers in marking the movement of these small differences nonetheless. Indeed, this is the kind of cognitive work that happens when attending to "things in their homes,"—Tansley's own reiterated phrase to describe interested ecological study ("What is Ecology" 5).

The rest of the passage, and of course the third plot-description, does precisely this, mapping the contours of the oval plot's topography and the architecture of the leaf through which the snail passes. The following passage, immediately following the insect/snail comparison, is crucial, a difference in Woolf's plot-descriptions that opens up a fissure in how this text's experimental form is interpreted:

> Brown cliffs with deep green lakes in the hollows, flat, blade-like trees that waved from root to tip, round boulders of grey stone, vast crumpled surfaces of a thin crackling texture—all these objects lay across the snail's progress between one stalk and another to his goal. (86)

Here, the (little) distance between the observer and the snail's on-the-ground perspective is dissolved as the narrator appears to be seeing the landscape of the plot from the snail's eye view. Pebbles, grass, puddles, dry leaves become vast, tiny things overtaking the plot-description; to be more precise, the shift in perspective makes the ragged, round, crackling, flat

and waving *forms* of the plot legible. The narrative perspective begins to take some representational liberties, here, dabbling with what it looks like to see at this level, at this speed, not least of which is the fact that this section appears to be playing not simply with the snail's eye view, but with depictions of landscape as well. Cliffs and lakes, forests of grass, boulders of stone; these features come together with a crackling tactility, a waving fecundity, that is always interesting: we are looking at a rather picturesque attempt to bring form to life, in prose. This is not simply imagining the world from the snail's eye view, but doing so *through* the conventions of a landscape tradition that has circulated widely through British aesthetic—and as we have seen, scientific—life. A small homage, a seemingly tiny moment: this small passage opens the story's narrative perspective up to a variety of moving, living things, all the while keeping a particularly picturesque humanism at its center.

This is the turning point that encourages us to see "Kew Gardens" as an experiment with non-human perception (either animal or mechanical, as the close-up perspective does also evoke, as Laura Marcus has argued, cinematic techniques of enlarging the small and insignificant);[86] leaving "appearances" behind in the description of the topography of the oval bed, the narrative perspective of the plot-descriptions appears entirely oriented towards the snail, his doubts and decisions, or, alternatively, simultaneously, his infinitesimal movements. Readers are asked to hold several interpretations in hand at this picturesque juncture—to pose a thought experiment about the epistemological and ontological framing of the short story's form. Indeed, the required work demonstrated in this section and prompted on the part of the reader is precisely the kind of *experimental* work that Woolf elsewhere postures as the readerly response to interesting literature. This is decidedly different than the "observational" practice that Alt positions as

86 See Laura Marcus's *The Tenth Muse: Writing About Cinema in the Modernist Period.* (New York: Oxford UP, 2007).

indicative of Woolf's performance of ecological thinking (180). The (1926) essay, "Life and the Novelist," a more extended critique of observational documentary methods than forwarded in *A Room of One's Own,* argues that while observational novels "report" and "describe" what appears to be a life rife with thick detail, this thickness is illusory, because at its heart, the observational method is a *formless* endeavor (133):

> The grudging voice will concede that it is all very brilliant; will admit that a hundred pages have flashed by like a hedge seen from an express train; but will reiterate that for all that something is wrong. A man can elope with a woman without our noticing it. That is proof that there are no values. There is no shape for these apparitions. Scene melts into scene; person into person. People rise out of a fog of talk, and sink back into talk again. They are soft and shapeless with words. There is no grasping them. (133)

Here, information's flat character rises to the surface of prose fiction, a list of nice-to-know facts that, however emotive, are formless and effervescent, unable to be held. This is the problem that we have seen before in the ontology of the (bad) photographic image, which, in Sontag's account at least, flattens out form in figuring a relationality that links every piece of information with every other piece. But this issue is not specific to the photographic image: it is a character of description as motivated by observation, understood as the listing of facts that are not life, but its abstracted representation, the list from which the pattern of life's protean character could be deduced. As Woolf goes on to argue, this kind of descriptive work produces the flattened relationality that allows nothing to emerge with clarity. "Quality is added to quality, fact to fact," Woolf argues, "until we cease to discriminate and our interest is suffocated under a plethora of words" (135). Boredom arises then, not only as an issue of information overload, but

as an inability to mark points of divergence and difference that allows pattern not simply to be perceived, but *to be.*

Texture, then, is lost in the observational method, in part because this flattening of form also produces a kind of perceptual quickness, caught up with the consumption of information. Referencing two (often entangled) media known for their ability to emphasize speed and movement—the train and the cinema—Woolf argues that this formlessness in prose emerges as we glance at information with the speed of an express train, the distinctive features of the hedgerow fading into a green blur. So, too, in the cinema, "we have sat receptive and watched, with our eyes rather than with our minds…what passes on the screen in front of us" ("Life and the Novelist," 134). Prose fiction that echoes these media's observational ontology, moves its audience quickly through time and space, and in doing so, abstracts life forms into a blurred representation (134). We note the appearance of its being, but we can't see the shape of its being (which is also its coming into being). And this is not all: "All this representation of the movement of life has sapped our imaginative power," Woolf claims (134). There is a certain distance inscribed here, then, by media of speed: even as they move an observer through space, they do not allow for the reader to engage with the image, the hedgerow, the passage. There is neither time nor space for tinkering with the object of analysis, to feel its roughness and smoothness, its shape and contour. Nor is there time to allow this feeling to become a making, to become involved in the in-formation of a text's meaning.

If to speed through the details of a text's plot prompts boredom, then Woolf's alternative prose model, inviting readers to participate in the meaning of a text by *slowing down* the process of reading and encouraging readers to tinker with its form, is the more interesting approach to prose. For Woolf, there are moments in Stern's novel where "the flow of words seems to darken

and thicken. We are aware of something beneath the surface, something left unsaid for us to find out for ourselves and think over. The two pages in which we are told how the old woman died asking for goose-liver sausage and a tortoiseshell comb, short though they are, hold, to my thinking, twice the substance of any other thirty pages in the book" (135). I am struck, here, by Woolf's choice to convey slowness through the language of tactility: in these two pages, full of substance but not of stuff, the reader is slowed through the thickening and darkening of syntactical detail, where sentences become, simultaneously and counterintuitively, more solid and less visible, figuring less information, but taking on form. This form is less detailed, but more palpable and even manipulable, if not quite ocular. Feeling our way through the form of the sentence, we begin to leave marks on its surface: the reader must work at the formation of knowledge here, supply some distinction, some pattern, some meaning, through which we navigate this dark, thick space at a snail's pace. We give the pages form as we approach their sparse visual detail and weighty substance through the handiwork of imagination, of previous knowing, of associations: of our own interest at work. And we do so by slowing down and experimenting with the information at hand, invited, alongside the novelist, to breathe life into the sentences we encounter. The text, creating conditions to experiment as opposed to observe, reaches out for our hands, in search of form.

A snail emerges, then, as we linger with a moment of contingency with which we must grapple, a moment wherein a choice can be made about how to read the cognitive and perceptual rendering of this short story, and where its formal vitality lies: do we see as a snail sees, or do we see as scientists do? Whose life is animated here, and whose life is stilled? At first blush, the third and shortest plot-description seems to settle the question for us, featuring the critical triviality of the crumbling leaf, forcing the snail's decision to nestle in its "cool brown light"

instead (93). Seeming to set aside the trappings of any kind of humanism, the narrator apparently sheds her human perceptual patternings to sink into the snail's world. However, another way to read this moment is one of intense interest in the snail and his home, a moment where the subject is grasped by the interesting object, an object that then forms its cognitive contours. Here, to see as a scientist sees *is* to see as a snail sees.

But this lasts only for a moment; almost as soon as we settle here, the perspective vacillates again, to use Allan McLaurin's description of the spatial relationship of Woolf's "lingering temporality," moving "from the near to the far, from the large to the small" (McLaurin 93), that shifts the perspective to the drawing onwards of Trissie to the tea room, and eventually back out in the garden itself, (ending as it began) "flashing its colours into the air" (98). This scene is alive with agencies of all kinds. While nonhuman forms—the thrush, the butterflies, the palms in the conservatory—do the most apparent action, "hopping," "making," and "opening," we need not read the humans in this scene as non-constitutive, because languishing in the heat, reduced to "shapes of colours. . . dissolving like drops of water into the yellow and green atmosphere, staining it faintly red and blue" (97). Rather, human bodies take up the creative work that light performed in the first and second plot-descriptions, "staining" the landscape with color just as beams of light and moving leaves stained the earth of the oval bed, the snail's shell. Notably, "stain" evokes not only photographic and painterly representation via ink and paint, but also scientific practices of making the tiny visible via ink on microscopic slides; humans, like light and wind, also leave prints upon the garden. Their words dissolve into voices, their bodies into stain, but they persist, making the garden at the center of a modern metropolis.

This short story is not a form without the human, even if it allows the human to slip into shadow, dots of color under trees. Indeed, the human hides, too, as I have been suggesting, in the

omniscient perspective, so indicative of feminized ecological experimentation, stooping over shoots and roots, crackling leaves, creeping snails. As we have seen, this experimental subject accounts for herself in the registration of data and form, even as she allows other agencies to make a difference. That the recent critical history of "Kew Gardens," vacillates between understanding the story as intersubjective and human, objective and mechanical, or intersubjective and nonhuman speaks to this point: feminized ecological knowing documents many (often trivial) garden workers, and thus, many alternative, if simultaneous, readings of its cognitive perspective. This applies, too, to the gendered history of ecological thinking I have drawn out thus far: in alighting on bodies both feminine and feminized—notably, the visitors upon which the narrator settles are either women, or attached physically or affectively to women—this cognitive rendering echoes the feminization of this mode of thought, while refusing to remain attached to any particular gender. Rather, the story suggests that interest lives in any one of us.[87] After all, as Woolf states elsewhere, fiction by women must not "insist upon its femininity" even though "a woman's book is not written as a man would write it;" in many ways, the omniscient narrator of "Kew Gardens" almost refuses to take on a form, resisting the gendered history that has trivialized its protean cognitive contours ("Women and Fiction," 147). But it is, of course, precisely these contours that make interested humanism so difficult to perceive in the story's form, and within ecological history. For interested thinking also opens the human up to the nonhuman, making the distinction between mind and matter difficult to parse: do we observe a snail as a scientist might, or do we see as a snail sees? The story doesn't insist upon either reading: it allows them both to live.

[87] Bonnie Kime Scott's observation that Woolf's gardens are often queerly and androgynously inhabited spaces seems useful here, of course, in that she suggests that Woolf's gardens are not sites where humans are figured within gendered difference, but as bodies open to gender conflation and nonconformity (99-101).

Nestled within the heart of imperial botanical science and its distinctively anthropocentric history, then, there exists an ecological humanism that takes a "different outline of form": it refuses to either insist upon or lose itself in the practice of documenting the relationships among things, in their homes. It is vanishing, to use Judith Ryan's description of Woolf's rendering of subjectivity, but not vanished; it "[n]either presses selfhood too far nor permit[s] its own total dissolution" (206). If, as Ryan suggests, this rendering of subjectivity creates a prose form that "holds the balance between these two extremes," then we can read Woolf's subject as not simply requiring, but as *creating* the precise environment in which this ecological humanism persists (206). In drawing out the ways in which the narrator of "Kew Gardens" shares a cognitive and something of a literary style with feminized ecological science, my argument has suggested that this widespread model of scientific instruction might have found its way into Woolf's writing. Creating this narrative of influence has been essential to understanding how Woolf's writing has engaged specifically with ecological thinking. But in recuperating this feminized ecological cognition and reading it alongside Woolf's fiction, I work towards another related purpose: positioning Woolf's writing as critical to understanding the nuances and ambiguities of this under-documented scientific history. For ecology, like Woolf's modernism, is birthed in a modernity defined by a lively object world that troubles the boundaries of identity and wherein the influence of other media encourage the reimagination of documentary prose not only in literature, but in science as well.[88] The relationship between these sets of texts, then, is not simply one of suggested influences, but one of origins, emerging from a similar set of concerns surrounding the documentation of actuality, the cognitive requirements of that task, and the

88 See Jonathon Foltz's *The Novel After Film: Modernism and the Decline of Autonomy.* Oxford UP, 2017, which details how the ambitions and failures of representation offered up by film altered Woolf's theory of what fiction could and should describe.

significance of that cognition on notions of identity. In the next section, I approach *To The Lighthouse* not as another case study for feminized ecological knowledge work (although it is also that), but as an experiment in understanding the nuances of experimental documentation that affect ecology and Woolf's modernism alike. How does one document the responses and responsibilities of the researcher, if in the act of documentation, identity becomes loose, even perhaps at moments, lost? Within what kind of prose might this particularly vulnerable bloom linger?[89] *To The Lighthouse,* taking formal cues from Clarke's stammering prose, echoes this interested ecological thought; in doing so, it offers an opportunity to plumb the ambiguities of inhabiting this particular ecological subjectivity which are so difficult to parse from within this science's history. For while Clarke's prose encourages researchers to dabble persistently among garden spaces, it only hints at, and does not document, the promises and perils to identity that this work entails. Indeed, this is the disciplinary difference between experimental ecology and Woolf's experimental fiction: Woolf's fiction is a map of the ecological mind, and its mode of being in the world.

Prosaic Alightments

Survival amidst surrender is a common theme in the critical history of *To The Lighthouse,* an issue that has long been associated with a theory of fiction that makes meaning experimentally. As Eric Auerbach has famously suggested, the novel creates a reading experience that documents "something new and elemental. . . nothing less than the wealth of reality and depth of life in every moment to which we surrender ourselves without prejudice" (552). This articulation of

[89] I make use of the horticultural definition of lingering here: "to delay the blooming of (flowers) by artificial means" (OED).

readerly surrender to the actuality created in the text's experiment extends, of course, to the characters wrought within it. From Douglas Mao's perspective, the novel's many acts of artistic making both threaten and suspend subjectivity, operating as "an intervention in the material that sustains the miracle and the ecstasy of the human dead and the object world, and yet also brings them into ordinary experience" (63). And Bonnie Kime Scott's ecocritical analysis also suggests that the novel is an act of experimental documentation, constructing a fresh actuality in which the novel's women might survive the inevitability of modern time, passing. Understanding the reiterated pattern of this novel as "collages of modernist bits and pieces," created by women searching for a new world order, Scott argues that the many moments in which women observe a plot of landscape serve to construct a "survivable system, a "model of holistic environmental order" which they might inhabit (219). What I want to forward here is a reading of *To The Lighthouse* that positions its prose form as critical experimental ground for perceiving and preserving modern ecological subjectivity, a task that this science's history has struggled to achieve. I harness the long history of Woolfian subjectivity, then, not only to suggest its likeness with modern ecological thought, of course, but to position *To The Lighthouse* as a critical ecological, experimental document, one that allows this form of ecological thinking to remain in bloom.

The flower at the center of the garden, Mrs. Ramsay's thoughts and feelings predominantly pattern "The Windows" section of the novel. From external accounts of her character, including her own quips here and there, Mrs. Ramsay's cognitive rendering echoes the trivialization of feminine knowledge work that has formed this chapter. In her own words, she often frames her thinking in middling terms, content to "trust herself utterly" to "the admirable fabric of men's intelligence" (106). Mrs. Ramsay does not know, for example, what a square root

is, although "[h]er sons know" (105) and she famously describes herself as "nothing but a sponge sopped full of human emotion" (32). From the perspective of other characters, her intellect is almost obsessively framed as nothing special: gossip suggests she is "Nothing but looks; Or was there nothing; nothing but an incomparable beauty which she lived behind, and could do nothing to disturb?" (28). Lily, her head against Mrs. Ramsay's knee, grieves the extent to which, for her, "Nothing happened. Nothing! Nothing!" (51), and of course, to Mr. Bankes, "her presence meant absolutely nothing to him; her beauty meant absolutely nothing; her sitting with her little boy at the window—nothing, nothing. . . he had nothing in the world to say to her" (89). What I want to mark here is that from an external point of view, Mrs. Ramsay's work—all the knitting, gardening, match-making and planning that binds the family and its guests together—remains trivial, a secret of her nature.

This sense of nothingness is reiterated in Mr. Ramsay's understanding of his wife's intellectual labor, a labor that is clearly identifiable as the cognitive work of interest. The lovely passages depicting Mrs. Ramsay's reading of Shakespeare before bed are a case in point. The passage begins, after many pages of omniscient narration, in the first person, situating us squarely within her character: "There is something I want—something I have come to get," Mrs. Ramsay tells us as she knits, hands weaving, while the lyrics of 'Lauriana Laurilee,'—'the China rose is all abloom and buzzing with the honey bee,'—find their way into her mind and set aglow and a-flight "words, like little shaded lights" that "fly across and across, or to cry out and to be echoed" (119). Associating among the sprouts of thoughts, "the odds and ends of the day," gathered throughout the movements of "The Windows," Mrs. Ramsay reaches out for words, for a text on which 'Lauriana Laurilee' might alight: "so she turned and felt on the table beside her for a book" (119). Here, an internal view of Mrs. Ramsay's cognitive work echoes apoidean

flight, “reading here and there at random,” nestling into words and sentences by “climbing backwards, upwards, shoving her way up under petals that curved over her, so that she only knew this white, or this red” (119). Of Shakespeare’s Sonnet 98, which she has picked up at random, “she did not know at first what the words meant at all,” but “she read and turned the page, swinging herself, zigzagging this way and that, from one line to another as from one branch to another, from one red and white flower to another, until a little sound roused her—her husband slapping his thighs” (119). Merely interested, Mrs. Ramsay does not yet know what pattern will emerge among these pages, but she lingers with them, allowing their form to emerge. Puzzling through the sonnet’s comparison between flower and woman, the “patterning” of the former after the latter—“Nor did I wonder at the lily’s white,/Nor praise the deep vermilion in the rose;/ They were but sweet, but figures of delight/ Drawn after you, – you pattern of all those”—Mrs. Ramsay finally sees the sonnet as the compilation of the days doings, “held in her hands, beautiful, and reasonable, clear and complete, the essence sucked out of life and held rounded here” (121). Formally, the section reiterates the form of a pollination study, as we watch Mrs. Ramsay swing to and fro among words and melodies; our task is to watch her make honey here, noting her alightments, attempting to follow her flight patterns.

A bead of honey, the sonnet gleams, a bit of sweetness to savor, to hold. It is this associative, intertextual and deeply tactile linking between poems and the events of the day that gives her this glimpse of life’s essence, interested thinking and feeling at work. Indeed, unlike Mr. Ramsay, whose reading of Sir Walter Scott confounds his efforts to “remember the whole shape of the thing,” thus requiring that “he had to keep his judgment in suspense” (120), Mrs. Ramsay’s reading makes a thing of the sonnet, something to hold, in the relationship between song, life, and word. This passage deeply reiterates, of course, Woolf’s own framing of readerly

interest in “Life and the Novelist:” interested readers, slowly moving among dark places where meaning has yet to emerge from data, make a text sticky with meaning, particles of nothingness given form. It also, incidentally, reiterates the divide between an interested experimenter on the ground and the disinterested observer in the air, preventing meaning making until the entire form of the novel can be captured. It is his wife’s experimental achievement that Mr. Ramsay doesn’t see, as he “exaggerates her ignorance, her simplicity, for he liked to think that she was not clever, not book-learned at all. He wondered if she understood what she was reading. Probably not, he thought. She was astonishingly beautiful. Her beauty seemed to him, if that were possible, to increase. . . ” (121). Here, in the act of documenting, because making, a record of her life, her work appears to others like nothing at all, trailing into statements of her beauty, into empty ellipses.

In pursuing the pattern of prose that Mrs. Ramsay’s character sets up, however, one might not only revalue her knowledge work as constructive and constitutive, void of the paralysis that the Air View appears to introduce into Mr. Ramsay’s intellectual work, but to understand it as responsive to imagining and documenting the changes interested thinkers create in the landscapes over time. Notably, this moment of interested thinking and feeling reiterates an earlier attempt to handle the days’ happenings in the garden. Upon leaving her dinner party, Mrs. Ramsy lingers for a moment here: as the omniscient narrator reminds us, “Not that she did in fact run or hurry; she went indeed rather slowly. She felt rather inclined just for a moment to stand still after all that chatter, and pick out one particular thing; the thing that mattered; to detach it; separate it off; clean it of all the emotions and odds and ends of things, and so hold it before her” (112). In attempting to locate the impact of the dinner party made and dissolved, the import of

her handiwork, Mrs. Ramsay cuts and pares back the tangled associations that have become attached to the day, so that she might see its form more clearly. In doing so, she

> quite unconsciously and incongruously, used the branches of the elm trees outside to help her to stabilize her position. Her world was changing; they were still. The event had given her a sense of movement. All must be in order. She must get that right and that right, she thought, insensibly approving of the dignity of the trees' stillness, and now again of the superb upward rise (like the beak of a ship up a wave) of the elm branches as the wind raised them. For it was windy (she stood a moment to look out). It was windy, so that the leaves now and then brushed open a star, and the stars themselves seemed to be shaking and darting light and trying to flash out between the edges of the leaves. Yes, that was done then, accomplished; and as with all things done, became solemn. (113)

At first blush, the passage appears to deanimate the beings of the garden; it is, after all, the stillness of the trees themselves that arrest Mrs. Ramsay's feet. Settling on these beings, she begins to put the day into place, to think about what it is that endures of her "vanished" labor, the product of her many touches (*AROOO* 88).[90] And almost as soon as she begins her pondering, anchored to the form of the trees, the garden itself takes on a greater vitality: the wind raises the

[90] Indeed, Derek Ryan's reading of this passage, which, following Deleuze and Guttari's own botanical metaphors pits the arborescent against the rhizomatic, construes the passage in precisely this way. For Ryan, Mrs. Ramsay upends the predominant position of trees within Western thought as associated with "rigidity. . . rooted in phallocentrism and promotes the binary machine," by lending them some rhizomatic movement, "aligned with the horizontal, multiple growths" of grass roots (84). Ryan makes this comparison in order to forward his own understanding of Woolf's rendering of gender as troubling the Oedipal tangle of identity that he positions at the center of the book's relationships; rhizomatic thinking, here, forges identity through multiple points of attachment to beings beyond the Mother-Father-Child dynamic. But to impose this admittedly elegant reading upon Woolf's rendering of cognition misses the subtle work of cognition as *both* a making of sense *and* a flourishing of associations, connections and attachments, a problem for which interest solves. Moreover, interest also does something different than the rhizomatic: it doesn't simply forge continuous and fresh attachments among the self and the world, but subjects that Subject to the movements of those beings, allowing them to overtake the very *form* of thought itself.

branches, still no longer; their leaves, now owning the action of the verb "brushed," reveal stars which shake and dart and flash. But the moment is especially strange because Mrs. Ramsay's thinking seems hidden from us: the movement of her ordering and composing is subjected to the movement of elms in wind. And yet, if we take this passage as an example of interested thinking and feeling, we do catch a glimmer of her mind at work, as we did in the case of the snail's picturesque landscape. Forged, momentarily, by the form of life itself, her cognitive contours take on its quivering shape. Interested thinking and feeling is trivialized in this novel, then, not only by how it appears, but by what it does: if offers opportunities to step out of the Subject position, to become simply a subjectivity among subjectivities—*to become trivial*.

It is this peculiarly trivialized subject position that allows Mrs. Ramsay to imagine an account of her handiwork over time. "When she was dead," the freshly-betrothed Paul and Minta would take her home and garden— "this night; this moon; this wind; this house: and her too"—into their future, including all the little trinkets and furnishings— "and this, and this, and this"—that fill the corners of the house. These trinkets become "all one stream" with the "community of feeling with other people" that she draws together here (114). Interested thinking and feeling, then, is not simply a way to make meaning among the many negligible moments of Mrs. Ramsay's day, but to imagine the future she makes with each snip of rosebuds, each placement of china, allowing lively things to carry her agency onwards—to allow her to linger—as time passes. A tension emerges in this moment of interested thinking and feeling: we could certainly read this as Scott does, as part of an effort on the part of Mrs. Ramsay to forge a place in the world in which she will endure: finding form in trees and wind, her thinking lives among them. But it also figures an inherent fading of the interested self. This is one moment in the novel that, in Cara Lewis's words, "*pre-figures* loss. . . without actually suffering from the removal of any

object" (439). A moment of interested thinking allows Mrs. Ramsay, then, to momentarily fade into the background of the composition, only to reemerge as the work is completed. It is a moment of practice, then, a place to experiment with inhabiting a world that makes one subject to vital forms around us. Indeed, Mrs. Ramsay lingers on here, her wilting evident but delayed.

Mrs. Ramsay shares with the interested ecological subject, then, a set of cognitive practices, and Woolf's rendering of this cognition offers an opportunity to plumb the ambiguities of inhabiting this ecological subjectivity. To be sure, like her home and garden work, her cognitive presence shapes the omniscient narrator's forays into other characters' minds throughout the novel. Tracing the flight patterns of feminine and feminized thinkers is in many ways the cognitive pattern of the novel, as the omniscient narrator dips into a variety of characters' points of view, marking similarities, marking differences, and working out prose forms that document the aberrations among these perspectives. Woolf repeats her experiments with documenting this subjectivity again, and again, data collected anew in reference to a different grouping of garden workers, in different spaces and moments in time. Nancy's examination of a coastal tide pool is a case in point, revealing a nuance in the placement of nouns and verbs that inscribes this lingering aesthetic:

> She crouched low and touched the smooth, rubber-like sea anemones, who were stuck like lumps of jelly to the side of the rock. Brooding, she changed the pool into the sea, and made the minnows into sharks and whales, and cast vast clouds over this tiny world by holding her hand against the sun, and so brought darkness and desolation, like God himself, to millions of ignorant and innocent creatures, and then took her hand away suddenly and let the sun stream down. Out on the pale criss-crossed sand, high-stepping, fringed, gauntleted, stalked some fantastic

> leviathan (she was still enlarging the pool), and slipped into the vast fissures of the mountain side. And then, letting her eyes slide imperceptibly above the pool and rest on that wavering line of sea and sky, on the tree trunks which the smoke of steamers made waver upon the horizon, she became with all that power sweeping savagely in and inevitably withdrawing, hypnotised, and the two senses of that vastness and this tininess (the pool had diminished again) flowering within it made her feel that she was bound hand and foot and unable to move by the intensity of feelings which reduced her own body, her life, and the lives of all the people in the world, for ever, to nothingness. So listening to the waves, crouching over the pool, she brooded. (75-76)

Beginning with the light touch of fingers on anemones, the passage suggests interested thinking and feeling in the project of documenting the in-formational contours of a plotted space—contours that include the observer herself. Seeing as Nancy sees, the optics of the passage offer both a surface and a sectional view, looking down upon a tide pool and looking out at a horizon line in which it sits, two views loosely linked by an "imperceptible" swivel of sightline. Attendant to the tiny things of the pool, Nancy notes the effects of her experimental handiwork: shading and illuminating the pool through the interaction of hand and light, she positions herself, for a moment, as the primary agent of the space, the different being that makes the difference. Indeed, it is her imagination that enlarges the pool, thus making visible the movements of minnows and crabs; her own agency, too, becomes god-like. But with that turn towards the horizon line, the pool's magnification slips away, and with it her stature; in allowing her vision to move "from the near to the far, from the large to the small" Nancy's interested engagement with the plot amplifies into something more powerfully felt (McLaurin 93). The

suspension within vastness and tininess of which lingering consists holds her fast, reducing her being to nothingness. Lost in a sea of other agencies, Nancy documents a world by making it—only to be grasped by what she has wrought.

But just as Mrs. Ramsay's psychology disappears momentarily among the trees to reemerge, Nancy's agency, too, persists. The temporality of this passage, indicative of the lingering aesthetic I am drawing out here, suggests as much. Woolf's play with verb tenses—present and past participles—suspends Nancy's actions not only within two senses of space, but two senses of *time:* a time wherein things continue onward and alternatively, simultaneously, a time of ending. If Nancy "touched" an anemone, then she is also "holding" her hand against the sun; if she initially "crouched" over the tide pool, then she also remains "crouching" at the passage's conclusion. The parallelism between these examples suggests a movement from finite action to ongoing action throughout the passage, echoing the paragraph's emphasis on the ongoingness of cosmic being that, "flowering" within Nancy, reveals her insignificance. To be sure, this "flowering" lingers on in the present participle form, a bud always bursting and never quite blooming. But the reiteration of "brooding" and "brooded" reverses this organization, suggesting an end point to this ongoing consideration of a space and its lively inhabitants, and putting Nancy back in the subject slot of the final phrase. Amidst all of the sweeping and withdrawing of this particular marsh, in this particular moment, Woolf leaves room for Nancy to be both passive and active, to cede her agency to other things, as well as to make beginnings and endings. While the waves hold her fast, she, stilled, responds.

The lingering aesthetics of *To The Lighthouse,* then, inscribe the stillness, both in space and time, that the interested ecological subject experiences and performs. Bodies move so slightly as to seem entirely motionless, and yet the scribbling and tinkering and plotting that

those slight motions generate persist, across time, starting some actions, ending others in an ongoing series of experiments. Lily's painting, an activity that she sees as particularly trivial, the product "hung in the servants bedroom" or "rolled up and stuffed under a sofa" (158), is framed in precisely these terms, as she works out the "knots" of relationships among color, line, affect, and emotion that her painting of the Ramsay's garden entails (157). But Lily also reiterates the epistemological difference between observing and experimenting here, reminding us that the latter model is what makes the decisions and affordances of small things—a brush stroke, a choice of color—come to life in such a way as to grasp the researcher herself. Indeed, the narrative echoes the media variations in ecological thinking here, suggesting that these small decisions appear much less consequential from the Air View than from within the garden itself: "But there was all the difference in the world between this planning airily away from the canvas and actually taking her brush and making the first mark" (157).[91] Lily lingers with this problem, within this garden, across the years of "Time Passes," reiterating experiments (quite like Clarke's students) in her "odds and ends of time" (157). She persists with the struggle of making, while it also holds her fast.

To persist across time, to be arrested, if only for a moment, by things: these little moments of women's experimentation are powerful for understanding "Time Passes," the section of the novel that has so often been debated in reference to the extent of its insistence on the nonhuman, inhuman, and the objective point of view, particularly from a media studies perspective.[92] And while ecocritical readings of the section don't often focus on the media

91 The narrative goes on to echo Nancy's tide pool passage in reiterating this point, from a slightly different perspective: "All that in idea seemed simple became in practice immediately complex; as the waves shape themselves symmetrically from the cliff top, but to the swimmer among them are divided by steep gulfs, and foaming crests. Still the risk must be run; the mark made" (157).

92 Laura Marcus and David Trotter, for example, have read the section as distinctly motivated by the apparatus of cinema, although they differ on how Woolf deploys cinematicity here: for Marcus, the section is a rendering of cinematic focus on nonhuman externality and movement, panning, zooming in on, and attached to the seemingly

ontology potentially framed therein, it is notable that these sections also emphasize, (indeed, how could one not?) the extent to which "Time Passes" attempts to figure life beyond the perceptual scale of human experience.[93] In searching for a way of reading what is undoubtedly an experiment without a recognizably human subject position, these readings don't see "Time Passes" as a continuation of these shorter experiments with subjective agency, material vitality, and women's thinking and knowing. Louise Hornby makes a valuable intervention here; in exploring the section as an exchange with photography's "temporal drag," which "removes the spectator from the passage of time, allowing her to observe her own future absence, a world without her," she suggests that there is, in fact, something of a subject that endures, a subject that will return to the archival record documented here (177). But the form of the novel up to this point suggests rather that what the section figures is a subjectivity that revels in its nothingness, finding a vitality there. As Sultzbach compellingly argues, this section is "the epitome of the kind of unexpected, unacknowledged, ordinary life that Woolf's 'Modern Fiction' champions," a world of small things made significant; this includes the subject herself, trivialized in tiny and significant ways, throughout the novel (132).

insignificant things that the camera brings to life (122-126). For his part, Trotter suggests that the section doesn't so much render camera work, but is an imaginative construction of cinematic ontology, an attempt to "imagine constitutive absence effectively"—or, in other words, to imagine what a kind of seeing without being, an observing of things without human vision, might look like (169; 174). For Trotter, it is the archaicness of film, its ability to present what has already faded, and even more crucially, to do so without human vision at all, that inspires the formal experiments of "Time Passes" with "neutrality;" that is in Trotter's terms, "the automatism of the camera-eye's view" (9). Crucially, Trotter makes this case by referring to the category known as the "interest" film, a category that the next chapter explores (166).

93 Scott and Sultzbach both understand the famous parenthetical references to the characters of "The Window" in "Time Passes," "a section devoted primarily to nonhuman life," as a way of "shifting the focus of experience to a larger host of sentient beings living within the spectrum of human politics and history. In this sense, decay and transformation don't perpetuate despair as much as they offer alternatives for life different from usual human experience" (Sultzbach 131-132). Aaron Jaffe takes it a step further, positioning "Time Passes" as the critical nexus of modernist inhumanism. In his account, the section "renders a world-format without subjectivized humans altogether (Mrs. McNab's presence, duly noted)," an example of a "modernist mentality…[that] reaches out to grasp objects and things" that exceed temporal and spatial grasp, both tiny and large, past and future, "processed at inhuman scales and expanding modernist reference beyond the Anthropocene" (496).

Having been grasped by so many interesting things with the moments of "The Window," readers might then become habituated to the process of how, in making something, one is made nothing, particularly in reference to Mrs. Ramsay's character, who is left "barely a shell of herself to know herself by" (38).[94] This reiterated pattern gives "Time Passes" a different agential flavor. At the beginning of this section, "Nothing," reappears in the subject slot of the sentence (as opposed to the direct or indirect object positions), taking on an agency lent form by prose; the opening passages, the description of the house asleep, suggest this odd agency, reiterated, if almost unrecognizably so:

> Nothing, it seemed, could survive the flood, the profusion of darkness which, creeping in at keyholes and crevices, stole round window blinds, came into bedrooms, swallowed up here a jug and basin, there the sharp edges and firm bulk of a chest of drawers. Not only was furniture confounded; there was scarcely anything left of body or mind by which one could say, 'This is he' or 'This is she.' Sometimes a hand was raised as if to clutch something or ward off something, or somebody groaned, or somebody laughed aloud as if sharing a joke with nothingness.
>
> Nothing stirred in the drawing-room or in the dining-room or on the staircase. Only through the rusty hinges and swollen sea-moistened woodwork certain airs, detached from the body of the wind (the house was ramshackle after all) crept round corners and ventured indoors. (125-126)

[94] I refer to the very first encounter with her, James and Mr. Ramsay; we recall, her ability to provide succor to the constantly buzzing Mr. Ramsay, leaves her emptied out entirely, a bloom wilted: "So boasting of her capacity to surround and protect, there was scarcely a shell of herself left for her to know herself by; all was so lavished and spent; and James, as he stood stiff between her knees, felt her rise in a rosy-flowered fruit tree laid with leaves and dancing boughs into which the beak of brass, the arid scimitar of his father, the egotistical man, plunged and smote, demanding sympathy" (38).

Initially, these passages work to animate darkness itself, and the "certain airs, detached from the body of the wind," breathing life into the architecture of a home where nothing stirs. Human bodies asleep, stilled—notably, neither distinguishable as male or female—in this dark, thick space, other things come to life. But in reading "Time Passes" through "The Window" of the past, "nothing," so often primed with feminine cognition and subjectivity in the opening section, begins to take on a greater vitality. Woolf's reiterated syntax often makes us feel as if nothing is something, after all—or, as James says in the final section of the novel, "For nothing was simply one thing" (186). Particularly after the parenthetical death of Mrs. Ramsay, "nothing" becomes even more lively, as the house falls into picturesque decay: the winds, "At length, desisting, all ceased together, gathered together, all sighed together; all together gave off an aimless gust of lamentation to which some door in the kitchen replied; swung wide; admitted nothing; and slammed to" (127). Here, "nothing" walks into a room, a ghost of something now subjected to the agency of decay itself. Note that the word is now in the direct object slot of the sentence, subjected to the whims of another agency—indeed, even brought to life by it. In relinquishing its subject position to the airs of change, nothing becomes another thing responding to the touch of a breeze. Elsewhere, "those stray airs, advance guard of great armies, blustered in, brushed bare boards, nibbled and fanned, met nothing in bedroom or drawing-room that wholly resisted them" (129). Here, all the nothings so carefully put into place by Mrs. Ramsay—hangings, tables, pans, china, flowers and vegetables in the garden—rolick in response to the light touch of the seabreeze, the efforts of her handiwork, quivering where her steady hand placed them: "Let the wind blow;" the narrative states, "let the poppy seed itself and the carnation mate with the cabbage" (138). Enduring things of her making, this list of furnishings as "nothings" links the objects of her handiwork with her subjectivity itself, suggesting that she

lives on here, in the shell of her home, now thick with wild entanglements among species, among subjects.

The figuring of Mrs. Ramsay's constitutive absence is not, then, necessarily an experiment with cinematic or photographic ontology, but indicative of the ephemeral, if also entirely enduring, subjectivity that accompanies women's cognitive patterning in this novel: a subject that does not insist upon its difference, but which responds, like the list of trivial things of which it is a part, to the tangle of other subjectivities that swarm around it, over time. Crucially, "Time Passes" registers not only its loss, but its endurance in prose form. The *sentence* is where we see this subjectivity take on its form: Mrs. Ramsay persists throughout "Time Passes" because of Woolf's syntax, the shell by which we recognize her shape throughout the novel. Visible through attention to reiterated symbolism, word choice, and syntactical position, the special structure of prose, we find her lingering, still, an agency that persists beyond—and because of—herself. Indeed, the struggle for subjective agency I identified in reading Lily's and Nancy's documentary moments comes to a head here, in the bizzare twining of a vital nothing: struggling to act, pushing against its inherent void, the noun slots of "Time Passes" ache with the possibility of life after death. This ontological position threatens to bloom, and thus to wilt, but this strange agential tension prevents its bud from bursting. "Time Passes" comes to life by activating life's limit, creating a world in which nothing is something after all.

My purpose in working through these prose experiments has not been to say that this "story of absorbing interest" directly imports ecology into its modernist form, but to make the case that modernism, responding to modernity in subtle and variable ways, can inform our understanding of the history of ecological thought. Woolf's fiction teaches us to look at the vagueness and trivialities of modern ecology, hovering, still over nuances in phrasing, in syntax,

in form, that make a difference in how we understand scientific history. Moreover, identifying the lingering aesthetics inscribed in the experimental prose of both science and fiction has been necessary in order to understand how the ecological picturesque circulates among various media, venues, and outlets of modern ecological thought. Its epistemological contours and ontological nuance are evident throughout the subject of the next chapter, a documentary film series that was also both celebrated and trivialized for the interested thinking and feeling that it provoked and performed. In what follows, I explore Gaumont-British Instructional Film's *Secrets of Nature* as a touchstone text in the modernist history of the ecological picturesque, parsing the precise nature of interested *feeling*, that response that Lilian Clarke so foregrounded in her pedagogical model, as it is tethered to an ethic of responsibility. In mapping this next plot of modernist ecological thought, we will encounter the bodies of ecological researchers again, lingering among images made to teach, to move, to interest the masses of modernity in the lives of plants and insects in their homes.

CHAPTER THREE—Camera Work: The Ethics and Erotics of Interested Ecology

In 1927, the same year in which *To The Lighthouse* presented literary modernism with Virginia Woolf's rendering of interested ecological thinking, George Bernard Shaw introduced a selection of the incredibly popular film series produced by British Instructional Films, *Secrets of Nature,* at the London Pavilion.[95] *The Spectator's* review of Shaw's introduction and screening expresses a distinctive affective relationship between viewers and these educational science films, also labeled 'interest' films, that is the focus of this chapter. In a peculiar moment of cinephilia—and ecophilia—Shaw and his reviewer describe what interested ecological epistemology *feels* like, as *Secrets of Nature* taught this paradigm across the varied screens of modern cinema. The reviewer states:

> Mr. Shaw does not himself want to see instructional or educational films, but interesting films. He considers that most people have an instinctive love of nature, and that one or two nature films included in every cinema programme would be universally appreciated, and in this we fully agree with him. When a flower falls in love, it opens its arms and invites an embrace, which is more beautiful than what we usually see on the screen. (919)

At first blush, the passage reiterates the trivialization of interested thinking that we explored in the last chapter, but with a difference. Neither Shaw nor his reviewer associate interest with any kind of educational agenda or knowledge work. But if interest isn't understood as a cognition here, it is framed as a desirable cinematic experience nonetheless: the work of the interesting

95 Presumably to the Film Society; perhaps Woolf herself was in attendance. The film to which the reviewer refers here is the aptly titled, *The Romance of the Flowers* (1927), unavailable for screening in the United States, which features Percy Smith's trademark time lapse photography of blooming flowers.

film is associated with "an instinctive love of nature," one that is typified by a surprisingly erotic image. The flower, falling in love, beckons. Bees, responding, zoom into flower centers. Viewers too, buzzing with interest, fall into its embrace, responding to the unusually evocative motion of blooming revealed by time lapse photography. "Target[ing] a conservative nation in love with gardening," as Robert MacFarlane has more recently suggested in his 2010 review in *The Guardian* of the BFI's rerelease of selected *Secrets,* the series teaches—and is informed by—the unique affective attractions of interested field and garden work.

As Macfarlane's commentary suggests, the eroticism of *Secrets of Nature* is unusual, a kind of cross-species rendezvous designed for a popular audience of variant social conservatisms. Crucially, almost as soon as the twentieth-century *Spectator* reviewer describes this encounter between viewer and flower, he positions the films' charms against the exotic eroticism of narrative films: "The public does not only demand films of wild and impossible adventure, or films saturated with 'sex appeal,' as most exhibitors seem to imagine," the review suggests, "similarly, our cinema audiences want films that have some real purpose in them and would appreciate a greater variety of interesting pictures. Close-ups of the final kiss are to many, including Mr. Shaw, tantalizing, if not embarrassing. . . Surely these secrets of nature are more interesting and fascinating than the flirtations of a flapper?" (919).[96] The hum of interested feeling provoked by the close-up of a flower is oddly a less "embarrassing," a less "tantalizing" experience than that suggested by the close-up of a human kiss; it is even, somehow, useful. And yet, even more strangely, to fall in love with botanical life via its cinematic image is even more affecting than the movements and gestures of women on film. In proclaiming a desire for a

96 As Macfarlane goes on to state, "Exotica was unnecessary."

greater proliferation of interesting films, this reviewer formulates a kind of human sexual propriety that blooms into cross-species attachment.

At once reserved and affecting, these 'interest' films charge viewers with erotic feelings while primly undercutting that attachment, loosening the tether between viewer and flower so that something useful may be learned. The documentary style of *Secrets,* a series of 144 short films that ran for over a decade in avant-garde cinemas, movie houses, and newsreel theatres, obliged this desire by offering up in serially interesting form iterations and reiterations of this tingling sensuality.[97] Generated by film's ability to unveil common aspects of actuality that are also unabashedly evocative, *Secrets of Nature* returned viewers to ecological plots again and again, both within the cinema and outside of its walls, making ecological knowing and feeling a foundational attraction of the British film industry in the 1920s and 1930s. In this chapter, I explore how the particular love affair described above—a conservatively sanctioned but quite queerly ecological eroticism—is structured by the earliest popular science film series to assert an ecological agenda and ethic. As Shaw's reviewer suggests, this series' groundbreaking camera work is critical to the construction and circulation of this affect: the eroticism of the opening flower lies not only in the fact of flowering, but in that fact amplified in time by the camera's technics. The series' camera work indexes a precarious eroticism planted within the scientific tradition of the ecological picturesque, and indeed, allows us to see the eroticism of this tradition more clearly. And in teaching ecological eros on the big screen, the series also engenders an ecological ethic defined by physical and ontological *distance* among human and nonhuman

97 In addition to being a favorite of the Film Society and *Close-Up* editors, *Secrets of Nature* was widely viewed in movie houses across Britain, paired with a variety of feature films. The 1933 *Peas and Cues,* featured in this chapter, was the first sound *Secret,* and was paired with the premiere of *The Taming of the Shrew*. The extent of their circulation throughout Europe and America is less well known. However, clips from *The Frog* (1930) appear in Bill Morrison's recuperation of the Dawson City dig in *Dawson City: Frozen Time* (2016), suggesting that select *Secrets* might have traveled quite widely indeed.

bodies. We can read the series, then, as not simply a moment in documentary film history where erotics form ethical responses, but as a site from which to theorize an ecological ethic that respects attachment as much as sovereignty, communions as well as distinctions.[98]

The chapter thus departs from contemporary ecocritical efforts that define ecological aesthetics as those which forge eroticism via increasingly close encounters with material actuality, often implicating scientific protocols and technologies as disruptive of that process.[99] Arguments in this vein have tended to forward an ecological ethic that "denies the human sense of separation from the interconnected, mutually constitutive actions of material reality," as Stacey Alaimo has recently argued, calling upon us to account for our actions as necessarily critical to the flourishing or the perishing of "nondiscrete life forms" (157-158). Interested ecological thinking, as I have argued, is undoubtedly committed to understanding and responding to the entanglement of human and nonhuman life forms, exploring and fostering communions

98 This chapter is indebted to the axiological tradition of parsing documentary ethics, famously initiated by Bill Nichols in *Representing Reality.* I refer to Nichols's pivot against Laura Mulvey's classic theorization of cinematic erotics here: for Nichols, "the difference in this regard between fiction and documentary is akin to the difference between an erotics and an ethics, a difference that continues to mark out the movement of the ideological through the aesthetic" (76). While Nichols argues that Mulvey's articulations of cinematic eroticism "do not hold" for the documentary film (in general), he does not anticipate how other structures of eros might operate in documentary film, a point that this chapter takes up. Indeed, as more recent examinations of cinematic ethics assert, the affective and the ethical are consistently entangled: as Jinhee Choi and Mattias Frey suggest, "Spectators' perceptual and sensorial engagement with film is considered ethical in and of itself, not merely as a moral ground to connect to reality and others outside the self" (1). See also Lisa Downing and Libby Saxton's *Film and Ethics: Foreclosed Encounters.* Routledge, 2009.

99 At least since Herbert Marcuse's seminal address incriminating modern, industrial technoscience in the destruction of ecological knowing in the twentieth century, the environmental humanities has consistently positioned ecological eroticism as a non-scientific endeavor (31). Throughout this discourse, scientific knowledge and representation are in many ways to blame for the distanced—and disinterested—articulation of Nature that has underwritten anthropocentric ecological thinking. As Timothy Morton has suggested, a queerly erotic ecological thinking might "humiliate the human" by reintroducing desire, love, and intimacy into human relationships with nonhuman "strangers;" but if science allows us to observe actuality as a twisted mesh of intimate actors, its findings are "too important to be left to scientists" ("Queer Ecology," 277; 279; 275). More recently, Andreas Weber's freshly-translated *Matter and Desire: An Erotic Ecology* (2017), has been particularly critical of scientific knowledge work and representation in this regard. Weber, a biologist and philosopher, rather sweepingly suggests that "the idea of being cut off from the other, as laboratory researchers are from their objects of inquiry, is perhaps the fundamental error of our civilization" (26); elsewhere, scientific description is an especially distanced, because abstracted, genre that "ignores our central life experience" as trivial subjects among many other subjectivities (7-8).

between mind and matter. But as a participant in this history, *Secrets of Nature* also suggests that interested ecological thought is attuned to the sovereignty of life forms as discrete entities, life forms that demand and warrant privacy, that are both related to, and deeply different from us, and indeed, which we can serve best by maintaining a sense of distinction. This ethic, and ontology, looks something more like Jean-Luc Nancy's "being-singular-plural" which "puts essence itself in the hyphenation. . . a mark of union and also a mark of division, a mark of sharing that effaces itself, leaving each term to its isolation *and* its being-with-the-others" (37). Indeed, it is not for nothing that Nancy heralds interest as the knowledge affect that can do this work: "we are interested in the sense of being intrigued by the ever-renewed alterity of the origin and, if I may say so," Nancy interjects primly, "of having an affair with it" (20). This ethics, marked by "punctual and discrete spacings" to use Nancy's terms, is inscribed throughout *Secrets* by punctuated descriptive aesthetics, forging loose erotic attachments that are respectful of entanglement, respectful of sovereignty (19).

As is typical of interesting aesthetics, the series has been largely overlooked by film historians and scholars, both within its moment and without, in no little part because of its close association with the lower documentary category of lecture, travelogue, and newsreel films so famously trivialized by John Grierson (100). Nevertheless, the series was lauded by critics and audiences alike. Paul Rotha, for example, describes these films as "the sheet-anchor of the British Film Industry" (322), while Rachel Low praises them in her sweeping and canonical film history as "one of the few bright features of the British film industry during the twenties" (130). As science films, too, the series is credited for having "perhaps given to untold thousands their first knowledge of biology, and indirectly they may have inspired much valuable research work" (Michaelis 86). The films of contemporary Jean Painlevé, whose association with the Surrealist

movement I explore in the following chapter, have received much more attention than *Secrets,* despite the fact that for many viewers, these films were not simply little documents of trivial British wildlife, but avant-garde experiments with cinematic form, as one short blip in *Close-Up* suggests: "a gentleman said to us in London that he found the *Secrets of Nature* as abstract as Man Ray" (Blakeston 86).[100] A diverse and highly collaborative effort across its thirteen-year history, involving at least two editorial directors and a small squadron of filmmakers, *Secrets of Nature* was a touchstone of not only educational and science filmmaking, but of cinema as an art form.

The position of *Secrets of Nature* within modernist art and cinematic history is only beginning to be understood; aside from Caroline Hovanec's very recent article in *Modernism/modernity,* "Another Nature Speaks to the Camera: Natural History and Film Theory" (2019) and Oliver Gaycken's entry in the recent *Encyclopedia of Documentary Film,* the series has most often been mentioned in passing among histories of documentary, science, and nature filmmaking.[101] Moreover, while Hovanec suggests that the "series' game is to apply [a] sentimental attachment to unlikely objects" within the natural world, the nature of that attachment has not been understood within a history of the interesting cognition and affect with which the films have long been labeled (260).[102] *Secrets of Nature* does not figure within Timothy Boon's explication of 'interest' films, for example, nor his thorough historicization of

100 This elliptical little review of avant-garde silent film places this statement on the *Secrets* directly next to a short description of Joris Ivens's *The Bridge,* which "turns the bridge into oblongs of pattern to be admired" (86). As Caroline Hovanec has recently pointed out via close-reading of the Film Society's screening logs, the 1927 *Secret,* "Plants of the Pantry" was screened at the Society alongside Man Ray's *L'étoile de mer* (244).

101 See Gaycken: "Secrets of Nature." *The Encyclopedia of Documentary Film.* Ed. Ian Aitkin. Routledge, 2006: 1195-1197.

102 Indeed, while Hovanec is specifically interested in positioning the camera work of *Secrets* within modernist film theory, her positioning of this series as an inheritance of the Darwinian grotesque brings a wide variety of other affective experiences, including disgust, marvel, enchantment, horror and wonder to bear in describing the series' construction of "sentimental attachment." This is not to say that films don't evoke these responses, but simply to suggest a methodological difference between our studies.

the early films of the Charles Urban Company. Many of the most successful *Secrets* were photographed by Charles Urban alumnus, Percy Smith, who photographed two of the films I bring to bear in this chapter, but the films do very different work than these earlier lectures. To be sure, evidence of Smith's "fusion of amateur expertise in natural history with specialised expertise applied to a 'tinkering' capacity to make new apparatus" is evident throughout many *Secrets* (Boon 22). But *Secrets of Nature,* occurring later in the century and in the midst of the growth of ecological epistemology and its circulation, was not entirely "creating an authentic popular science independent of élite biology" (Boon 27), nor was the series simply applying "the latest cinematic techniques to an old-fashioned brand of natural history" (Hovanec 243). Smith's 1931 film, *War in the Trees,* for example, was commissioned by the Imperial Forestry Institute at Oxford University in order to better understand the life of the wood wasp, and to experiment with an ecological solution to its infestations; moreover, long-time editor Mary Field was a former secondary school teacher, and would likely have been quite familiar with contemporary vogues in biological and ecological study circulating throughout Arthur Tansley's popularization efforts.[103] Epistemologically, we cannot so easily categorize *Secrets of Nature* alongside other contemporary educational nature films, which as Jennifer Peterson and Oliver Gaycken have both noted, tend to uphold the natural historical paradigms of collection and classification.[104] Nor

103 For a discussion of this study, see Field and Smith's *Secrets of Nature,* pp 97-103.

104 As Peterson suggests, such educational films would have appeared trite and outdated to modern ecologists who would been looking for a relational and successive focus on plant and animal life (156). And while Peterson hints at the *Secrets* epistemological values here, pointing towards the efforts of its many photographers to "depict animals in their natural habitat" and to "play up the sensationalistic aspects of their subject matter" identifying their performance of science lies outside the scope of her project (150). *Secrets of Nature,* too, remains on the periphery of Gaycken's historicization of the Urban science lectures, which, as in the case of the American lectures brought to light by Peterson, bear witness to a practice of natural historical representation indebted to Lorraine Daston and Peter Gallison's truth-to-nature paradigm (*Devices* 42). In reference to histories of wildlife filmmaking and nature documentary, which tend towards an American bias, they are not mentioned at all, not even registering as a branch on Mark Dion and Marina McDougall's family tree of nature documentary: see a reprint of this pen and ink illustration in Cynthia Chris's *Watching Wildlife* (xvii).

are these films indicative simply of ethological study, as Christina Alt has suggested (60). Rather, I situate the series firmly within ecology's textual history, its relational and environmental approach to the study of plant and animal life, and primarily, its commitment to interested ecological educational praxis. Indeed, rather than "making perceptible the ecological unconscious of modernism," *Secrets of Nature* makes perceptible the precise affective character of a widely circulated and taught modern ecological *consciousness* (Hovanec, "Another Nature Speaks" 246).

The 1933 *Secret,* adorably titled, *Peas and Cues,* is a good example. Interest-based ecological education is at its most transparent in *Peas and Cues*, and it thus serves as a valuable model for understanding how camera work encourages this educational agenda to provoke an erotically ethical relationship to British ecosystems. That this film features a quite common, even mundane, resident of any British garden, the unassuming sweet pea, is a case in point: this is a being that audiences, upon leaving the theatre, can both see and handle in their own gardens. This is critical, as Smith notes: "Nothing is more difficult than to work up, in the very limited time represented by a reel of film, an interest in an unfamiliar object" (*Secrets of Nature* 163). The editing, too, is a textbook case of Ngai's interesting style, as the film justifies its claim for the garden-variety sweet pea as an object of interest; the temporal pacing and commentary is particularly attentive to provoking "modest flickers of affect" via "successive encounters with minor differences from an existing norm" (151). Pedagogically, Mary Field's editing of Percy Smith's remarkable photography literally structures a successive encounter with this rather normalized object: the commentary consistently explains what we have just seen, and then allows us to see it again in a different form, as in the case of the exegesis of pollination mechanics. This section cuts between a model of the flower to a real flower, and back again,

reiterating, via the manipulation of petals by tweezers and fingers, how the internal structure of the petal allows for pollen to be collected upon the landing of a bee. We see it again as the film models pollination with the stop-motion character, "Bertie the Bee," and footage of actual bees conducting their garden work. This structure reiterates in the film's larger narrative project; moving from the birth of a seed, to its maturation, fertilization, and re-seeding, we begin and end at the same place, encountering the familiar pea with the knowledge of its conception at hand.

Perhaps most tellingly, the film appears to recreate the spatio-temporality of lingering garden experiments, emphasizing the role of the cinematic apparatus in the production of this experience. The temporality of the shift between the film's opening sections—the maturation of the plant and the functioning of its reproductive system—is worth a closer look here, particularly because Field's editing makes use of the distinctive temporality of interest. The film echoes this pattern, beginning with time-lapse footage that cuts quickly through the early stages of the plant's life cycle (30-45 seconds), presenting us not only with new images fairly often, but implicating its own media: as the narrator reminds us in these opening moments of seedlings and sprouts, these 24 seconds take 5 days to film. However, once the film shifts to demonstrations of pollination and fertilization via model and animation, the film slows down, taking about a minute between sequences. Note here that the film also moves from time-lapse to real time, quite literally slowing down the speed of perception. Crucially, Field's editing recreates the precise timing of experimental pollination studies.[105] The last sequence of pollination footage—real bees in the garden, in real time—consists of four blocks of pollination footage constituting about a minute of the film. Within this minute or so, four couplings of bee and flower are presented, each

[105] See Lilian Clarke's descriptions of pollination experimentation in the early 20th century, as featured in the last chapter: Clarke's students lingered over flower beds to count the number of landings per bee, per flower, per minute (66). *Botany as an Experimental Science in Laboratory and Garden.* Oxford UP, 1935.

given decreasing amounts of time: 24 seconds, 13 seconds, 9 seconds, 9 seconds. The number of contacts between bee and flower also *increases* in the last block. Blocks one, two, and three are punctuated by the coming and going of the bee, but block four features two successive encounters before the bee, satisfied, leaves in a flurry of wings, effectively chopping that final 9 seconds into two mini encounters. "Mistress bee, grows tired of being continually pottied," the commentator tells us in this lingering moment, as she thrusts with greater speed into the flower's center.

A contrapuntal temporality, a moment of suspension in which repetition speeds up, is in part responsible for the affective experience of this 'interest' film, the flicker of which is not quite surprise, but in this case, sensuality. The alightment of the bee on the petal punctuates the rhythm of the shot, the point of contact so aggressively moving that in the final shot, even the camera almost appears to jostle as it registers the petals' flurry of movement in response to the bee. Offering a chance to look at in-formation at length and with speed, to do both alternatively, simultaneously, viewers are titillated by in-formation presented both fast and slow. We linger, then, over the information that presents in-formation: of a life not simply as it appears, but at its origin point among the ecstatic, cross-species meeting of bodies.

However, while this merely interesting aesthetic might be evocative for viewers like Shaw, the films did not always satisfy audiences searching for more charismatic species, affects, and aesthetics. A short blip in *Variety* describes a screening of the 1930 *Secret, Scarlet Runner and Co.* in terse terms: "Produced by the British Instructional Films. On the development of the bean plant.//Perhaps interesting to those who like beans. But that's even doubtful" (*Film Reviews* 23). As Mary Field explains, the series was not edited for shock value, but to cultivate interest through carefully organized exegesis. Field asserts that "If, as in many of the 'Secrets', the film

is trying to explain a story and to develop a thesis, then a shock is a mistake because it jars the members of the audience and shakes them out of their mood of concentration" (Field and Smith 201). While Field does admit that "it is sometimes necessary to administer a knock-out blow to the onlooker in order to force the point of the film home," she ascribes less to a theory of aesthetic charisma "that believes that every scene by its beauty and its dramatic value should assault the eye," and instead prefers a moderate administration of scintillation (201). Her reasons for this are plain: even shockingly beautiful and dramatic images create boredom without some affective variation. "After a time the eye, in self-defence, refuses to be assaulted and puts up a barrier of boredom as a defence," she claims, hinting at the viewer's need for distance within the cinematic experience (201). Indeed, "pictures of extreme beauty or interest, by the very quality of arrestingness, sometimes check the flow of the film and defeat their own ends," (Field and Smith 201). Interest, then, must be carefully managed with attention to the ways in which exegesis is felt by viewers, a subtle game of seduction and severance that requires the filmmaker to mind her editorial p's and q's.

After all, if this encounter is titillating, it is so because Field's editing has been consistently encouraging a variety of punctual caesuras through a series of successive encounters, slowly organizing the tempo of viewers' attachments to evocative footage. In this instance, mildly affecting sequences teach us how to take up the real-time pollination footage as the erotic encounter that it is. It does so by pointing towards the cues of its own camera work. Throughout, the film deploys notions of mechanicity, technology, and instrumentation to temper and produce the eros of its images, in a handful of ways. Images of reaching, grasping vines, for example, which beckon evocatively towards each other and the viewer, are noted for their "mechanical efficiency,"—indeed, "it is very interesting to notice" the way in which these

creeping vines avoid grasping each other even as they respond quickly to the trellis upon which they get to work. This phrase, "mechanical efficiency" is repeated in the pollination sequence as well, but this time in reference to the successive encounters of model and petal being manipulated by tweezers and fingers to demonstrate physiology. These references to mechanism, of course, corresponding with moments of scientific manipulation, lend the images an aura of affective distance via Victor Peers's cool, almost flat delivery. But they are more than simply efforts to inscribe a sense of scientific objectivity, or something like Vivian Sobchack's professional or even clinical gazes, into the film; they are indicative of Field's philosophy on how to promote interest via filmmaking, by allowing the camera's mechanisms to alter—indeed, to administer—the spaces and rhythms of our attachments (88).[106]

The stop-motion sequence that sets up that alluring, real-time pollination sequence is a case in point. If in the real-time footage of pollination, viewers are aroused by the increasingly fast rhythm of alightments on petals, this preceding shot arrests real-time movement so that viewers will apprehend the mechanics of pollination more clearly. To put it differently, the shot instigates the allure produced by the real-time speed of in-formation by teaching viewers to see its information in slow, separate movements, movements that stutter and jerk with mechanicity. Stop-motion, after all "exaggerates the discontinuity according to which motion pictures work and in the process renders even more obvious the discontinuous nature of movement, both cinematic and human," while "offer[ing] a lingering look at an *extended* arrest of movement," as Jennifer Barker has suggested (136). Of course, this bit of camera work focuses on nonhuman movements as discontinuous, ensuring that we pick up the real-time footage as the distanced and

106 "The clinical gaze may well be an abject response, the symptom of a social pathology that carries detachment beyond a justifiable limit" (Sobchack 88).

discontinuous beckoning among bodies that pollination is.[107] Viewers register the shot as stop-motion upon the appearance of modeled grains of pollen populating the flower's stamen in three successions, each take adding a bit more pollen to the model. Following this, Bertie the Bee flies in from the right of the screen, lands on the model and triggers the exposure of the stamen and anther; pollen collects on her furry body.

She remains there, stilled, for what feels like a rather long moment, and then turns, looks at the camera, and stiffly lifts off, allowing the lever of the petal's wing to retract to hide the stamen once again. This turn towards the camera, breaking the fourth wall for just a moment, is startling in the eye contact that it makes between bee and viewer, a moment of cross-species beckoning that only stop-motion allows within the confines of this film. When we reach the sequence of real-time footage, then, we have been trained to look for these moments of stasis, of spaces between movements, in which the bee might beckon towards us, and we are drawn into the speed and rapacity of its movements through an effort to make contact with the actor again. The effect is that in this punctual interruption of movement, the space between us and the garden is both bridged and drawn into relief by the sheer artificiality of the shot's *mise-en-scene*. Field's editorial claim is clear: camera work can draw us closer to the in-formation of our world by representing its information at a remove from actuality, by celebrating the artificiality of mechanism, as opposed to attempting to mask it.

Peas and Cues, and the films I read in more detail to follow, thus exhibit many of the techniques that exemplify Christina Ross's "precarious visuality:"[108] the film's pollination

107 As Smith notes of his own pollination experiments, bees often visit the "wrong" flower, that is, the one upon which the camera is not focused, beckoned consistently by the mass of flowers required to attract them in the first place (Field and Smith 152).

108 Ross deploys "precarious visuality"—a notion she places within the poststructuralist turn in visuality studies towards understanding the social, historical, and ideological construction of perceptual experience—to understand the mode of viewership constructed by contemporary art and visual culture.

sequence, in particular, "prevents the stabilization of identification, identity and place" by moving its viewers in time with pollination patterns, and alternating between live action and animation filmmaking; this particular alternation, designed to make legible pollination practice, also suggests that the film "keeps oscillating between visibility and invisibility." And its strange temporality "entails a perturbation of sight through the contradictory valorization of other senses," such that we *feel* ourselves "blurring the distinction between the viewer's sense of self as 'self' and the represented 'other'" (8). "All these aesthetic strategies which are examined here," Ross describes, "concern a spectator whose seeing activity is being embodied through precarious attachments" (8). In what follows, I note the ways in which camera work structures the precarious attachments of ecological thinking and feeling in *Secrets of Nature,* dovetailing with Asbørjn Grønstad's recent suggestion that an ecocinematic aesthetic that facilitates such precarity might "indicate the emergence of a posthuman visuality in which certain forms of turbulence and occlusion are mobilized as agents of ethical reorientation" (208).[109] For Grønstad, this ethics is positioned within aesthetic forms that aim for a hyperrealism of experience, which also entails a sense of proximity: "Exposing the camera to the severe maritime environment to obtain 'impossible' views bespeaks a readiness to get as close to the rawness of experience as possible" (210). But if precarious visuality requires both drawing closer and drawing away, then ecocinematic aesthetics might also require, as *Peas and Cues* begins to suggest, an understanding of distance—both physical, ontological—as critical to ethical reorientations concerning more-than-human life.

109 Grønstad goes on to develop this ethic in reference to *Leviathan* (2009) more clearly, stating that: "the film's overt challenging of a logocentric tradition of ethnographic filmmaking and its concomitant embrace of an immersive, tactile, and non-anthropocentric aesthetics occasion a shift in the epistemological framework from a disembodied, language-centered morality to a biovisual ethics" (215).

To construct this understanding of ecological erotics and ethics, the chapter makes three moves. First, I define how this lingering ecological eroticism emerges from the descriptive practices of field work, bringing contemporary theories of the erotic to bear upon the source-text of *Secrets of Nature,* Gilbert White's epistolary text, *The Natural History of Selborne* (1834).[110] Long considered an antecedent of British ecological thinking, White's picturesque text allows us to see the eroticism that inheres within the practice and writing of ecological description in the field. This eroticism is dependent upon notions of distance and separation, marked aesthetically through White's distinctive syntax. I then trace White's erotic, distanced description across two especially beloved *Secrets,* demonstrating how cinematic practices of description inscribe this ecological eroticism into the form of the films. I aim to parse how an aesthetic practice, then, rooted in ecological thinking, defines the affective values of *The Nightingale* (1932) and *Gathering Moss* (1933).

These readings then theorize a lingering ecological ethics through a close examination of this descriptive practice, with two different, but related, objectives in mind. *The Nightingale* positions acts of physical distancing and separation, via camera work, as critical to the ethical treatment of its nonhuman stars, extending notions of privacy and consent so important to the long history of documentary ethics to nonhuman bodies. Indeed, the film's quite clearly precarious visuality forwards one option for what an aesthetic that "balances the interests of all involved" might look like (Pollo et al, 1358).[111] *Gathering Moss* takes a different turn because of

110 *Natural History of Selborne* is currently enjoying a renaissance of sorts, recently re-edited by Anne Secord by Oxford University Press (2013); as a review of this release in *The Guardian* reminds us, this odd text has been popular for over two centuries and has been reprinted 300 times.

111 I play on the notion of economic interest implied here throughout this discussion, by suggesting that the *feeling* of interest must also be tempered in order to prompt ethical dealings with non-human lives. See Pollo et al, "The Ethics of Natural History Documentaries," (2009), who are specifically interested in the ethics of wildlife and nature filmmaking. Pat Brereton, citing Holmes Rolston's *Environmental Ethics: Duties to and Values in the Natural World,* too, suggests that eco-cinematic ethics should also balance human and nonhuman interests: "Being ethical

the alterity of the life form that it documents; this film operates as a site from which to understand how a documentary ethic might be inscribed not only by external ideological structures, but by a close attention to distinctive patterns of movement and form that plants inscribe upon film.[112] This close-reading stands by form as a site for ethics to emerge, arguing that Percy Smith's plant films provide a nascent ground for theorizing an ethical treatment of plants by attending and responding to the formal and thus ontological distances and proximities between plant and animal life. In doing so, *Gathering Moss* also makes a stance for cinematography as perhaps *the* medium through which to ethically study plant life. *Secrets of Nature* invites its viewers to fall into the bristling embrace of life as it is creatively treated. In doing so, it positions camera work alongside the field and the garden as a critical site not only for the study of ecology, but for its ethical conduct.

Beckonings

To understand how *Secrets of Nature* produces its brand of ecological eroticsm—and to understand how I am defining ecological eroticsm in this chapter—it is helpful to turn to the source text of the series, Gilbert White's *Natural History of Selborne.* White's distinctive prose form suggests an eroticism to field work, but it looks quite different from the kind of close and proximate relationships between "strange strangers" that Timothy Morton suggests is critical to ecological eroticism. For Morton, a queerly erotic ecological thought begins with the observation that nonhuman agencies are indelibly proximate, living and working so closely as to be within us, "nearer than breathing, closer than hands and feet" (*The Ecological Thought* 78, 131). While

sometimes means having to place the interests of others above our own and that means that certain of our interests will not be satisfied, at least not in same degree that they might have been had we no ethical concern" (210).

[112] See Nichols, *Representing Reality*, 76.

it is certainly true that nonhuman bodies are within and around us always, ecosystems are also made of distances between human and nonhuman bodies that protect inhabitants by allowing the bonds between these participants to slacken and loosen. White's letters do document close encounters among human and nonhuman neighbors, and the text most certainly teaches readers to cozy up to bodies unlike our own, encouraging feathers and spines to brush up against and dabble with our sensorium. But his descriptions inscribe an eroticism to moments of observational distance that is essential to allowing the life forms of both researcher and quarry to linger. This descriptive practice finds its twentieth-century footing within the camera work of the *Secrets of Nature* series, engendering its facilitation of ecological feeling.

The Natural History of Selborne occupies a critical position within the history that I have been narrating throughout this dissertation, in large part because of its unique style of descriptive prose. It is a touchstone text in the history of the ecological picturesque, and cultivates ecological interest in its readers; it participates quite clearly in the theorization and popularization of the picturesque, paying close attention to both ecological and aesthetic variation in the landscape of Selborne: the "various and diversified" soils, for example, are almost as assorted as the "views and aspects" (1). White recommends, for example, that "some future faunist. . . extend his visits to the kingdom of Ireland; a new field, and a country little known to the naturalist" taking with him both a botanist *and* "an able draughtsman, for he must, by no means, pass over the noble castles and seats, the extensive and picturesque lakes and waterfalls, and the lofty, stupendous mountains, so little known, and so engaging to the imagination when described and exhibited in a lofty manner" (178-179). Tellingly, the first truly ecological description in the text is a discussion of how the dung of some especially "picturesque cows" supply fish with food in the

vegetation-poor Wolmer pond (38). Here, "Nature, a great economist, converts the recreation of one animal to the support of another!" as White exclaims (37).

Teaching its readers to see the variations that inhere within ecosystemic patterns, *The Natural History of Selborne* succeeded in the picturesque task of provoking interest in its readers. This proved true for Bruce H. Woolfe, the director of British Instructional Films who found the text critical to seeing British ecology's endlessly interesting variations.[113] Indeed, it is the text's ability to provoke interest *in* ecological relations that inspired Woolfe to create the *Secrets of Nature* series: recounting his fresh interest in his local hedgerow, thanks to White's letters, Woolfe states that these encounters "made me consider the possibility of putting the lives of some of these creatures on the screen. Surely there must be a large number of people who would be interested in seeing something of the life that is lived all round them" (Woolfe, 10). And Woolfe was not alone in finding Gilbert White's picturesque take on natural history deeply interesting: Charles Elton features White's words on the very first page of *Animal Ecology*'s opening chapter: "Faunists, as you observe, are too apt to acquiesce in bare descriptions and a few synonyms; the main reason for this is plain because all that may be done at home in a man's study, but the investigation of life and the conversation of animals is a concern of much more trouble and difficulty, and is not to be obtained but by the active and inquisitive, and by those that reside much in the country'" (White, quoted in Elton, 1). For her part, Virginia Woolf finds in White a particularly lingering—and gender-bending—ecological thinker, "the image of science at her most innocent and most sincere" ("White's Selborne" 461). Indeed, Woolf goes on

[113] "During my pre-Gilbert White days," Woolfe recounts, "there were only four classes of birds to me: game, poultry, crows, and various kinds of sparrows. Now I found it gave me a great deal of pleasure to pick out the different birds I met on my way, and how eager I was when I saw one I did not recognize to hurry home and turn up Morris's *Book of English Birds* and find out what it was. My road—the one that ran between my home and my studio—became a never-failing source of interest to me" (*Secrets of Nature* 7-8).

to say that as a scientist, White's "own description fits him best: 'the kestral or wind-hover,' he says 'has a particular mode of hanging in one place, his wings all the time being briskly agitated'" ("White's Selborne" 461).

In bringing the descriptions of White's text—in White's words—together here, I reiterate my claim that the nature of the relationships among ecology, fiction, and film is characterized by the act of describing, and how the presentation of information is accompanied by interest's cognitive and affective markers. White's rules for successful description—to which Elton ascribes, and of which Woolf makes coy use—are characterized by an attention to detail that is likewise an attention to movement, on the one hand, and a particularly lingering spatial relationship on the other. As White states throughout, description should be attuned to difference and movement, and less towards generating normative classifications: it should document in-formation, and resist registering as static data. Referring to Linnean morphological description, White claims that "Foreign systematics are, I observe, much too vague in their specific differences; which are almost universally constituted by one or two particular marks, the rest of the description running in general terms" (119). Elsewhere, White barbedly suggests that "it is expected of him [Linneas] that he should be able to account for the motions and manner of life of the animals of this own *Fauna"* (118). In contrast, "our countryman, the excellent Mr. Ray, is the only describer that conveys some precise idea in every term or word, maintaining his superiority over his followers and imitators in spite of the advantage of fresh discoveries and modern information" (119).[114] In this instance, interesting description, attuned to detail, specificity, and movement is more highly valued than species novelty. Rather, this descriptive effort, echoing Tansley's beef with morphological botany, emphasizes the documentation of

[114] White is referring to the even earlier parson-naturalist, John Ray, whose *Historia Plantarum* (1686) is particularly attuned to classification based on species difference.

species' and landscapes' in-formation.[115] Passed down from White into practices of field and garden work, ecological documentation is a primarily descriptive practice attuned to difference and movement, the critical features of interested ecological epistemology.

Crucially, White understands the work of describing the "motions and manners of life" as a practice of tracing the contours of love. For White's descriptions are often about tracking what each organism loves within and about its particular milieu.[116] To be sure, there are practical reasons for these moments of pleasurable contact among living beings, but my point resides in White's characterization of these relationships as loving ones: throughout, love is articulated as an active relation that is essential to ecological systematicity, and is perhaps *the* relation of ecological system. Moreover, the *researcher's* desires are included in this accounting. White's position as a scientist is often described in amorous overtones: he consistently refers to moments of scientific encounter as desirous and pleasurable. One letter, consisting of a thorough description of varying species' survival instincts—"an affection that sublimes the passions"—is critical in this regard, in that its prose style underwrites how scientific desire is embodied throughout this text (182):

115 See, for example, this quotation, which appears surprisingly prescient (written in 1774) in light of Tansley's history articulated in my first chapter: "The standing objection to botany has always been, that it is a pursuit that amuses the fancy and exercises the memory, without improving the mind or advancing any real knowledge; and, where the science is carried no further than a mere systematic classification, the charge is but too true. But the botanist that is desirous of wiping off this aspersion should be by no means content with a list of names; he should study plants philosophically, should investigate the laws of vegetation, should examine the powers and virtues of efficacious herbs, should promote their cultivation, and graft the gardener, the planter, and the husbandman on the phytologist" (257). As we have seen, Tansley did precisely this, and started the field of ecological science in Britain.

116 One correspondent's description of song bird communities, for example, is "a very probable one, since the matter of food is a great regulator of the actions and proceedings of the brute creation: there is but one that can be set in competition with it, and that is love" (166). Bats "love to frequent waters, not only for the sake of drinking, but on account of the insects, which are found over them in the greatest plenty" (50), while partridges "love to make excursions" into dense forest, and especially in dry weather (29). Here, ecological relationality is described as a matter of love, the word covering a variety of behavioral tendencies not only related to practical matters like feeding practices and reproduction, but as in the case of the partridges, of recreation, crashing through dry thickets for pleasure as much as sustenance.

> A further instance I once saw of noble sagacity in a willow wren, which had built in a bank in my fields. This bird a friend and myself had observed as she sat in her nest, but were particularly careful not to disturb her, though we saw she eyed us with some degree of jealousy. Some days after, as we passed that way, we were desirous of remarking how this brood went on; but no nest could be found till I happened to take up a large bundle of long green moss, as it were carelessly thrown over the nest, in order to dodge the eye of any impertinent intruder. (183)

White's prose has a particular rhythm in its placement of nouns and verbs, accompanied by consistently interrupting phrases and clauses, and it takes us a moment to get our bearing in its form. When we do, we start to see that this mildly affecting moment—fulfilling interest by "remarking" the brood's development—begins to appear particularly erotic, and especially if we take contemporary theories of eroticism into account. For Laura U. Marks and Luce Irigaray, eroticism is engendered by a vacillation between distance and closeness, between "near and far," as Marks argues (Kindle Location 136). For Irigaray, an eroticism that respects the sovereignty of both partners—that respects survival instinct—depends upon an essential degree of separation; here, the erotic caress "would begin at a distance" (136). This caress may not be the contact of skin on skin, but is rather a "[t]act that informs the sense of touch, attracts, and comes to rest on the threshold of the approach. Without paralysis or violence, the lovers would beckon to each other, at first from far away" (136). A sense of tactile arousal, delivered across spatial separation, this "salutation that means the crossing of a threshold" can find form in visual and aural experience, and presumably, through a variety of media (Irigaray 136).

Irigaray's vague but sensory "tact" underscores Marks's particularly erotic notion of haptic visuality: for Marks, haptic visuality is a "sliding relationship between haptics and optics,"

where “distant vision gives way to touch, and touch reconceives the object to be seen from a distance” (Kindle Location 140). In a statement that echoes the ontology of interest, Marks claims that “in a haptic relationship our self rushes up to the surface to interact with another surface. When this happens there is a concomitant loss of depth—we become amoebalike, lacking a center, changing as the surface to which we cling changes. We cannot help but be changed in the process of interacting” (Kindle Location 140). Marks does not allow the allure of the protean, because feeling, subject to define eroticism, however; she also frames critical distance, via optical perception, as necessary for the creation of this affective encounter:

> But just as the optical needs the haptic, the haptic must return to the optical. To maintain optical distance is to die the death of abstraction. But to lose all distance from the world is to die a material death, to become indistinguishable from the rest of the world. Life is served by the ability to come close, pull away, come close again. What is erotic is being able to become an object with and for the world, and to return to being a subject in the world; to be able to trust someone or something to take you through this process; and to be trusted to do the same for others. Thus you will see that many of the works I write about are erotic even though they have nothing to do with sex. (Marks 140-147)

Here, Marks brings Irigaray’s erotics into conversation with new materialist philosophy by reasserting the centrality of distance to erotic relationships that occur outside the bounds of gender performance and inscription: the erotic is critical to understanding materiality as vitally active, on the one hand, and the subject as a being that is trivially subjected, on the other. This is how one “serves” life, in Marks account: by being able to turn away from objects that seduce us,

so that both parties may live in communion, in distinction. Feeling and seeing, moved by matter and persisting through abstraction, eroticsm for Marks and Irigaray is a matter of survival.

Marks's materialist repurposing of Irigaray's erotics finds an ethical potential in Vivian Sobchack's notion of interobjectivity, an ontological position that also echoes the ontology of interest through its haptic emphasis on revisioning subject/object relationships: "through reaching toward or touching the material object that is other than oneself," interobjectivity "seeks to actively grasp both a concrete sense of one's own self as immanently material and a concrete sense of how some of the world's objects may also be subjects" (186). This doubled attention to the pulsations of affect among feeling bodies is necessarily ethical because it facilitates care, for ourselves, for others:

> Our recognition of and care for ourselves not only as *objective subjects* who are capable of grasping and feeling the alterity of other worldly objects but also as *subjective objects* that can be experienced in such a way by others allows us the possibility of appreciating—and caring for—the form and substance of 'things' external to ourselves. It also allows us to hope that the world and others' material grasp of us will be similarly appreciative and 'care-full.' (187)[117]

As in Marks's erotics, this kind of ontology is grounded in mimesis, wherein bodies cozy up to and echo each other's movements and comportments: "our subjective body image is always also materialized objectively in a potentially mimetic 'postural schema' responsive to the world we inhabit" (Sobchack 187). But crucially, this ontology, this ethic, is also defined by a sense of "alienation" or distinction, among objects: "interobjectivity as a structure includes alienation," Sobchack requires, and it is "the density and opacity of material things in a *negative* relation of

[117] We should note that Sobchack's play with the subject/object relationship here echoes the placement of nouns in White's syntax.

reciprocity with the body-subject" that allows this subject to perceive of an ontology wherein he "leads a life of his own in indiscriminate and unwilled reversibility with non-intentional matter" (201). The embrace of alienation, of distinction, rescues mimesis from anthropocentrism or fetishism, instead allowing it to operate as a site where material things and nonhuman life forms have as much agency in the encounter—and the representation of the encounter—as human subjects (198). Mimesis might be ethical, then, by facilitating an "unselfish, radically decentered, and expansive self-interest," she argues (186).

White's passage enacts this eroticism and performs this ethical mimesis, serving life by teaching a style of description that beckons subtly to ecologists across distances near and far. Crucially, he does so by documenting a moment of distinctly precarious vision in the field. Indeed, the prose is formed by the embodied postures and rhythms of field work itself, reflecting the play of interests that shape this encounter in the field. White's prose documents a moment where the vision of the researcher is obscured by an administered act of distancing, an act that also creates muddiness between visual and tactile experience. On the one hand, the syntax appears often concerned with bringing researcher and wren into close proximity. The second sentence punts the verb so as to bring the subject of the sentence (the researchers) into close proximity with (if subsequent to) its direct object (the wren). On the other hand, White's punctuation and phrasing inscribes a critical distance between researchers and wren. White and his friend are "careful not to disturb her," keeping their distance in field as in prose; note the passive voice construction of this sentence, which foregrounds the bird as opposed to the researchers. And the careful commas separate out the observational activity from the bird on her nest. Mimicking restraint, these commas reinforce a distance between wren and researcher. And

yet, a closeness beckons still: the statement of critical distance also *interrupts* the bird's action of nesting, inserting itself into the syntax despite its efforts to remain apart.

A sense of both near and far is wrought within White's syntax here, the act of researching vaguely described as one of both seeing from afar and coming close enough to touch. The wren's own act of distancing—disguising the nest with moss—is uncovered by White, who carefully scans the landscape and "takes up" this slight variation in the terrain. White's visuality is distinctively precarious here: it is not clear whether the moss is identified by eye or hand. Does White reach out and touch the nest, or does the nest remain at arm's length? The passage doesn't quite confirm this point of contact, performing the near-distance of lingering researchers. Indeed, his parallelism suggests as much: observing both the wren "as she sat on her nest," and the act of research "as we passed that way," White's repeated use of conjunctive clauses forges another close, but distant point of contact between the wren and the researcher. The final conjunctive clause, "as it were carefully thrown over the nest," referring to the position of moss itself, puts this relationship into relief, in that it describes the position of the agent of distance and closeness within this encounter: the moss brings the researcher closer, even as it retains a critical distance between White and wren. White's prose, then, respects the "punctual and discrete spacing between us" that Nancy suggests inspires our continual, erotic interest in life, quite literally punctuating this loving moment with a "dense and opaque" alterity.

In this moment of desire, White's prose reiterates the ontological position of interested field and garden work—and insists that it is "science at her most innocent and sincere," as Woolf suggests, that facilitates this work, as researchers and wrens come into intermittent contact. His text's legacy, opening onto the history of institutionalized science I have recounted in previous chapters, challenges Andreas Weber's recent stance on scientific description as anti-erotic, and

instead performs a variation of the ontological relationship that Weber positions at the center of his ecological eroticism:

> From an ecological perspective, love is a practice of balancing interests that lead to a state of greater aliveness while also accepting failure in advance. A successful attachment always has two sides: living without fear, and learning to die courageously. (Kindle Location 195)

White varies Weber's ecological eroticism—and ethic—in two ways. Weber also places interest at the center of loving nature in ecological terms, justly arguing for severing one's attachments to material beings, and primarily those personal, economic interests that forge so many encounters between human and nonhuman neighbors. But as White reminds us, to balance one's interests in an erotic encounter is also to balance one's affective attachments, to be able to both give in to the desire to touch and see the object of desire, and to turn away from that attachment: there is no need for ontological death here, but rather a sundering of bodies who live in communion, in distinction. Establishing distance, as Irigaray and Marks suggest, is a way to respect survival instinct, to serve life by subjecting our interests to those of another. Here, interest's ability to attach and release, to bloom and fade, to come into close contact and to turn away, situates it as crucial to the kind of loving human subjectivity that finds itself on a planet quivering in response to our touch. This severed attraction, beckoning, sits at the center of modern ecological epistemology, both institutional and popular.

There are many moments of syntactical eros—and precarious vision—to unravel in *The Natural History of Selborne,* but we will leave Gilbert White and his wren loosely drawn together by a mossy patch, a researcher cozying up to a beckoning wren, mimicking her postures at a remove. I will, however, continue to trace how White's prose informs further moments of

interesting ecological eroticism, serving as a model for beckoning across the distance between fields, gardens, and screens. The close readings from *Secrets of Nature* that follow reiterate this model, adapting White's erotic descriptions to serve life at a remove from the fields and gardens in which these films are shot. As much as these films "share things" with ecological researchers, as Jennifer Barker might argue, in that they often figure and appear informed by the "texture, spatial orientation, comportment, rhythm, and vitality" of field and garden work, their cinematography is involved with teaching ecological lessons at a distance, deploying the cinema's unique descriptive capabilities to facilitate close encounters with British ecosystems at a respectful, unselfish distance (2). In this regard, these films teach a pedagogy of life by rather punctually cueing viewers' interests to turn towards the spaces between ecologists and ecologies, as these entities beckon towards each other. Within these punctuations, the series' ethical stances become legible, even if the life forms that inspire them remain hidden among the thicket of things.

The Nightingale

Guided by film, then, we approach, if at all, ideas no longer on highways leading through the void but on paths that wind through the thicket of things. —Siegfried Kracauer

In many ways, *Secrets of Nature* appears rather conventional in terms of wildlife documentary ethics. Its title belies a commitment to an audience's "right to know," that long-standing paradigm that so worries Brian Winston in his account of documentary ethics, for all appearances emphasizing a contract between viewer and film over the rights to consent and privacy that its stars also possess (132). While Winston, like much of the discussion around

documentary film ethics, remains focused on human participants here, Brett Mills has made this case explicitly in reference to nature filmmaking, arguing that the "right to know"—typified by efforts to reveal nature's secrets, even while motivated to protect habitats—grounds these film's ethical agendas. While nature documentaries "do good" by facilitating ecological awareness and, to an extent, by keeping human traffic out of wild ecosystems, they also fail to respect animals' and plants' rights to privacy and consent: "when confronted with such 'secretive' conduct, the response of the wildlife documentary is to see it as a challenge to be overcome with the technologies of television. The question constantly posed by wildlife documentaries is *how* animals should be filmed; they never engage with the debate as to *whether* animals should be filmed at all" (196). Mills' argument puts Winston's primary question—how much mediation is ethical?—into a somewhat different light, suggesting that documentary technologies consistently violate the rights of nonhuman documentary participants in their very operation (Winston 132). As might be expected, *Secrets of Nature's* production history is filled with anecdotes concerning technological innovations for exposing its subjects' secrets—we should consider it the progenitor of the genre. From specific directions concerning the design and camouflage of hides to accommodating plant growth on film to filming below the soil's surface, Field and Smith position revelation as an ethical cornerstone of the series, and even suggest to readers how they might go about exposing nature's secrets for themselves.[118] But the series' distanced descriptive practices—an index of ecological eroticism—germinates a competing species of ecological ethic within the series, one that *emphasizes* technological mediation in the service of nonhuman

[118] Mary Field's early chapter, "Filming Bird-Life," is especially instructive in this regard, as she narrates how each of the series' bird photographers approached the research and composition of their films. Indeed, technological innovations of revelation are tied up in her descriptions of the photographers' personalities as researchers. And Percy Smith's chapters "Plant Life" and "More Plant Life" are especially fascinating in their foregrounding of technological innovations for filming the mysteries of plant life.

sovereignty. Mediation, then, is a source of (and not a liability to) ethics throughout this chapter, as we reassign *Secrets of Nature's* ethical priorities by understanding its scientific and aesthetic ecological history.

As should be expected of this diversely curated series, mediation in the service of life looks quite different throughout, sometimes relying upon photographic innovations (time-lapse and microcinematography, in particular), and sometimes playing upon the camera's shortcomings. The 1933 *Secret, The Nightingale,* is a delightful case study of the latter category, leading its viewers into the thickets surrounding Oxford in search of this capricious, if nyctophiliac, songbird. It does not accomplish this work, however, through the revelatory supremacy of cinematic vision; throughout, the camera is often quite visually inept. Indeed, *The Nightingale* doesn't often speak to Kracauer's claim that "film renders visible what we did not, perhaps even could not see before its advent," making *more* legible the elusive details of our ordinary environment (Kindle Location 6494). In many moments, *The Nightingale* appears to reinforce Malcolm Turvey's critique of the revelatory narrative within film theory. But if film *can* reveal scientific information that is unable to be perceived without the aid of the camera, as Turvey also argues, then *The Nightingale* suggests that this kind of revelatory knowledge work may not be critical to science and documentary filmmaking either (113). The camera gropes and blunders through the nightingale's beloved shady groves, generating an instructional film that teaches the experience of interested field work as being simultaneously drawn into and rebuffed by the thicket of things. *The Nightingale* explores how film might not lead us towards a more proximate relationship with material actuality, but might instead teach the beckoning, distanced eroticism that field work requires. Indeed, *The Nightingale* is a case study in how this series'

affective experience underwrites a field work ethic that, as Marks argues, "serves life" by encouraging viewers "to come close, pull away, and come close again."

Shot by Oliver Pike and edited by Mary Field, the film is known for its serendipitous footage of the titular star performing a sprightly dance near the film's conclusion, an image so beloved that it was caricatured charmingly in *Punch* (Field and Smith 229). Set in a circular mask, and scored on the fly by W.E. Hodgson, this sequence is remarkable for its close encounter with a bird who has for most of the film been particularly well-hidden from human and cinematic eyes alike. Rather, searching among the shifting patterns of shaded groves, eyes constantly fooled by the falling of light through tossing branches, viewers find themselves, like the camera, scanning woodland landscapes, "desirous of remarking" the birds' whereabouts. Its visual experience is distinctively precarious, filled with darkness and obscurity among the dense underbrush of the forest understory.

Thanks to the camera's clumsiness in dark places (a fact reinforced by Field's editing), the bird doesn't even make an appearance until a minute into the film. Viewers watch cars rolling through Oxford streets, scan the forest in a rare panning landscape shot, and are introduced to the nightingale's often-mistaken doppelganger, the robin. Panning is a rare technique in *Secrets,* which is almost always shot straight-on and without much movement, or with the illusion of a stilled camera, in any case, suggesting a visuality that peers and searches, but does not settle upon its object. A quick cut between robin and nightingale introduces our star, with the effect that we almost can't identify the difference: the commentary orients us by pointing us towards the marks in coloring that the camera doesn't register. Following this short glimpse, we spend almost half of *The Nightingale's* eight minutes looking for him. The bird alights on a branch in close-up, a relatively long take of about 10 seconds, jumping away as the

scene cuts to a long shot of the forest understory. We lose his particular form in the sea of light and shadow that defines his dark habitat, but our eyes adjust as we scan again for particulars to note and record. Finally, we catch sight of him not in person but by the movement of the central branch in the middle of the shot, hanging down towards the bracken. An even longer take of about 13 seconds, the shot finally allows us to see the bird as it leaps onto the tip of the farther branch just towards the end, a body catapulting through leaves, settling again on branches. The movement is startling after so many seconds of watching and waiting, and this moment of "remarking" the bird refocuses our eyes away from the patterns of interesting trees and the ever-alluring movement of leaves in the wind, and back to the bird itself.

But this effort is quickly frustrated, as the film cuts to a closer, if still quite dark, shot of this branch as the bird hops along it. Here again, we need some seconds to orient our eyes to the shade, almost long enough to make irrelevant this scant 5-second close-up of the bird hopping along the bough. Just as we catch sight of him, the film cuts *back* out to the forest understory, and we once again struggle to locate the bird among the boughs for another long take. The evasion continues into the film's third minute, during which we follow several women field workers through the underbrush as they search and find nesting sites—but crucially, no birds.

Figure 12: Film still: Still from The Nightingale (1933), dir. Oliver Pike

These opening sequences distinctively reiterate the eroticism of interested field work, as typified in White's prose. Field's editing keeps viewers hopping between close-ups and long shots, getting close enough to identify the bird, even as the bird—and in turn, Field's editing—insists upon maintaining some distance. The orientation of each shot vacillates between near and far, although longer takes in this opening sequence tend towards further distances. Indeed, throughout, the camera movements quite clearly suggest that the camera is scanning, looking, and feeling as a researcher would do, attempting to find the subtle variations in forest vegetation that might bring a birder into contact with a bird. At several points in these opening minutes, we suspect that this is the case: the camera pans dense woodland from right to left, looking for tiny alightments on branches just as viewers, sitting in the cinema, allow eyes to scan straight-on shots horizontally, looking for the bird among the branches. Looking as the camera looked, encouraged by the fluttering of wings that Field skillfully cuts in horizontal patterns across close and far shots, viewers are trained by the camera—which in turn mimics the movements and points of view of researchers.

Jennifer Barker's *The Tactile Eye* (2009) offers one tempting way of understanding this moment of mimicry among camera and researcher, particularly as the film asserts its subtle environmental ethic. *The Nightingale* does seem to encourage what Barker identifies as muscular empathy in this sequence, as the camera, learning from field workers, scans the landscape, and then having displayed its movement for viewers, allows us space and time in long takes of understory to do the same. Barker's notion of cinematic musculature is indebted to the theories of erotic encounter that I have pointed towards previously; here, she also aims to account for the camera's role in teaching erotic responses. For Barker, the

> viewer and the film are two differently constructed but equally muscular bodies, acting perhaps in tandem or perhaps at odds with each other, but always in relation to each other. Viewers are not passive participants in this engagement: we may be drawn into the film and also (perhaps even simultaneously) pushed away by it, but at the same time, we might move closer to the film or pull back and resist its invitation. (74)

The relationship Barker describes here is a distinctively mimetic relationship, wherein the film, the viewer, and the cinematographer echo each other's "behavior and comportment and. . . the way we use the muscular body as a means of expression" (77). Notably, this is primarily a *descriptive* operation, in that it does not generate plot conflict and resolution, but encourages a sensory experience of the editing and movements of the camera.

The sequence devoted to the uncovering and classification of nightingale nests by women field workers is an excellent case in point. Here, the camera mimics the posture of interested field work, and links that posture to its cognitive patterning. The women gently brush through and search among bracken, interspersed with close-up images of nests. The camera watches the

women work as they stop periodically to examine something on the ground layer. Upon their stooping, Field carefully fades the images of field research into close-up shots of the nests encountered. Some information is delivered by the commentary, following Field's strict rules for pairing image and word in descriptive sequences, ("The eggs vary in number from four to six, and are a dull olive green which tones with their surroundings"), and the image of the nest fades back into images of the women's search (*Secrets* 218). This sequence repeats three times, with some subtly interesting variation: in each, the film reveals the hiding places of nightingale nests under "the dead leaves and bracken of last year," nestled against the foot of a tree, and "A third type of nest which is rather rare, is built about two feet above the ground in a bramble bush." This final shot, once again reiterating the move between stooping researcher in mid shot and close-up of nest, features the hands of the worker brushing away the top of the bramble to reveal the nest inside. Field's editing shines in this sequence, pairing the gentle if purposeful roving of the researchers with images of their quarry, encouraging us to see, feel, and move as scientists do: looking for variations in nesting patterns, this camera work encourages viewers to embody the stooped posture of interested field work, hovering at a little distance above the patterns being observed.

In this moment of mimetic description, then, the film, the viewer, and the researcher mimic each other's movements, changing postures in response to the distant touch of the others. Indeed, distance is critical to cinematic musculature, as Barker suggests. For as much as the camera may stoop as we have stooped—or, in turn, we may crouch over thickets as the camera has instructed—there is a critical distance inscribed within this mimetic relationship via the medium itself which is most often viewed in venues far from the fields in which footage is shot. The mimetic musculature of film and viewer gives rise to the "palpable sensation in cinematic

experience of feeling 'there' with (and within) the film and 'here' where I am," a duality within camera work that is inherently erotic in its beckoning across time and space (Barker 75). Indeed, this erotic position is inscribed within the very notion of educational filmmaking, as Jennifer Peterson reminds us; educational films are designed to "take the place of the field excursion and the visit to the manufacturing plant," to bring the work of the field into the classroom—but not to actually *go there* (155). To be sure, this is the nature of the medium, as it responds to Nature, as Mette Hjort suggests: "Cinematic depictions of nature will always remove us from nature, even as they bring us into contact with it" (210). *The Nightingale's* mimetic camera work, then, is particularly interested in maintaining distances within the complex ecosystem of field work, encouraging its viewers to engage with this species closely, if at a distance.[119]

But if interesting camera work facilitates literal distances in order to protect endangered habitats, then it also teaches viewers how to respectfully linger within ecosystems, encouraging a mimicry that includes camera, researcher, viewer, *and* ecosystems. In characteristic form, the ontology of the interest film encourages human bodies to be overcome by nonhuman bodies, while simultaneously sundering that ontological coupling. *The Nightingale's* camera work in this section performs what Marks describes as an erotic process of "being able to become an object with and for the world, and to return to being a subject in the world; to be able to trust someone or something to take you through this process; and to be trusted to do the same for others." Here, viewers trust the *camera's* unique visual (in)capabilities to do this work. Timothy Morton (drawing on Derrida but also echoing Gilbert White) might call this the "re-mark," or the

[119] *The Nightingale* inscribes this ethic subtly, via its aesthetics, but this is not always the case across the series. The 1931 film, *The Bittern*, for example, one of Walter Highgate's especially picturesque films featuring the windmills and bogs of the Norfolk Broads, has much to say about the recreational and tourist activities that threaten these irascible birds' nesting sites—and brings this bird's life story to the cinema so that we might be touched by it at a remove.

"gesture" of mimesis that "flips an 'objective' image into a 'subjective' one," that allows us to read a single descriptive moment through various embodied positions: as a scientific researcher, as a camera, or even as the birds that are described (*Ecology Without Nature* 48). In Morton's account, as in Barker's reading of cinematic musculature, the re-mark is built into the fabric of description itself, an aesthetic fact that brings a variety of bodies into contact—at a remove. *The Nightingale* relies upon this critical distance in its instructional effort, inscribed by re-markable moments where the camera's body forges simultaneous alternatives for how to position oneself within its ecosystem.

Within the nesting variation sequence, then, another reading emerges: this series allows the re-mark of camera work, both like and unlike our own visual and haptic experiences, to inscribe the kind of lingering eroticism that White's prose performs, rendered here in cinematic syntax. The dissolves between the nest images, where the camera leaves women's bodies in the field and transitions to close-ups of nests, is the descriptive re-mark that structures field work as an erotic encounter—and which *teaches* that eroticism to viewers sitting in cinemas. Just before the dissolve begins, Field holds the shot just long enough to allow the women's bodies to be perceptibly stilled, about 3 seconds, so that viewers can "take up" their posture within the scene. As the dissolve occurs, the women's bodies begin to melt into the image of the nest as it appears, with the effect that for a short moment, their bodies linger within the nest. The second fade-in is especially remarkable, as the woman's movement from a stoop to a stand is superimposed over a blade of grass that mimics her posture; the effect is that for a flickering moment, the woman's upward movement enlivens the still image of the grass, making it appear to be standing on end. Camera work allows woman and grass to both touch upon and pull away from each other here, dispersing this moment of shared posture between researcher and environment. In a cinematic

equivalent to White's efforts to teach the researcher how to mimic the wren, *The Nightingale* allows researchers to mimic the movements of nesting matter, as they fade out of prominence in the picture.

Figure 13: Film still: Stills from The Nightingale (1933), showing researchers lingering in the field. Dir. Oliver

The implication of this sequence is that viewers become not only like researchers, but like researchers cozying up to birds in their homes—while allowing them distance in which to live. After this sequence of nested fades, the film finally focuses on nightingales, filming the

nesting and feeding behaviors of a small family for most of the rest of the film (excluding the final shots of a very dark Oxford Castle, backlit only with birdsong). With the priming of field work postures in the film's rear window, the first on-nest long take of a female nightingale appears to mimic the bodies of women field workers as they fade into nest images. Cleverly camouflaged such that we don't see her at all until the commentary directs us to her position at the bottom of the screen, the nightingale emerges from the texture of nests and leaves with this remark. Who mimics who becomes difficult to parse here: does the camera, following the scientist, mimic her movements? Or does the camera, following the bird, mimic her motions? This is the question at play in understanding the editing of *The Nightingale,* which learns from scientists as much as it learns from the evasive bodies of its quarry. Indeed, the film's opening sequences, which hop capriciously between branch and bough, close-up and mid-shot, could also be read as mimicking the movements of the bird as it flits among branches. The effect, then, is that the camera forges an erotic encounter between the movements of birds, scientists and viewers that encourages viewers who will step into the field to approach field work with interest—that is, to allow oneself to be overcome by the nonhuman while remaining crucially apart.

Figure 14: Film still: Still from The Nightingale (1933), featuring a well-hidden nesting mother. Dir. Oliver

The Nightingale suggests, then, that this film's "pedagogical shaping of conduct" is about learning how to comport oneself in the field, respecting the distances and proximities that inhere within the complex perceptual ecosystem that field work is (Stollery 321). The ethical paradigm of ecological field work—responding to sovereign beings' demands and needs for communion, for distinction—is taught via this film's camera work, which revels in the ambiguity of description to document the entanglements and aporias that bring human and nonhuman subjects into being-with each other.

The Nightingale says little about sex, allowing its eroticism to live subtly in the dance among bodies that cinematic description forges here. The effect is that the film softens, but still satisfies, attachments to this beloved British bird, who is both ecologically and aesthetically valuable.[120] But the film is somewhat unique, even among bird *Secrets,* in this regard; the series often works to add common, uncharismatic species to the database of British ecology, enacting what Geoffrey Bowker might also describe as a particularly ethically-minded effort to reticulate

120 As the commentary states, the nightingale is "most useful birds that we have" in ecological terms, as it "rids the woods of injurious caterpillars," its song has also long been valued for its ability to "make lovers dream, and drive poets into ecstasies of poetry."

scientific interest around ignored species and landscapes (153). Indeed, one way to understand *Secrets'* erotic ecology in this chapter is as a disruption of the "feedback loop" of scientific interest that forges *too much distance* between researchers and the "very small," "the mundane," and "transformed landscapes," by exposing these sorts of beings as agents of intensely interesting arousal (Bowker 146, 153). Percy Smith's revelatory and revolutionary cinematography works to draw closer communion among humans and non-charismatic species by teaching a deeply affecting—if still closely administered—eroticism to reassign value within British ecosystems. This ethical agenda is tied up with an aesthetic project that *The Nightingale* also performs: a precarious mimetic practice defined by cross-species (and cinematic) attachments. In drawing viewers quite close to the mosaic of the picturesque landscape, Smith finds moments of ecstasy in that unusual, if ordinary, agent of erotic encounter: the mossy patch.

Gathering Moss

Percy Smith's plant and microbial films pose some questions concerning the ethics of nature filmmaking, and documentary filmmaking writ large. The series generally fails to extend the considerations of privacy and consent to plant life that Mills takes care to extend to animals on film; there is no such call to "keep one's distance" in these films, which are defined by consistent—if careful—manipulations of plant and microbial bodies, using microcinematography to peer into plants' most intimate nodules.[121] The cellular matter of reproductive cells waver with energy under the microcinematograph's eye in these films, exposing the intimacies of life with a proximity that *Secrets'* animal films dare not approach. And yet, filming these organisms

121 See wildlife photographer Chris Palmer's *Shooting in the Wild: An Insider's Account of Making Movies in the Animal Kingdom* (2010) for a current call to action in this vein—and a list of filmmakers whose practices are both ethically sound and suspicious.

required a certain hands-off technique, the inscrutable—if penetrable—bodies of plants insisting on their own agency in the filmmaking process. "A plant makes up its own mind—or whatever Nature has given it in place of a mind—as to the programme it intends to carry out," Smith states, "and, unless one has already sufficient experience of its habits to know exactly what to expect, the working-out of a detailed script is useless, as the plant will be no more likely to follow it than it will to conform to the precepts of the textbooks" (Smith, *Secrets* 148). Indeed, unlike human and animal subjects whose cooperation may be plied, "plants can be neither bribed nor bullied, coaxed or cajoled. . . unduly generous treatment is useless, and over-fertilization may injure or even kill the subject" (148). Rather, "our wisest plan is to allow the plant to tell its story in its own way, while optically accelerating its slow and dignified progress to conform with the requirements of the age of speed" (148). Smith articulates the interests of plant subjects in his films as narrative and formal, suggesting that a respectful documentary ethic concerning plant life may be less attuned to notions of privacy and consent than to allowing these life forms, in design so alien to human and animal subjects, the space to tell their own stories. Rather than inscribing physical distance, Smith suggests that plant films inscribe a different kind of distance, via the sheer alterity of their forms, recalling Sobchack's reminder that the "density and obscurity" of material beings refers not only to the physical distances among beings, but also to their differences in form.

Here, Smith suggests a confluence with a strain of documentary film ethics that considers ethics as emergent from the life forms whose images the cine-camera indexes. Asbørjn Grønstad and Illona Hongisto, taking a materialist standpoint on cinematic ethics, both work to understand ethics as emergent from the *forms* of images themselves. Their perspectives are useful here in framing the argument of this section; Grønstad, following in the long history of aesthetics, sees

form as capable of inscribing ethics (6). Meanwhile, Hongisto suggests that documentary films are not only indexes of pre-existing and historically situated ethical systems, as Bill Nichols argues (although they are also that): documentary films are sites from which ethical values might be theorized and "released into the real" (135). This strain of documentary ethics speaks powerfully in response to Sylvie Plouteau's recent call to theorize an ethics of plant life from their status as life forms, whose bodies and behaviors defy the Euclidean geometries of human and animal life (85). Critically, for Plouteau, understanding the plant body as exemplary of the "continuous unfolding, open-ended stream of life and evolution"—and generating an ethics that responds in kind to this body— "requires new forms of aesthetic appreciation as well. …. [O]ne needs to perceive how plants grow as if they were pulled from a periphery that acts simultaneously on their multiple growing points located all over their surface" (93). Plouteau asks us to think about how to define plant ethics via images of plant life, and how to trace plant life's alterations within the precarious attachments of environmental ethics.

Percy Smith's films offer one model for how this theorization, rooted in plant life, rooted in plant imaging, might proceed. Indeed, one of the two popular botanies produced by the series' editors, *See How They Grow* (1952), argues specifically that the cinematic revelation of plant bodies lends aesthetic charisma to this slow-growing kingdom of life via its magnification of time and space, but also allows us to see life as emergent from many points of origin along these bodies: "Ciné-biology" not only makes interesting "the dull science of botany, that bane of so many schooldays," but also "captures the vitality of a living plant and preserve[s] it for all to see; it can give us a new insight into the life of the multifarious vegetation with which our world is clothed; it can give us undreamed-of glimpses of new beauties, the beauty of movement as well

as that of form" (Field, Durden, and Smith ix).[122] Sobchack's description of the ethical considerations that emerge from engagements with alien life forms is critical in understanding how these films might forward an ethical consideration via their punctuated and precarious eroticism. Smith's filmmaking teaches an ethic of care that proceeds from an engagement with the movements and behaviors of common, interesting life forms, as they grasp us carefully in turn. This ethic is structured by a carefully punctuated eroticism between viewer and plant life, dictated by the life form, magnified by camera work. The 1933 film, *Gathering Moss,* is a stunning, and picturesque, example.[123]

"Old walls that have stood long enough for their stones to gather moss; old roofs, covered with grey cushions of moss; and old hedgerows, where the moss grows in green patches;"—in characteristically interesting, reiterative prose, the commentary to *Gathering Moss* begins, placing us immediately within the aesthetic of the ecological picturesque, refracting and fragmenting a picturesque landscape to expose its texture. The opening shots position viewers in the field, as the camera hovers over three plots of moss growing on rock walls, crumbling roofs, and a nondescript hedgerow, a series of fractured viewers, loosely collected. Echoing the posture of the interested researcher, the third shot lingers over this mossy patch for twice as long as the opening images. A small beetle scuttles past just towards the end of the shot, catching our eye;

122 *See How They Grow* is a companion text to the earlier *Cine-biology* (1941), also by Durden, Field and Smith, and detailing many lower forms of animal life. Despite the title, however, *Cine-biology* never once mentions the cine-camera in the text. That Durden, Field and Smith (or really, Durden and Field, who include a posthumous chapter written by Smith) took pains to emphasize what the camera can do in *See How They Grow* suggests that not only did the earlier edition miss something critical for its audience—to understand how film might alter biological knowledge—but that animal life, unlike plant life, does not require film in order to secure our interest in these species forms and movements.

123 *Gathering Moss* thus upsets Jean Epstein's assertion that the "picturesque in cinema is zero, nothing, negation. About the same as speaking of colors to a blind man." Rather, Smith's picturesque most certainly "describ[es] a field, close-ups of a flower, a fruit, or an animal: living nature" (11). To be sure, Smith's picturesque camera work doesn't only offer the "horizons of the touring club," but focuses on the increasingly "close-up, close-up, close-up" (Epstein 11).

otherwise, nothing much happens here. Instead, from this perspective, we "take up" this mossy patch as texture. As we watch and wait, our eyes feel along its soft yet pebbly contours.

Figure 15: Film stills: Opening shots, in sequence, of Gathering Moss (1933), dir. Percy Smith

These opening moments of *Gathering Moss* are designed to bring viewers closer to the organism, subtly embodying the various positions of a researcher in the field. From quick glances at a distance to hovering encounters with hedgerow patches, the film brings viewers into closer and closer proximity to the textures that emerge more clearly in each shot. Just after the beetle scuttles past, for example, the film cuts to a rotating close-up of moss spores, seen at a distance indicative of a hand lens. The sample of moss turns around clockwise, as viewers register its grassy texture, so much more distinct than in the previous plot; halfway through, the rotation stops for several seconds, encouraging us to linger with it here.

However, the film does not retain the posture of the lingering researcher, and instead, leaves her visual and tactile experience behind by moving even closer to observe moss spores under the microscope. The remainder of the film is designed to allow viewers to see and feel this plant from an even closer proximity than that allowed by field work. The commentary bridges the cut between the images of spore cases under the hand lens and microscopic spores by encouraging us to "look closer," aided by the camera's eye. We watch spores sprout in this image, sending feelers along the ground. But while we might be looking closer at the moss here,

we are also *feeling* more closely, touched by the vibrations of cellular matter that sizzle and pop on the screen's surface. Through the microscope we are brought into very close contact with the interesting textures of this diminutive, slow-growing, and generally uncharismatic species.

Gathering Moss teaches cinephilia to encourage the revaluation of this species, particularly by exposing its evocative textures. As Barker argues, watching film with an eye that feels out texture is particularly useful in overturning boredom within the cinematic viewing experience. Citing Virginia Woolf's "aimless and serendipitous" watching of the bubble in *Dr. Caligari,* Barker suggests that films retain our interest by facilitating "attentive pressure," encouraging our eyes to caress the screen's surface (37). Films that lack texture—scuttling bugs, seedy surfaces, vacillating sputters—"skirt past us without being touched, and our attention never gets caught on the surface…if the film lacks even the slightest bit of texture, we say it is 'dull' and we mean it both literally and figuratively" (37). The experience of boredom is "an absence of pressure or friction" between eye and screen, where smooth surfaces prevent viewers from brushing up against the film's surface. In these opening moments, *Gathering Moss* provides opportunities to catch our eyes as they move across subtle surfaces, encouraging a mounting attentive pressure to textures—and the change in textures—that this film displays.

Gathering Moss's particular performance of ecological eroticsm operates precisely through the camera's ability to defamiliarize the texture of moss structures, seen through the microscope and in time lapse. Throughout the middle section of the film, documenting the "most complex life history" of this overlooked plant, "comprising two alternating phases of development, a sexual and a non-sexual" (Smith 128), Smith's camera reveals many prickly, spiny, and crackling textures that are "sharp, but effectively too small to disturb people sitting on mossy banks," as the commentary reports. Indeed, the magnification here is designed to make us

aware of this being's materiality, such that we might *feel* it more sharply. Field's editing establishes an interesting variation in the presentation of these textures by alternating between microscopic images of the plants as they grow into maturity with time-lapse images speeding up their notoriously slow growth; the film juxtaposes overhead microscopic shots with profile time-lapse images, between cellular vibrations and bristling shoots, to encourage viewers to feel moss in theme and variation. We see, for example, the cellular division and organization of cellulose "into branches and leaves" and then we zoom out just enough to associate those patterns with bodies that tickle and poke the surface of the screen.

Figure 16: Film stills: Microcinematography and close-up sequence, Gathering Moss (1933), dir. Percy Smith

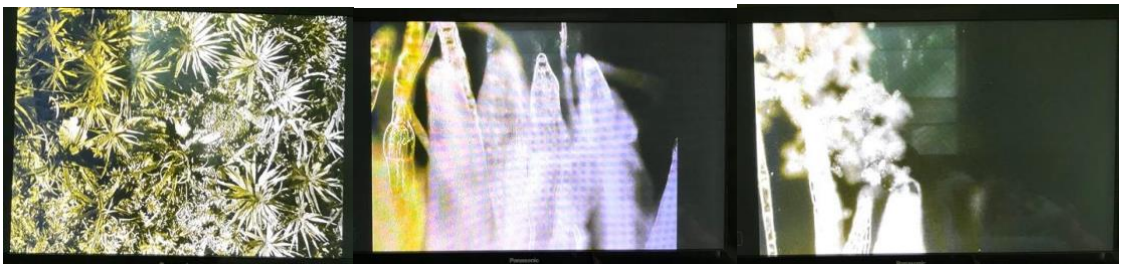


Figure 17: Film stills: A sequence of mossy textures, Gathering Moss, dir. Percy Smith

These two distinctive forms of camera work continue to alternate, simultaneously making abstract and tangible the form of moss growth, until one odd shot begins the film's description of moss sexuality. A moment of mossy ecophilia, a close-up time-lapse image, shot from above, registers moss leaves uncurling in response to moisture, the necessary ingredient in mosses'

sexual reproduction. This is not only an odd camera angle within the film, but within *Secrets* more generally: most often, time-lapse images are shot in profile, focusing on flowers' opening faces. Here, the emphasis is placed on the texture of the fabric of the plot, the "mosaic" that is made by cellular activity, more so than a particular plant's beckoning (Smith 128). Instead, we watch as the plot, dampened from right to left, outstretches its fingers towards us, "grasping and holding lots of water." Responding erotically to humidity levels, the moss tickles viewers' eyes as craggy feelers unfurl.

The result of all this varied texture is to encourage our fingers to ache with the desire to feel these different forms, forms that we couldn't actually perceive without the visual aid of the camera. In other words, this encounter with plant bodies begins to make us aware of our own feeling, sensing body, an encounter brokered via camerawork. And it is here where the film begins to toy with our own experiences of erotic caress. Using the priming of "attentive pressure" that these opening moments engender, Smith's camera work surprises viewers with frankly evocative imagery of masculine moss flowers releasing sperm. Appearing after another rotating close-up, a short circumambulation around the lovely, if unnoticed male flowers, looking altogether innocent, the microscopic sequence is one of the most unfamiliar views of this plant's form yet. The camera barely focuses on the form of the vaguely outlined "certain parts" of these male flowers here, only slowly allowing the cellular features of the background feelers to come into focus, registering as pattern and texture that our eyes take up. The film then cuts to a microscopic close-up of the cells' release: matter-of-factly, the commentary tells us that "the water they hold causes certain parts of the flower to expand, and by this expansion, a number of cells are forced out into the moisture." After watching so much creeping and prickling growth, the speed and shape of this moment is as striking in its momentary diffuseness, a quick moment

where form disperses. Viewers, responding to the diffusion of cellular matter into water, feel this moment like *la petit mort,* a release of the consistent pattern of cinematic touching that has structured this display of plant in-formation. Almost without our recognizing it, the film seduces us with textural rhythms that allow the love affair between moss and water to move us.

As my description suggests, however, the film works hard to manage the response that moss engenders in its viewers. Acts of distancing are critical in retaining the viewer's continued interest throughout and after this climactic encounter: the aim of the film is not to satisfy our physical desires too abruptly, but to keep us bristling. It does so by playing skillfully with texture-as-description. The blurry microscopic images of the male flowers, and the commentator's affectively flat phrasing and tone of voice, are a case in point: a strategic abstraction is happening here because the imagery is evocative. Perhaps more tellingly, the actual fertilization of the *female* flower's egg is featured in the film's sole animated sequence, a sequence that is effectively devoid of the textural elements that Smith registers via the touch of moss on film. "A dull little thing, nowhere near as attractive as the male flower" as the commentary reminds us, the female flower is drawn in smooth, symmetrical lines with subtly and lightly shaded roundness, making her body—and the actual conception of moss spores—a decidedly uncharismatic moment.[124] Flattening the texture to flatten the eros of this moment of in-formation, the film falls into a strictly informative mode. However we want to read the gender politics of this sequence—and it is very likely following in the Linnaean tradition of making female plant sexuality less prominent, and thus less offensive to female viewers—this is a

[124] Notably, her body become more Euclidean in this way, echoing the symmetry that defines plant and animal bodies.

moment of descriptive abstraction, where the film flattens its scintillating textures so that viewers might step away momentarily from its lushness.[125]

But animated distance, too, is precarious, and even here, the film pulls viewers into communion even as it aims to push us away. On the one hand, it encourages viewers to turn away from the film's patterns of touching and grasping so that we might account for and manage our own responses to this plant's form. As *See How They Grow* suggests, "to the uninitiated" moss reproduction is a "series of surprises," one of which is its evocative imagery, and our physical response to it (51). But animation itself is a surprising medium, and especially in reference to nonhuman life forms, as Paul Wells has suggested in *The Animated Bestiary: Animals, Cartoons, and Culture.* For Wells, animated characters are defined by ontological ambiguity, operating as "phenomena and, consequently able to carry a diversity of representational positions" (3). Animated characters might read as human or animal, as representative of ideological, political, ethical, or philosophical conversations, or do none of these things, performing in another way entirely, and most certainly "provok[ing] discourses rather than embedding, rationalizing, and fixing them" (Wells 18). Critically, the slipperiness of the animated form "can accommodate cross-species coupling without radical complaint or intervention," as Wells goes on to suggest (4). While Wells is writing in reference to animated narrative here, this statement appears particularly apt in reference to this animation of moss reproduction, which appears both alien and undoubtedly *like* our own (human/animal) reproduction, with an active, swimming spermatozoa drawn to an egg hidden in a vessel. *See*

[125] See Elke Kleinau's "Botany and the Taming of Female Passion: Rousseau and Contemporary Educational Concepts of Young Women" *Studies in the Philosophy of Education* 31 (2012): 465-476. According to Kleinau, not only did Linnaean classification reinscribe "the Enlightenment hierarchy of the sexes, in which the parts of the plants which now were considered 'masculine' were upgraded in value vis-à-vis the more lowly 'feminine' parts" (469). Kleinau also notes the moral controversy surrounding the gender politics of classifying plant life via sexuality which was (assumed) to be particularly embarrassing among "interested female readership" (469).

How They Grow suggests that this is moment of ontological fluidity, via its invocations of cross-species coupling: "And here we come up against that curious paradox once again, that kind of intermingling of plant and animal attributes which was discussed in Chapter 1. If spermatozoa of moss were examined out of their context, it would be quite pardonable for the not-so-expert enthusiast to fall into the error of supposing that they were once a species of Protozoa, so active are they. These spermatozoa are lured down into the necks of the egg-flasks by the promise of the cane sugar, and they fertilize the eggs" (Field, Durden, and Smith 55).[126] Fittingly, the symmetry of the female flower echoes the symmetry of our own animal beings here, as Plouteau has noted, making Euclidean an inherently non-Euclidean form to forge a point of attachment (85). Dan Torres's observation that animation "reifies the abstract, making it more concrete, but at the same time remaining non-specific" seems particularly apt here, as the film attempts to both help us understand moss development by concretizing it via comparison with our own experience, while not specifically naming it as such, forging a "non-specific" connection among life forms (183).

A point of communion, of distinction, the animation, serving the straightforward purpose of informational delivery, is fraught with the very kind of ontological slipperiness that defines the ecological eroticism of this chapter: a constant push and pull among material bodies, among human and nonhuman beings, as they respond to each other. At its core, the animation—and the film's larger project—"provokes" rather than "fixes" the ontology that these films explore, constantly slipping between moments of formal unity and distinction. The films' ethics proceed from this erotically structured ontological slippage among sensing bodies, as the camera allows

126 We should certainly note that Field, Durden, and Smith don't go so far as to compare moss fertilization to human fertilization here, even though the imagery suggests as much; here again, a layer of distinction is asserted between human and plant life forms, mediated via the animal body.

plant life forms to "tell their own stories," and to dictate their own care. Footage can be taken only when the filmmaker's patterns of touch are subtle and sparse, and accountable for the pleasures that touching invokes in his body as it responds to this Other life form.

The last sequence of the film—featuring some of its most alluring images—suggest the performance of this ethic in its flurry of interesting variations on the theme of asexual moss production. This section is shot largely in time-lapse, speeding up slow growth, documenting the vitality of moss properly cared for. To reach this stage of growth, the plants would have needed to survive the first phase of their life cycle, an impossibility if the filmmaker had plied his subjects with too much water, with too much touch. Crucially, this growth sequence begins to tap into the *cognitive* pattern of interest here, aligning interest's attention to theme and variation with these quivering bodies. The commentary tells us, for example, that "spore cases vary in shape, but they all twist and turn about"—on screen, the plants quiver towards each other, twist around each other, and dance with each other, quite evocatively taking on each other's forms. Scored with an especially passionate waltz, a skeeling violin highlighting the sporophytes' moment of tangled mimesis, this shot echoes in its close-up perspective, the bending and fitting of bodies in a close embrace. We find ourselves swaying in time, moved by the movement we see and feel.

Figure 18: Film stills: Stills from Gathering Moss, displaying different forms of sporophytes. Dir. Percy Smith

Figure 18 (cont'd)

The film's final sequence—varied close-ups of three different kinds of sporophytes opening to release spores—likewise prompt interested thinking and feeling, offering up moments to compare and contrast variations on the theme of sporophyte structure. In time-lapse, the film alternates between straight-on and profile shots of each species, as we watch each sporophyte open and close. The commentary tells us, for example, that "Different mosses have differently shaped cases," and if we attend with interest to their (rather alien) pattern and texture, we note one theme: that each sporophyte has an eye at the center which opens and shuts, from which spores are ejected into humid air. The difference lies in the feelers that protect the eye: all three sporophytes feature filaments that open and close around the center, but they look different in each shot. The first opens as if twisting a scored circle, and the feelers are exposed as tiny filaments along the edge of each cut. The second two species open by uncurling the filaments from their position over the seed head, fingers surrounding an opening eye.

Fingers protecting eyes, the seed heads embody Smith's attempts to bring distance back into the film's representation of reproduction. We should note that the actual spores are unseen here; crucially, Smith brings us back to surface textures and shapes—and these are decidedly less evocative, even off-putting—at this moment of reproduction. What I aim to mark here is that

within this specifically interesting moment, the eroticism of the film's earlier microcinematography is quelled by the quite literal distancing between the camera and the plant. After having been moved by the subtle movements of embracing sporophytes, we forget that this close-up is actually not such a close-encounter, and that Smith has tempered our attraction by actually drawing further *away* from the plant's release of reproductive material. The commentary, ending on a note of similarity, bridges the last cut between an opening seed head and another straight-on shot from above, seen at a little distance above the patch of moss, with this information: "but they all give out the tiny spores which form the clumps of moss which we see and know." A return to the familiar after many moments of unfamiliar, the film returns us to a merely interesting patch of moss. We take it up once again, returned to the hovering perspective of field work.

The close-ups of this final section suggest a nuance in Mary Ann Doane's definition of the concept that is worth articulating in reference to the ecological ethics that this film offers. Doane has noted how the close-up's epistemological work structures an internal ontological inconsistency within film theory, underscored by a desire to at once "annihilate the space of the spectator, to suggest that the only world is that of the screen," while at the same time "attempting to salvage the spectatorial space, to reaffirm its existence and its relevance in the face of the closed, seamless, space of the film" (108). Here, the close-up emerges as survival instinct in film theory, a way of forging critical distance between the world of the screen into which the viewer falls. Doane suggests that this simultaneous structure is a product of conflating methodological positions: the close-up remains specific to detail within a diegetic analysis of the film world, while it will bend towards totality if we position our point of view from the perspective of the spectator, within a theatre. In other words, the schizophrenia of the close-up resolves when we

distance these two "worlds," and mark the fact that close-ups do different work in different forms of film analysis (108). But the close-up also does different work within the confines of Smith's ecological filmmaking. Rather than making use of the close-up to provide a particular diegetic detail or to subsume the spectator with informational abundance, the close-up of the seed head is useful as a perspectival middle ground that is both near and far, an entirety and a particularity, an intimate view of a flower's unfurling or a seed head's ejaculation that neither allows us to die "a death of abstraction," nor a "material death," as Marks might put it. These close-up images, so indicative of haptic optics with their fingers closing over alien eyes, lead viewers through "the process" of "becoming an object with and for the world, and to return to being a subject in the world." Hovering between abstraction and materialism, this close-up lingers. Within the context of the 'interest' film then, the close-up need not be understood as schizophrenic in this mode of viewing, but a mechanism that teaches a mode of spectatorship that exists precisely within this duality: learning to be touched by and distinct from the beings which we encounter within this technique's slight distance.

In *Gathering Moss,* Field and Smith lead viewers through this process in order to revitalize and sustain interest in the mundane, tiny, and transformed organisms and environments that recede from the center of an ecology of charisma—that is, to make us care for them, both emotionally and physically. This care is produced by allowing plant life to tell its own story, via film. *See How They Grow's* description of the first seed head is especially powerful here—"when they are wetted, these teeth curl together with a movement that resembles the iris diaphragm of a camera, and they close the capsule" (56). The image evokes, of course, a point of communion between the haptic optics of the cinematic apparatus and the form of the plant itself, suggesting a reading of Smith's filmmaking that allows plant life to tell its story via this

medium's hands-on, hands-off procedure—indeed, to suggest that film might be the *only* medium through which plants can gain this aesthetic agency and its associated practicum of care. After all, as the authors of *See How They Grow* assert, "A flower, picked in hedgerow and carried back to the classroom, to be torn apart piecemeal, petal by petal, stamen by stamen," is not only "a lifeless and uninspiring thing indeed," but one distinctively uncared for (ix). The film makes an argument, then, that film is not only the most charismatic and interesting method of studying plant life, but the instrument that provokes and inspires care, in terms of value, in terms of action. In *See How They Grow*, this ethos is forged by a *formal* mimicry between camera and moss, as the descriptive metaphor of the iris lens for the seed head suggests: camera work, because it is lively, because it is distanced, is the instrument that cares for plants, and for their delicate, inscrutable, and distinctive forms.

Secrets of Nature, then, makes an argument for a formally attuned documentary methodology for filming life that is dictated by the material agency of life forms themselves.[127] This is, of course, the primary protocol of ecological documentation as the product of interested thinking and feeling throughout this dissertation: ecological documentation is defined not only by the collection of information, but by a representative practice that indexes in-formation. But in adopting this medium, in this way, the series also makes an argument for approaching ecological study with *interest,* making the precarity of this attachment, forged at the intersection of information and in-formation, of sign and index, a critical piece of its ethic. This is a decidedly different pedagogy than Weber's pedagogy of death, which, to use Jennifer Fay's recent phrasing "does not teach viewers how to survive in this world," but to "lay bare the attachments to it that kill it" (99). This does not describe *Secrets of Nature,* which commits to

[127] Notably, this hands-on, hands-off methodology is also what makes the series particularly modernist for Hovanec (246).

producing life-affirming attachments to organisms and environments—by, often ironically, loosening them (99).[128] Rather than suggesting that we "learn to die courageously," *Secrets* suggests that, via camera work's distinctive distance from actuality, we can learn to allow the locus of our attachments to shift and turn away from dark spaces where our favorite songbirds hide, and to revel in the textures of different beings made re-markable. Camera work, then, takes its place alongside the field and garden as a site for modern ecological research, teaching, and thought; for *Secrets of Nature* viewers, the cinema was a place to practice the eroticism of interested field work, circulating widely, if precariously, throughout British modernity. For twenty-first century viewers, the series is a case study in figuring the relationship between ecology, affect, and ethics, figuring punctuated, discreet spacings—in grammar, on film—as necessary for lingering with earth's varied life forms. From frogs to wood wasps, sweet peas to myxies, *Secrets of Nature* carefully patterns viewers' ecological interests, encouraging an ethic of care for organisms who deny us proximity, physically and ontologically.

Camera work, like the field and garden work methods explored in chapters one and two, is critical in teaching and learning interested ecology, and reveals the buzzing eroticism that is inherent in this form of field work. In the last chapter, I examine how a final form of field work documentation—the species list—infuses Surrealism with the interested thinking and feeling of its contemporary ecology—and in fact, becomes a form of poetics that teaches the lyric behavior of Surrealist field work. Surrealism's *l'amour fou* takes on interesting cognitive, affective, and

128 This is not to say that death doesn't star throughout the series, but rather to claim that its relationship to the death and brutality of modern ecosystems is a nuanced and varied affair. Death stars rather spectacularly in many *Secrets: The Strangler's* (1930) demonstration of creeping vines' destructive garden work, for example, is billed as film noir, framing this weed as an insidious metaphor for modernity writ large. And the darkly comic tale of three bunnies' untimely demise in *Once We Were Four* (1942), a feature in the series' post-war reboot titled *Secrets of Life,* suggests that the editorial team took a much different stance on ecological politics and ethics post-Blitz. In this film, a fluffle of bunnies find their ends via quite natural means—with the exception of bunny number three, whose small body flies across the screen in the wake of a bomb falling in its field. The message is plain: the war machine of modernity has ecological impacts, with consequences that human and nonhuman neighbors alike will share.

aesthetic characteristics through its innovations with merely interesting lists of species, documents that were being redesigned by practitioners of ecological Surrealism to describe the often indescribable experiences of mimetic kinship among forms of mind and matter that they experienced in the field. Bringing the merely interesting, often overlooked species lists of modern ocean ecology into a proximate, if slightly distant contact with *surrealisme*, I demonstrate how ecological Surrealism blossoms from the hardy varietal of ecological epistemology I have been studying here: interest.

CHAPTER FOUR—Water Work: Three Species of Ecological Surrealism

The flora and fauna of Surrealism are inadmissible!
—André Breton, Manifesto of Surrealism

Shores: André Breton

Inadmissible: not to be verified, not to be accepted as valid, not to be allowed. In this elliptical exclamation, André Breton puns on the function of the species list as a scientific document. For species lists make organisms known, verifying and validating their presence, and allowing an organism into the annals of the natural historical record. The presence of the pun in this moment of "Manifesto of Surrealism" is critical, appearing in the numerated description of "poetic Surrealism," which also includes a list of images from various writers standing as evidence of this aesthetic experience. These images—Vitrac's flaming forest, Morise's regressive cephalopods, and Breton's own *poisson soluble*— "attest to the fact that the mind is ripe for something more than the benign joys it allows itself in general," Breton states (39). Urging his readers towards marvelous experiences, Breton's language game draws on the listed forms of scientific classification as a common form of documentation for defining the gen(i)us *surrealisme.*

Experiments with listed forms appear often throughout Breton's writings, and they appear in important moments for defining Surrealist poetic protocols. Throughout *L'amour fou,* for example, the "lyric behavior" of Surrealism is articulated in language evoking the listed document:

> It is only by highlighting the close relationship between these two terms, the real, the imagined, that I hope to break down the distinction, which seems to me more and more ill-founded, between the subjective and the objective. Only the

> meditation of this relationship leads me to ask if the idea of causality does not become haggard. Only, finally, by underlining the continuous and perfect coincidence of two series of facts [considered]—until further notice—as rigorously independent, that I intend to justify and advocate, always and electively, for the *lyric behavior* as it imposes itself on all life, even if for only an hour of love, such as surrealism has tried to systematize it, for all purposes of possible divination. (*L'amour fou* 61)[129]

Here, considering the relationship between two series of facts—the real, the imagined—is critical for breaking down the distinction that exists between the polarities of mind and matter, subjectivity and objectivity that Surrealism aims to enact. It is critical that Breton uses the terms "séries de faits" here, because this kind of document does not presuppose a "haggard," dessicated notion of causality as the primary relationship between mind and matter, and indeed, can and does emphasize the gaps of information and the "rigorous differences" between entities that list forms allow.[130] Rather, lists make room for associations of other, particularly poetic, influences to emerge. The syntax throughout the passage suggests as much, usefully establishing a relationship between the lyric behavior and the consideration of these two series of facts: the repeated phrase signaling the "system" of surrealist divination/documentation here— "*C'est seulement"*—echoes in the verb of the phrase "*par le soulignement de la coïncidence continue, parfaite, de deux séries de faits*" (*L'amour fou* 61). What this consonance brings to bear is the

129 Unless otherwise noted, all translations of *L'amour fou,* Gallimard, 1937, are my own.
130 I am especially fond of Mary Ann Caws's translation of the phrase, *l'idée de causalité ne sort pas complètement hagarde,* which in its watery imagery suggests that our own imaginations of Breton's underwater mythology color our readings of it: "Only the contemplation of this relationship leads me to wonder if the idea of *causality* doesn't turn out to have run quite dry" (Caws 53).

binding of surreal knowledge work to surreal poetics, framing poesis as critical for reimagining relationships between the facts of mind and matter, serially arranged.

Breton exhibits a primary feature of the ecological Surrealism I inventory throughout this chapter: employing the form of serialized, listed documents, and especially species lists, as a resource for cultivating poesis. Species lists teach ecological Surrealism, as an aesthetic, as a fieldwork, throughout the three thinkers I bring to bear here: Breton, whose amateur studies in lepidopterology and entomology would have made him quite familiar with the documents of natural historical (and eventually ecological) research; and two liminal Surrealists, the pioneering American ocean ecologist, William Beebe; and the French filmmaker, scientist, and educator, Jean Painlevé. All of these thinkers were swimming in similar textual waters in the 1920s and 1930s, as they developed documentary protocols for capturing the marvelous, wonderful (and also often merely interesting) experiences they aimed to live and produce, in conversation with ocean environments which figure prominently here. And these thinkers design species lists as innovative descriptive technologies capable of producing surreal cognitive and affective experience. These documentarians envisioned a form of representation that would allow the experience of marvel *felt in the field* to persist within reproduced and mediatized language and image. "The Manifesto of Surrealism," after all, calls for Surrealist practitioners not only to resist the "dull" and "incurable mania" of rationality, as we desire to "make the unknown known, classifiable," but to do so in the face of a barrage of descriptive banality created by the circulation of "superimposed images taken from some stock catalogue (Breton, "Manifesto" 7-9). As two scientists interested in developing a range of media technologies for documenting life underwater—and in circulating the surreal experience of these environments *sous l'eau*—Beebe and Painlevé also grapple with the problem of representing "poetic Surrealism" within their

widely circulated science writing, still images, and films. As Beebe states, "We need a whole new vocabulary, new adjectives, [to adequately] describe the designs and colors of undersea" (*Beneath Tropic Seas* 35). Painlevé echoes this multi-media sense of poetic design in his own way: science film is "not only a tool, but a grammar and an art" ("Scientific Film" 169).

Breton's play on the species list in "Manifesto of Surrealism" typifies a shared descriptive innovation developed in response to problems of representation and pedagogy among these ecological Surrealists: playing on the fluid, if also systematized, nature of species lists to teach poetic encounters with representative images of ocean life. Indeed, Breton seems aware of the role these lists play in managing both ecosystems and the researchers who document them. Species lists are, after all, consistently redesigned via disciplinary protocols, ecosystemic conditions, and political and personal interests—that is, they are codified forms only "until further notice." As contemporary ecologists will note, the massive species lists collected in digital archives and databases are evolving documents that shape relationships among ecosystems, organisms, researchers, and communities, in increasingly complex and often troubling ways.[131] They are active, living documents that shape the way that humans interact with ecosystems, and thus ecosystems themselves. Breton's exclamation echoes this relationship between human and nonhuman entities: it refers not only to the catalog of plants and animals that

131 The literature on species list completeness and corresponding ecological impact is much larger than I can footnote here; see, for example, this scattering of recent ecological research which assesses how the blind spots of large-scale species lists find their ways into the research generated from them: Tao Deng et al. "Incomplete species lists derived from global and regional specimen-record databases affect macroecological analyses: A case study on the vascular plants of China," *Journal of Biogeography* (Dec 2018) 45.12: 271-283; Katherine Dorey and Tony R. Walker, "Limitations of Threatened Species Lists in Canada: A Federal and Provincial Perspective." *Biological Conservation* (Jan 2018) 217: 259-269; and Thomas M. Bach Christian A. Kull, and Haripriya Rangan, "From killing lists to healthy country: Aboriginal approaches to weed control in Kimberly, West Australia." *Journal of Environmental Management* (Jan 2019) 229: 182-193. Giberson, Donna J.; Burian, Steven K.; Cárcamo, Héctor A.. "How Valid are Old Species Lists? How archived samples can be used to update Ephemeroptera biodiversity information for Northern Canada." Canadian Entomologist (Dec 2017) 149.6: 755-774. All of these studies challenge the decision making that proceeds from current species list records, and encourages varying and updating species lists with new information and fresh perspectives to more accurately model ecological relationships.

embody Surrealist notions of the uncanny and the marvelous, but to the practitioners of Surrealism themselves. His remark suggests a mimetic morphology among the flora and fauna of Surrealism (species, epistemologies): this kinship among life forms of mind and matter sits at the heart of Surrealism itself.

Part 5 of *L'amour fou* is a critical case study for understanding the kinship among Surrealist species and its epistemologies, and how species lists produce it. The section almost insists on its form as a botany, encouraging us to read it as both a document of lyric behavior and of the Tenerife's plant community. From spurge cactus to dracaena tree, from the poisonous *pitunga* tomato to *sempervivium,* the sensitive plant, from the datura to the mangrove, from a variety of figs spectacularly reimagined to the blazing *retama* shrub, the section is a list of species, and an exploration of potential meanings, potential relationships that exist within the aporias of this botanical document. Descriptions of the region's species ground many of Breton's explanations of surrealism and its primary terminology. His description of the native succulent species, *sempervivum,* commonly known as hen-and-chicks, is a remarkable case in point:[132]

> It is cumbersome to tear oneself away[133] from the contemplation of this autochthonous species, I think, of *sempervivum* which enjoys the frightening property of continuing to develop in any conditions and as well as from a leaf fragment as from a leaf: crumpled, pierced, torn, burned, imprisoned between the pages of a book forever closed, this glaucous scale—about which you cannot decide if it would be better finally to press it against your heart or to insult it—

[132] Indeed, for readers not well rooted in the plant life of the Canary Islands, including this reader, understanding this section requires one to turn to a basic botany in order to parse the images that Breton creates, as well as the metaphors that he attaches to the surrealist verve.

[133] I differ from Caws in my use of the adverb cumbersome here, as I am emphasizing the notion of attachment that this passage suggests in its use of the verb *s'arracher* (to tear oneself away).

> remains well. It tries, at the price of whatever revolting efforts, to reconstruct itself according to the destroyed probabilities that it has. It is beautiful and confounding like human subjectivity, as it emerges more or less haggard from egalitarian revolutions. It is no less beautiful, no less ineradicable than this desperate desire of the present day, which can be described as *surrealist* as well in the field of the particular sciences as in the field of poetry and the arts, to operate at every moment the synthesis of the rational and the real, without fear of bringing into the word "real" all that it can contain from the irrational *until further notice*. It is not more beautiful, it is not poorer in reasons for being and richer in becoming than the separation of love, no matter how brief, than this delicious wound that opens and closes on a phosphorescent, secular series of temptations and dangers. (83-4)

Stitched together with a comparative prepositional phrase and, again, with some poetic consonance, the description of *sempervivum* and a description of surrealism are wrought into each other's forms. Poesis allows surrealism to take on the hardy well-being of the hen-and-chicks, and indeed, the passage plays on the notion of "haggard causality" from the previously cited section explaining the surrealist methodology. It is this variable but persistent patterning, this hardy and recurrent stolon, that lends surrealism the ability to take root across a variety of "fields." But the passage also insists upon a gap between these concepts; it does reiterate, after all, the phrase "until further notice," another runner from the previously cited passage, which emphasizes the *difference* between sempervivum and surrealism, the one as a form of material life, the other, as a life of the mind. Critically, Breton formulates a kinship between surrealism and *sempervivum* here, but not a mirroring: the facts of mind and matter are held in communion,

in distinction. After all, there is no metaphor or simile in this passage, and the gender of the pronouns in French suggests that *sempervivum,* not surrealism, remains the subject throughout: it is the humble and haggard *sempervivum* that is as beautiful as the delicious wound of love.

In this passage, Breton figures a taxonomic similarity that defines the Surrealist characteristics of the scientists I bring to bear here: Beebe and Painlevé, too, are preoccupied with the ways in which human experiences appear to "brother" material ecosystems, to use Beebe's terms, and how to cultivate that uncanny kinship among readers and viewers who experience ocean life on dry land (*Beneath Tropic Seas* 5). And Breton also demonstrates *how* ecological Surrealism produces this experience: species lists, as documentary technologies, reveal the ways that plant and animal species come to incorporate the cognitive and affective experience of Surrealism, and indeed, how this written form, often paired with images, allows this kinship to become visible and thinkable.[134] I read the species list, like Beebe, Breton, and Painlevé, as a source of descriptive experimentation in this regard: it is a language game, that when juxtaposed with fieldwork maps, photographs, films, and pictorial representations, makes this relationship between species and epistemologies visible via the "force field they set up between them," to cite Michael Sheringham's *Everyday Life: Theories and Practices from Surrealism to the Present* (81).[135] If one might divine the unconscious organization of one's life

134 Like Breton's vague, if enthusiastic exclamation, Kirstin Strom's syntax, describing the relationship between Darwinian and Surrealist inheritances notions of the uncanny and the marvelous, also begins to suggest this relationship: "Anyone who begins to look for nonhuman animals in Surrealist works will soon begin to see them everywhere," she states, "Nightingales, fish, giraffes, ants, dogs, horses, cats, grasshoppers, cows, lions, and many, many others inhabit Surrealist paintings, poems, and films. The implications of such representations may be due to a perception of these animals not only as uncanny, but also as literal embodiments of the marvelous" (23).

135 Sheringham traces Surrealism's experimental practice as existing within a Charles Taylor's notion of the Modernist epiphany: "In Modernist epiphany it is not the description or presentation of a thing—object or landscape—that makes something appear, but rather a juxtaposition of images or words: 'the epiphany comes from between the words or images, as it were, from the force field they set up between them, and not through a central referent which they describe while transmuting.' (citing Charles Taylor here). What is involved is the creation of a frame around reality, which makes something appear—indirectly—by giving it a structure. Modernist epiphany involves mediation" (81).

by “staring fixedly” at a hazy “pattern of facts, whose surface is cracked or cloudy”—what Breton describes as a grid—then we should read this grid in a multi-media context (*L’amour fou* 87). After all, this passage is immediately preceded by a cloudy list of species—Hamlet’s camel, weasel, and whale—which Breton suggests, might be “the discovery of the deep psychological motives for Hamlet’s behavior during the whole play. It is certainly not at random that the names of these three animals, and not others, come to his lips” (Caws, *Mad Love* 85).

Ecological Surrealism involves a multi-modal practice of documentation that pairs species lists with other forms of field documentation, and in doing so, cultivates its experience as a kinship among human thinking and feeling, and nonhuman life forms. Rather than locating my critical focus, then, on the forms of *species*—I am not describing Surrealism as a form of Donna Haraway’s “tentacular” thinking, for example, although species with tentacles do capriciously appear throughout these works—I focus instead on the form of the *documents* that mediate those species, how these documents alter the perception of nonhuman movements and behaviors, and thus how the cognitive and affective pedagogies of ecological Surrealism become modeled upon the nonhuman world (*Staying With The Trouble* 30). Beebe’s often surprising writings make this relationship clear. For Beebe, modernist aesthetics—and its practitioner’s protocols—have something to learn from underwater ecosystems as avant-gardes worked to redefine realism: “If one asks for modernist or futuristic designs, no opium dream can compare with a batfish or an angry octopus,” he postures (*Beneath Tropic Seas* 36). Beebe’s emphasis on design—an emphasis he reiterates in his writings on scientific training—suggests that drawing critical attention to the form of field work documents, and the ways those documents alter how

practitioners perceive actuality and think and feel about it, are critical to understanding the relationship among ecology and Surrealism.[136]

And finally, the species list I have designed here reveals a critical epistemological relationship between ecology and Surrealism that places modern ecological thinking—that is, interested thinking and feeling—as central to the "lyric behavior" of Surrealism. Indeed, interest is critical to the designs of both lists and practitioners of ecological Surrealism. Species lists are serial forms of informational display, and thus generate varying degrees of interest among readers engaging with their data, as Sianne Ngai has argued.[137] For Ngai, interest, and interesting aesthetics, are responses to information on display: "telegrams, memos, spreadsheets, newspaper ads, specimen cases, list structures, notarized certificates, graphs, geological surveys, spectrometer analyses, card catalogs, surveillance reports" become aesthetic objects that prompt vague and often vacuous feelings and associations (158). Parataxical and punctuated formats, lists evoke more than illustrate relationships and confluences among entries: white space, commas, periods, and line breaks curtail descriptive detail. The use of numbers, too, within many list structures reiterates this sense of fragmentary and nascent knowledge work; as Ngai notes, "in a sense," numbers are "merely interesting, generating 'sudden moments of insight without any substance' and 'simultaneously more information for those who already have some knowledge'" (Ngai 145). List structures, then, like other interesting forms, might generate deep or shallow attachments to data, depending on the preparation of the reader and their ability to form relationships among entities that are both brought into proximity *and* distanced from each other via the gaps of meaning that exist within listed forms. Indeed, species lists can be

136 See his 1939 essay, "Design of a Naturalist," examined in more detail in the sections that follow.

137In the process of arguing for the interesting as a unique aesthetic response to information infrastructures, Ngai emphasizes the close relationship between information and the interesting aesthetic throughout her study, noting that information is itself often (only merely) interesting—a "mild surprise" as Niklas Luhmann suggests (145).

understood as an interesting documentary "style of serial, comparative individualization;" the knowledge contained within them is "essentially adrift, isolated from any universal concept that would stabilize the interacting units,' since it hinges upon a subject's 'receptiveness' to an open-ended process of comparisons whose function as either the synthesis or analysis of varying quanta of content remains completely uncertain,'" as Ngai asserts (122). They are the products of a field work that lingers along the "border-line between the known and the still unknown," to use Tansley's phrasing, and their poetics inheres within their status as both documents of known and unknown quantities ("The Future Development" 16). In innovating on this list form, ecological Surrealism locates interest as the flowering—and progenitor—of its poesis.[138]

I read species lists, then, as "anti-literary" documents, to use Dawn Ades's term, that are particularly conducive to being taken up and reshaped by surreal efforts to refigure descriptive patterns (161). This conversation has often surrounded documents produced by mechanical means, in both scientific and secular contexts, and especially photography. Historians of Surrealism's documentary impulses consistently frame cinema, photography, and other visual media as critical to understanding and experiencing Surrealist marvel as "consciousness of this relation between materiality and imaginative representation," as Patricia Chu has described it (195).[139] But species lists share certain characteristics with other forms of surrealist documentations/hallucinations: they are marked by "changeability or mutation, including indeterminacy and cloudiness, and disguise" (Caws, *The Surrealist Look* 5); and like the

138 Indeed, it is precisely this seriality that, as Ngai goes on to note, defines modern poetry for Schlegel: "modern poetry. . . is thus marked by the '*total predominance of the characteristic, individual, and interesting*'" and which thus participates in the ongoing exploration of interested thinking and feeling (125).

139 In addition to Krauss and Caws, Michael Richardson and Ian Walker have both excavated how the surrealist movement saw in the indexical documents of cinema and photography a potential for the imagination to worry at and trouble the boundaries of representational models, to make "hallucinations" from "facts," to use Walker's words (23).

surrealist use of photo montage, which for Rosalind Krauss exemplifies surrealism's marvelous aesthetic, the species list also emphasizes the "gaps between one shard of reality and another" (25). To be sure, like photographs, species lists are often repurposed, reiterated and reduplicated, and thus "open[ed]. . . to the effect of difference, of deferral, of one-thing-after-another" through iterations and reiterations that are always only fragmentary (28). Ecological Surrealism develops its innovations on this listed form in conversation with these mechanical technologies of representation, and species lists also inspire poetic uses of these media.

A number of textual lineages developed by historians of science and Surrealism are evident within this reading, and they speak to the wide-spread nature of modern ecological interest pedagogies. Donna Roberts, for example, has traced a lineage between Surrealist methods of thinking and analysis—also described as "analogical, comparative, curious, and marvel-based"—and natural history, exploring the works of Breton and Caillois as "radically ecological" in that they understand "mankind as firmly entrenched within the continuity of nature" (301). Tracing a history of surrealist natural thinking to the German romantic tradition, and particularly Alexander Von Humboldt, who is often claimed by ecologists as one of their earliest practitioners, Roberts describes the Surrealist project as a "pre-scientific" attempt to re-enchant modernity—and the psyche—through the natural world (288).[140] To describe this mode of thinking as "pre-scientific" is of course dubious: James Leo Cahill's *Zoological Surrealism:*

[140] Indeed, as Juli G. Pausas and William Bond have very recently noted, Humboldt can be understood as the "first global ecologist and biogeographer," the inspiration for Haeckel's coinage, as well as inspiring ecological interest in Darwin, Frederic Clements, his contemporary Henry A. Gleason, two of the most prominent American ecologists in the 20th century (1). Notably, Humboldt was also a participant in the articulation of picturesque aesthetics: see his *Personal Narrative of Travels to the Equinoctial regions of the New Continent During the Years 1799-1804.* Longman, Hurst, Rees, Orme and Brown, 1814. My own argument, of course, reaches somewhat further back, and suggests that Humboldt sits within a long history of picturesque aesthetics and travel that reaches backwards into the 18th century and towards the aesthetic theorists William Gilpin and Uvedale Price. And, of course, Gilbert White was doing picturesque ecology well before Humbodlt, writing his little documents of desire in the 18th century as well.

The Nonhuman Cinema of Jean Painlevé, for example, has demonstrated that these precise epistemological values are evident within the training in comparative anatomy that many Surrealists shared, including Louis Aragon, André Breton, Jean Painlevé, and Jacques-André Boiffard. This "artful science" emphasized "establishing connections, exploring differences, studying the sources and causes of development and change, and cultivating a strong capacity for analogical thinking" (Cahill 37). Cahill describes much of the cognitive work of interest here, and indeed, as he notes, comparative anatomy in the 1920s was beginning to reflect the shift towards ecological field work that British and American botanists and zoologists had been pioneering throughout the early twentieth century.[141] Both studies work to describe the Surrealist attitude towards nature "as continuous to the human mind," wherein the material study of nature shapes Surrealist cognition, imagination, and desire (Roberts 288). These studies also tend to focus on notions of marvel, surprise, and wonder within the Surrealist experience, emphasizing the powerfully felt emotions of this field work. But as Breton and Eluard note in *L'amour fou,* a research methodology that fails to account for "d'un ensemble de faits en apparence plus ou moins miraculeux" is fundamentally flawed (26). Interest—which is by nature both more and

141 James Leo Cahill has done the most to contextualize Painlevé's cinema within the context of his contemporary science education; while Cahill's explication of the course of study in comparative anatomy in which Painlevé enrolled at La Sorbonne in the 1920s was beginning to reflect the shift towards ecological field work that British and American botanists and zoologists had been pioneering throughout the early twentieth century. As Cahill notes, on the one hand, comparative anatomy was less an "organizing logics for research in the field as useful institutional titles;" the field was quickly following Lamarck's "emphasis on the metamorphic potential of organic life and gave the milieu an increasingly important causal role in transformations, thus leading the imagination, if not always the researcher, to move beyond the walls of the anatomist's cabinet, gallery, and laboratory to consider the natural world from an ecological perspective," as Cahill states (40). Under Paul Marie Joseph Wintrebert at La Sorbonne, Painlevé completed fieldwork as part of this laboratory training (40). Indeed, Wintrebert's pedagogy is an interest pedagogy, as I have been explicating it: "Wintrebert encouraged methodological flexibility among his students," Cahill writes, and when educating naturalists, "'the greatest freedom must be allowed for all to choose their own working methods according to their temperaments'" (Cahill 36). For an entirely different take on Surrealism and its relationship to Darwin, which traces a relationships of critique among both primary strains of Surrealism and Darwin through Nietzsche, see Gavin Parkinson's "Emotional Fusion with the Animal Kingdom: Notes Towards a Natural History of Surrealism." *The Art of Evolution: Darwin, Darwinisms, and Visual Culture.* Ed. Barbara Larson and Fae Brauer. Hanover: Dartmouth College P, 2009: 262-287.

less miraculous—is thus a critical experience under examination by these Surrealists attempting to understand ecological arrangements of ideational and material facts.

These studies also handle mediation as critical to the relationship between Surrealism and science in varying ways: photography, film, and microscopy as a research instruments, for example, are influential in these discussions for the ways in which they enlarge particular life forms, position them in relationship to the other species, reveal uncanny kinships, and thus manipulate particular positivist boundaries.[142] Classifying a form of science writing as source of Surrealist poetics is thus distinctive among researchers exploring the intersection of mediation, Surrealism, and scientific documentation; taking my cue from Breton, Beebe, and Painlevé, I ask my readers to read these documents as much for the potential relationships they help us to envision and imagine as for the data they present. In "yielding" my critical "initiative to a *form* of writing," to echo Robert Ray's (Surreally-inspired) methodology for understanding cinema, I explore species lists as both a primary historical document and a methodological model for understanding the entanglement between twentieth-century ecological thought and the practices of its contemporary Surrealism, and indeed, suggest that *practicing* this form of writing and the comparisons, associations, and relationships it evokes can reveal the varied performances of ecological Surrealism in this moment (97). I understand the instruments that science and Surrealism use to record and question materiality as the homes of sentiment and knowledge

[142] As Cahill states, "microcinematography and extreme close-ups rather than a spectator's unconscious desires—play with and productively alter comparative anatomy's principle of correlation between the part and the whole, introducing aspects of non-self-same identity and displacement into a field of inquiry rooted in taxonomic identification, organic function, and form" (32). See also Patricia Chu's "Sea Urchins and Circuses: The Modernist Natural Histories of Jean Painlevé and Alexander Calder." *Modernist Cultures* 13.2 (2018): 187-211, for an explication of the visuality of laboratory science and its implications for Surrealism, and David Lomas's history of the graphic recording device as a source of Surreal experience in *Simulating the Marvelous: Psychology, Surrealism, Postmodernism.* Manchester UP, 2013.

work, and as experimental models that structure and reveal comparative relationships among Surrealism and ocean ecology.

The close readings that follow explore variations of ecological Surrealism, as they draw on species lists to teach the cognitive and affective experience of field work. Beebe and Painlevé redesign species lists to facilitate poesis and reinforce the centrality of interest to the thinking, feeling, and representation of ecological Surrealism. William Beebe's innovations on species lists produce poetic brothering among Surrealism and underwater species and environments, but he varies this technology to rescue his mediated and repetitive descriptions of marvel from banality. Meanwhile, Jean Painlevé's written and cinematic variations on the document respond to other paradigms of scientific thinking and feeling adrift in the same tide pool. All both thinkers, like Breton, develop new forms of species listing, in image and word, in order to illustrate the vulnerability of an interested ecological Surrealism, and to suggest descriptive solutions for it. Their lists teach us how to read species lists as documents that make quantities of things known, and as documents of unknown quantities, aporias of potential knowing emerging within the spaces among entries. These works do not simply reveal the poetics of scientific documents by appropriating and presenting them within aesthetic contexts; they position ecology as a resource for poetic experience and grammar. This positioning is the defining characteristic of ecological Surrealism.

A final description from Part 5 of *L'amour fou*—figuring the humble and creeping cousin of the pea, *mimosa pudica*—helps to illustrate the claims of this chapter: that ecological Surrealism locates its poetics in interested thinking and feeling and often by adapting the merely interesting documentary devices known as species lists. Breton writes:

> It is made, this perforated grass, of a thousand invisible, *intranchable* links, which

> unite your nervous system to mine in the deep night of knowledge. This boat, rigged by children's hands, unravels the bobbin of fate. It is this grass that will continue after me to line the walls of the humblest room every time two lovers shut themselves up in defiance of everything that may happen, even the hastening of the end of their lives. No overhanging rock, no rock threatening to fall any second, can prevent this grass from thickening around this bed, hiding from the rest of the world the two gazes seeking each other and losing each other. Rolled by the sea of my grass, the traces of paint will not yield to impeccable decorations and rich toilettes. There is nothing that changes, and nothing would have more value if it changed. The greatest hope, I say, is that for all it exists, and for all it lasts. May the absolute gift be in the eyes of all be only the natural and supernatural pier grown across life itself. But what is this enigmatic grass, in turn that forestation and total deforestation, that foliage of the mimosa of your eyes? The coils suggest, lighter than a wave washing over it, that it is the *sensitive plant.* (Breton, *L'amour fou* 95).

As in the description of *sempervivium,* the passage insists upon its reading as a species list, allowing *l'amour fou* to be surrounded by thick articulations of the plant's characteristics—we should note the theme and variation of "this grass" (cette herbe) throughout the passage in the subject slot of the sentences. Here, what appears to be an undoubtedly interesting form of life surrounds and protects a moment defined by cognitive and affective rupture, generating connections and associations couched in the night of knowledge. But it also protects the passage's poesis from boredom. For Micah Mattix, Surrealist poetry is often a boring experience; without a distinctive narrative patterning, the gaps and fragmentations of Surrealist poetry, in his

opinion, suggest little meaning at all, putting the "hard-nosed philosophical aesthetic Breton championed" at risk (36). "The result is boredom," he postulates (36). Notably, however, Mattix goes on to suggest that Surrealist images don't have this issue: "I could look at Max Ernst's drawings in *Histoire Naturelle* for hours, but reading even the best 'absolute' surrealist poem is something like 10 percent exhilaration and 90 percent standing in line at the DMV" (36). His comment suggests that the interest of Surrealist aesthetics resides in a visual capacity to imagine relationship, a capacity that Surrealist language games do not always support.

But this description from *L'amour fou* suggests that interest lives in the ability of language to support visual associations. If we turn to a botany to explore the imagery of this passage, we learn something critical about how it is patterned, and not simply as a metaphor for *l'amour fou*. For a long time now, as recently as 2016 and as early as 1873, the *mimosa pudica* has been a focus for the study of plant habituation, learning, association, and memory.[143] Unusually responsive to touch—thus its many names, the shame plant, the touch-me-not, the humble plant, the sensitive plant—the *mimosa pudica* has forged relationships among psychologists and botanists as they explore the terrain of learning through feeling together. Indeed, its many names suggest a merely interesting character to this humble plant that its physiology reiterates: the earliest studies of *mimosa pudica* and plant learning by Pfeffer (1873) and Bose (1906) demonstrated that it would become habituated to repetitive touch such that it would fail to close its leaves upon reiterated stimulations without sufficient rest. The plant learns, then, *not* to respond to repetition, effectively growing bored at repeated stimulations, but requires varied encounters to retain its sensitivity.

143 See "Learning in Plants: Lessons from Mimosa pudica," by Charles Abramsom and Ana Chicas-Mosier. *Frontiers in Psychology* 7 (2016): 1-9.

To put it differently, *mimosa pudica* teaches interest, aesthetically. To study the plant's response, *we* must vary our pattern of touch, creating variations on the rhythms that we use to document its character. We can see the lessons of *mimosa pudica* in Breton's word play throughout the passage, which touches variously upon a description of this species to weld the facts of its materiality to its role within the Surrealist imagination. As a botany, this section performs similar work, although Mary Ann Caws's translation obscures this reading somewhat, in choosing to replace the word, *bruit,* with "rumor" (83).[144] Rather, in choosing to translate "bruit" as a *formal* descriptor, I read this final sentence as a moment that insists upon this passage as a description distinctive to the plant itself: the coil is, after all, a physiological marker that helps us identify the species.

But to understand this description as one that marks out the facts of this plant is to also begin to parse other moments of poetic patterning that don't appear immediately connected, and which may, if we take Mattix's argument seriously, induce boredom by their lack of meaning within the whole. For example, the earliest nautical metaphor in the passage, and what reads as the most incongruous thanks to its subject, which diverges radically from the reiterated pattern of "cette herbe" and thus appears to describe something else entirely, finds some resonance here. The boat that "épuisé la bobine du sort," also speaks to a coiled image—*la bobine* can also be directly translated as "coil"—or rather, an uncoiling of the associations and organizations that appear fated. Breton's word play creates a contrapuntal relationship between coiling motions within this description of the plant, produced by language's distinctive slippages, that both facilitate and unwind pattern—made by touching upon the plant's description variously. The result is that cognitive rupture and knowledge work remain tethered here, joined by a poesis that

144 Original French: "Le bruit court, plus léger qu'une onde sur elle, que c'est la *sensitive*" (*L'amour fou* 95). Caws: "Rumor has it, it is the *sensitive plant*" (Caws 83).

learns from its interesting subject. The placement of this passage is also important, facing the landscape painting of Tenerife in the 1937 edition: if we grow "rapidly bored with contemplating a dismal stretch of sand and pebbles," then the *mimosa pudica* gives us "some imaginative recourse" (Caws, *Mad Love* 101).

One way to understand Surrealism's relationship to its contemporary ecology is, then, as kin: as variations within an aesthetic tradition that is also a scientific tradition, and which is both inherited and emergent within the landscapes and ecosystems—emotional, cognitive, technological and material—in which these practitioners reside. As a case study, this kinship demonstrates how interested ecological epistemology and ontology creates a mad love between surrealism and ecology, coiling these traditions around each other, even while, and importantly, *because* waves threaten to untangle them. Wrought by a merely interesting form, this relationship teaches readers and viewers to find marvelous potentials in any place on earth: on dry land, under water, and amidst our inherently cloudy images and words. It is a love that has endured.

Depths: William Beebe

As my line stretches back my brain contracts, my muscles expand, I drop down on all fours, sprout a tail, develop long ears and snout, my teeth simplify and insects satisfy my hunger; reptilian characters accrue, my ribs increase; I slip into the water, and looking for the last time upon the land, I sink beneath the surface. Gills mark my rhythm of breath, limbs shrink to fins, and even these vanish, while my backbone, last hold upon the higher life, dissolves to a notochord. At one end of my evolution Roosevelt called me friend—millions of yearx earlier any passing worm might have hailed me as a brother.

—William Beebe, *Nonsuch: Land of Water* (1932).

Outfitted with a bevy of newly advanced diving and camera work technologies, ocean ecologists from the 1920s through the 1940s were seeing and documenting the ocean floor at

previously unfathomed depths, and thus grappling with problems of representing the wonder-filled, and distinctively disorienting, experience of seeing this underwater world for the first time. William Beebe's work with the Department of Tropical Research, funded by the New York Zoological Society, generated not only the first views of ocean ecologies, but the very first artistic renderings of them created in the field, via the work of his diverse team of painters, writers, photographers, and filmmakers.[145] The stunning images produced by his artists, including surreal images of deep ocean life, captured the imaginations of readers of science and popular science alike, as his biographers have noted.[146] The Department's influence touched upon avant-garde venues as well, as Katherine MacLeod has uncovered; the Department exhibited "rows of undulating clear material painted with deep-sea animals that glowed in a sphere-shaped room suffused with black light," just steps from the infamous and ill-fated "Dalí's Dream of Venus" at the 1939 World's Fair in Flushing (31). Circulating alongside modernisms both popular and avant-garde, Beebe's work and the Department's archive can be understood as an effort to redesign representative media to appropriately document this untrammeled

145 Beebe's team included men and women of distinctive artistic and scientific talent; the cinematographer, John Tee-Van, was a long-term collaborator, and Ernest Schoedsack, who would go on to direct *King Kong*, was also a Department filmmaker. Floyd Crosby, of *High Noon* and *The Pit and the Pendulum*, worked on his expeditions as well. And while the expeditions did feature some rough living, Beebe made a point of encouraging women scientists and artists to contribute towards the Department's research: as MacLeod notes, many of these women, including Isabelle Cooper, Jocelyn Crane and Gloria Hollister, became household names (27). Ruth Rose, the expedition historian, went on to write the screenplay for *King Kong.* Women also filled critical roles as artists on the expeditions: Helen Tee-Van and Else Bostleman provided many of the paintings that helped Beebe capture and reiterate these "designs and colors of undersea," where photographic technology failed (MacLeod 27). See MacLeod's "Sinking Beneath the Surface—William Beebe, the Department of Tropical Research, and Marine Ecology" *ASLO: Association for the Sciences of Limnology and Oceanography* (May 2015): 26-31. See too, the guidebook to MacLeod's 2017 curation of the Department's work for The Drawing Center in New York City, titled, "Exploratory Works: Drawings from the Department of Tropical Research" found here: http://www.drawingcenter.org/en/drawingcenter/5/exhibitions/9/upcoming/1460/exploratory-works/.

146 Beebe contributed, for example, to *Science, Auk, American Naturalist,* and *Zoologica* as well as *National Geographic, Vanity Fair, Ladies' Home Journal, Boys and Girls,* and *The Atlantic Monthly* (Matsen, Kindle Location 402). See Robert Henry Welker's *Natural Man: Life of William Beebe* (1975), as well as the more recent biography by Carol Gould Grant, *The Remarkable Life of William Beebe: Explorer and Naturalist* (2004). Brad Matsen's history of the bathysphere, the deep-sea vehicle designed by Beebe and innovator Otis Barton, is also illustrative concerning issues of media, design, and communications; see *Descent: The Heroic Discovery of the Abyss* (2005).

ecosystem. As Beebe states, "We need a whole new vocabulary, new adjectives, [to adequately] describe the designs and colors of undersea" (35).

Beebe was not alone in his search for words and images that might describe these depths; ocean exploration across the globe was fraught with this problem of description.[147] What is remarkable about his work is the carefully crafted, multi-genre and multi-media effort to reform science writing, and popular science education, alongside this documentary effort, on the one hand, and to do so by consistently critiquing and subverting rationalist ideals, on the other. Beebe shares certain epistemological values with contemporary Surrealists in this regard. His work often disturbs classifications, even as his expeditions document them: he consistently notes, for example, the kinships among plants and animals (human and nonhuman) in underwater environments; finds joy among odd juxtapositions of species, environments, and conditions; revels in the unknown character of ocean science in this moment; and often allows ocean observation to challenge the relationship between the material and the ideal.[148] Beebe's imagination is in full operation throughout his research and writings, and particularly at depths reached via his deep-sea diving apparatus, the bathysphere: he often troubles to distinguish between fact and hallucination in these landscapes, a half-mile down. "Between this depth and 1300 feet not a light or an organism was seen," Beebe describes, "it was 50 feet of terrible

147 See Margaret Cohen's "Denotation in Alien Environments: The Underwater Je Ne Sais Quoi." *Representations*. 125. 1 (Winter 2014): 103.

148 A short series of relevant Beebe-isms:
contrast: "I have always felt that the chief joy in life is contrast, and here there is nothing else;" "the type of mind which is thrilled by having picked oysters from trees could make an excellent Haitian yarn from the juxtaposition of anemones and ants" (*Beneath Tropic Seas* 7).
mind and materiality: "The little zone of radiance of which I was the huddled hub became a nebula in space; the schooner was but an idea, I, merely an invisible onlooker. In the pale luminescent green ether surrounding the magic circle lay all the possibilities which ever cluster just beyond our sensory perceptions: I was one great eye" (*Beneath Tropic Seas* 81).
facts: "The Isness of facts is boring and futile—the Whyness is the chief excuse for going on living" (*Beneath Tropic Seas* 189).

emptiness, with the blue mostly of some wholly new color term—a term quite absent from any human language. It was probably sheer imagination but the characteristic most vivid was its transparency. As I looked out I never thought of feet or yards of visibility, but of the hundreds of miles of this color stretching over so much of the world" (*Half-Mile Down* 129). Beebe's incredibly popular nature writing circulated these "fairy tales for adults, fairy tales still almost blue" as Breton might classify them, among a wide swath of publications, popular and scientific (Breton, "Manifesto of Surrealism" 16).[149] The images his team produced via deep-sea diving are legible as surreal in this regard: created from dictations sent from the bathysphere to illustrators top-side via telephone, they depict previously unknown species, and are often dazzling efforts to recreate the new colors, perspectives, and optical experiences encountered via these technologies. And, as Margaret Cohen has argued, Beebe's descriptions of deep-sea color and optics appear particularly fruitful for Surrealists attempting to define an aesthetic of marvel ("Underwater Optics" 3).[150]

149 Ecological historian Frank Egerton describes Beebe as the most widely known and read American naturalist of the early twentieth century (373), while biographer Brad Matsen claims that "Tens of thousands of fans across the English-speaking world anxiously awaited every word he wrote" (Kindle Location 323). This included such well-known tycoons as Harrison Williams and Mortimer Schiff, who often funded his expeditions, as well as eccentric artists and activists including Fannie Hurst (Beebe's downstairs neighbor), Rube Goldberg, and Zahr Pritchard, whose underwater paintings were featured often in Beebe's accounts of undersea ecosystems (Matsen, Kindle Location 312). J.A. Roebling, the engineer of the Brooklyn Bridge (and Cincinnati's prototype), provided cable wire for his expeditions (*Half Mile Down* 229). He befriended Thomas Edison, and he had a life-long friendship with Theodore Roosevelt, who describes Beebe as "possess[ing] a wide field of interest; he is in the truest sense of the word a man of broad and deep cultivation. He cares greatly for noble architecture and noble poetry; for beautiful pictures and statues and finely written books. Nor are his interests only concerned with nature apart from man and from the works of man. He possesses an extraordinary sympathy with and understanding of mankind itself, in all its myriad types and varieties" (Murdoch 30). *Better Homes and Gardens* even published a delightful write-up of his New York City penthouse in 1936, shared with his wife, the novelist Elswyth Thane. See Boykin, Elizabeth MacRae. "A Deep-Sea Diver's Snug Harbor: A Visit to the Home of Dr. and Mrs. William Beebe, Better Homes and Gardens readers of New York City." *Better Homes and Gardens.* 15.1 (September 1936): 36.

150 "Perception beneath the water. . . ," Cohen argues, "would appeal to modernisms that explored an emotional palette of wonder as an antidote to bourgeois aesthetics and society—-a form of wonder that was at once otherworldly and completely secular. Surrealism was the most famous of these movements, and a number of surrealists drew on the aquatic world to give this wonder spatial expression" ("Underwater Optics" 3).

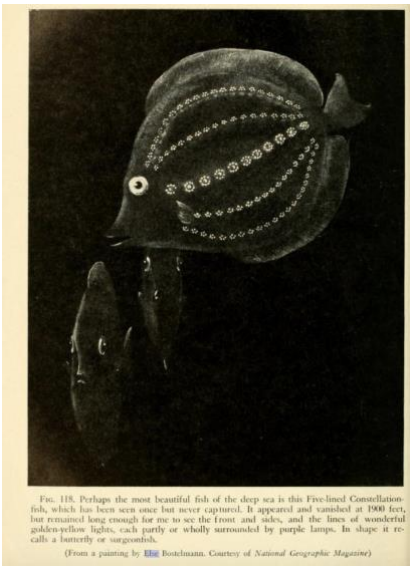


Figure 19: Photograph: An image by Else Bostlemann, appearing in Half-Mile Down and reprinted in black and white in National Geographic. Documenting a new species of fish observed by Beebe at 1900 feet

Beebe's efforts to redesign science writing to account for the mysteries and miracles of undersea life were entangled with his efforts to redesign the natural historical hobbyist, a task he undertook by calling for his audience to imagine the knowledge work inscribed by field work methods and forms of documentation differently—especially the species list. His 1939 essay, "Design for a Naturalist," for example, describes the ideal scientist as yearning to build relationships—ecological and evolutionary—among the gaps in knowledge that have been constructed by a natural history motivated by the curation of specimens and lists:

> I want to urge with all the power of my experience that your interest include the crystals of the earth and of the moon, snow crystals forming today and those of granite shaped a billion years ago; the English sparrow you are watching through your glasses should be linked in your mind with its cousin, the ostrich, racing across the deserts of Africa, never forgetting the ancient ancestor of both these feathered creatures, which was also ours, swimming in primeval seas and making distant but very certain relations of us all. ("Design for a Naturalist" 274)

Here, Beebe's sweeping reverie, taking the form of a list, suggests relationships among disparate species and geologies across time and space, including the human animal that is related to it all; indeed, a kind of thinking—identified as a type of interest—that can build relation into the existing record of the species list is critical for moving fieldwork forward, for "fewer and fewer new organisms are coming to light," making the compilation of lists a less purposeful task ("Design" 275).[151] Meanwhile, "the fame and honor—and what is more important—the satisfaction of scientific work and achievement in the future will lie chiefly with those who have a flying start in the investigation of structure and life habits" (Beebe, "Design for a Naturalist" 275). What is wanted is a new design for the species list—to figure it as a site of relational knowledge work—and the scientist's role as a documentarian who forms tendrils of relation across time and space, and in doing so, allows the facts of mind and matter to become kin.

To teach this lyric behavior, Beebe's interesting species lists are sites for poetic evocation, if not always illustrative description—we might note, for example, the "Classified Résumé of Organisms Observed," at the end of *Half-Mile Down* also includes a series of descriptions of "Unknown Organisms:" "To list these would most excellently reveal my abyssal ignorance of the majority of sparks, lights, half outlines, and glimpses of heads, tails, or eyes. But the fractional character of exact identifications has been thoroughly presented, and the few following notes will serve as samples of all the rest, notes which will be of value only when I or some other diver descends and resolves them into something understandable" (328). The result is undoubtedly poetic, an interesting list of numerated images, inherently incomplete, but also quite evocative in its depiction of sights we might only imagine:

151 We can feel free to disagree with Beebe here: according to William Alverson and Michael Donaghue, we are living in a new age of discovery, with innovations in research technology and ecological survey of previously unknown places encouraging a boom in new species naming and listing. See "A new age of discovery," *Annals of the Missouri Botanical Garden*. 87 (2000): 110-126.

400 feet. Four. Myctophid-shaped, but not Myctophids.
550 feet. Black forms in distance; four coming nearer.
600 feet. Large, indistinct bodies moving in distance; seemed uniformly pale: squid or fish?
920 feet. One, four-inch. Six bluish-white lights along side.
1060 feet. One, five-inch. Deep fish, like chub. No lights and sharp jaw.
1100 feet. Hundreds of pale blue, double lights.
1310 feet. A luminous head seen for an instant.

1440 feet. Fins spread like flyingfish; many lights on basal half of fins. No outline.
2090 feet. Ghostly forms in every direction.
2200 feet. One, six-inch. Deep. Outline of fish visible from reflected light of invisible photophores.
And so on.

Figure 20: Text: A poetic, and interesting, species list of unknown fish, Half-Mile Down (328-329)

If Beebe draws on the species list as a resource for poesis, he does so to address a problem with the aesthetics of marvel: that its existing methods of representation are often quite banal, and thus fail to teach a fieldwork rooted in both the observation and imagination of relationship. The 1928 text, *Beneath Tropic Seas,* takes up this issue, and offers some solutions. The opening chapter, titled "Brothering Fish," an introduction to this record of The Department of Tropical Research's surveys of Haiti, begins this work. The book begins not with a description of landscape, or an overview of the study's methods and scope, but with a second-person description of a daily dive, wherein the author meditates on the ontology of the ocean ecologist, the construction of actuality and language's role in shaping it, and the limits of what we can and do know, what we can and do articulate. Describing his encounter with a school of fish whose open, rounded mouths seemed to say, "Oh! Brother! Brother! Oh! Oh!," Beebe acknowledges the fact that marvel is at heart an *inarticulable* experience, existing outside the bounds of language's sense-making apparatus.[152] Rather, the inarticulate mouthings of fishy kin suggest that

152 Beebe's writing here usefully suggests that there are solutions within modern literature and science that Louise Economides has recently discounted in her articulation of ecological wonder: Beebe works hard to ensure that

language's relationship to marvel is its ability to create and suggest relationships among seemingly disparate entities, here, via a *formal* cross-species mimicry. Beebe's interjections mimic the open Os of fish mouths here, creating a poetic assonance between researcher and fish that lies at the intersection of linguistic and species form, and at the intersection of word and visuality. This moment of marvelous poesis, however, is rooted in this particular ecosystem: underwater, "Your attention swings from wonders to marvels and back again" and "You begin to say things to yourself, gasps of surprise, inarticulate sounds of awe" (5-6). Upon surfacing, the Ohs! of wonder shared with the fish lose life in the open air: "You had planned to tell the others all about it, but now you are wordless. You exclaim something bromidic which sounds like Marvellous! Great! Wonderful! then relapse futilely into silence and look helplessly into the distance where the emerald waves still break and the palms wave as if fairyland had not intervened in your life since you saw them last" (5-6). Once topside, the inarticulate, if suggestive, kinship between language and ecosystem falls away as the sensory experience of underwater research is left behind. The language of wonder gasps for breath on dry land, growing banal, like so many of the specimens Beebe observes, in the open air: "If I had ventured to make a probable list of the sea creatures most likely to be found among the mangrove roots at low tide I would have completely failed," Beebe states, "I should have favored sturdy, strong-housed snails and hermit crabs. But here instead, were the flabbiest bits of life—unpleasant, wormy sea-cucumbers which as seen half-dried in the sun, not even an enthusiastic Holothurologist could call attractive. Their claim upon our interest, as I have shown elsewhere, is quite another matter" (54).[153]

representative media facilitate the cognitive and affective rupture—a "radical openness" to ecosystems—that she places at the center of her definition of ecological wonder (21).

153 Inarticulable grunts were also, notably, part of diving safety, and would have been transmitted over the wires to Beebe's partners top-side: About one particularly luminous, but difficult to see fish, Beebe states, "It was posed with

While *Beneath Tropic Seas* aims to document the flora and fauna of Haiti's reefs and shores, it also seems predominantly occupied with the "dryness" of language as a descriptive technology, to use Laura Marks's terms: as his innovations on linguistic-species brothering suggest, his body of work can be understood as a search for a scientific prose that can "make the dry words retain a trace of the wetness of the encounter. . . to condense experience and re-explode it in another form" (Marks, Kindle Location 50). Beebe is quick to remind us that "books, aquaria, and glass-bottomed boats" are no replacement for diving—and yet, his widely-published and consumed writings continue his effort to bring even just a small trace of underwater experience to readers on dry land (*Beneath Tropic Seas* 6). Historians of Beebe's work have suggested a variety of textual influences, including and especially fantasy literature, as critical to this effort to reproduce the experience of marvel, what Margaret Cohen describes as Beebe's "imaginative bricolage" (Cohen, "Je Ne Sais Quoi" 111). Here, I take a different tack, and demonstrate how Beebe's efforts to innovate the species list as an ecological document rescue his descriptions of marvel from banality. His species lists infuse *Beneath Tropic Seas* with interest, and in doing so, generate poetic brotherings among language and species that are Beebe's unique form of ecological Surrealism.

only a slow waving of fins. I saw it was something wholly unknown, and I did two things at once; I reached behind for Mr. Barton, to drag him away from his camera preparations to the windows, to see and corroborate, and I disregarded Miss Hollister's insistent questions in my ears. I had to grunt or say something in reply to her, for I had already exceeded the five seconds which was our danger duration of silence throughout all the dives. But all this time I sat absorbing the fish from head to tail through the wordless, short-circuiting of sight, later to be materialized into spoken and written words, and finally into a painting dictated by what I had seen through the clear quartz" (*Half-Mile Down* 204).

The Author on a Coral Reef, Writing on a Zinc Pad with Lead Pencil

Figure 21: Photograph: William Beebe, wetting some words. *Beneath Tropic Seas* (39)

Throughout *Beneath Tropic Seas*, ecological research methodologies vary the book's marvelous descriptions of underwater environments; the form of the book quite literally protects marvelous underwater descriptions from wear by introducing the descriptive protocols of the varied, often interested field work perspectives of ecology done *á terre*. The title is, after all, somewhat of a misnomer in that it is not simply a record of underwater ecosystems, but a document of Beebe's "interest in Haiti and its fauna as a whole" (99). Of the book's thirteen chapters, only five feature underwater description; rather, the book creates a fractured map of Haiti's ecosystems from sea, sand, and air. Narrations of dives are broken up with chapters featuring lingering tide pool observations, aerial coastline surveillance, microscopic encounters in Beebe's on-deck laboratory, and on-foot bird-watching expeditions. Introducing perspectival contrast produced through the full gamut of ecological research technologies, the chapters

encourage readers as well as Beebe to wonder anew at the watery world that stars intermittently throughout the text.[154]

Much of this documentary effort is organized around the creation of species lists; creating a comprehensive list of Haitan fish was Beebe's primary objective on this particular expedition. Indeed, "To prepare a list of Haitian fish, there being none in existence" is listed as the first objective of his diving work, *before* the "study at close range and at first hand by means of a diving helmet the life of a coral reef" and the creation of "motion pictures of the life of a coral reef" (199).[155] At first blush, Beebe appears to be rather critical of species lists, both as vehicles of interest and as documents of ecological relationships, as is discussed in the book's final chapter, incongruously titled, "The New Study of Birds." Written during a much-needed break from ocean survey— "I had dived too often, I had glued my eyes to the microscope long after my body had begged off,—in a word, I had gone stale on submarine science," Beebe writes—the chapter turns its attention to a series of observational strategies and documentary models for reinvigorating interest in ornithology (184). The chapter is a manifesto of sorts that takes issue with both vapid methods of species listing and with wonder as a descriptor of natural historical experience. The chapter recognizably adapts the issues of information management indicative of Tansley's plant ecology to the study of birds, working to revitalize ornithological data collection by encouraging readers to record a habitat's in-formation, as opposed to creating a "pallid" list of

154 Like Tansley, Beebe was working to update fieldwork methods for a broadly-practiced ecology, as MacLeod and Matsen have both noted; my readers will note that many of Beebe's innovations in fieldwork methodology—including separating small segments of jungle or ocean into grids, and studying the mutable particularity of the species and their relationships within these smaller spaces—were pioneered by plant ecologists quite a bit earlier than Beebe's work in the 1920s (MacLeod 27, Matsen Kindle Location 284). And as "Design for a Naturalist" suggests, Beebe is committed to interested thinking and feeling—he even applauds this specifically British tradition for its accomplishment of "excellent scientific work in. . . odds and ends of spare time" (272). See also Beebe's early essay, "Exploring a Tree and a Yard of Jungle," *New York Zoological Society Bulletin* (July 1915): 1807-1818.

155 According to Beebe, at the time of this writing, Haiti's political unrest in the early 20th century kept quite a bit of scientific work from being done on the island, and had left the record of Haitian species, particularly in reference to fish life, quite undocumented (*Beneath Tropic Seas* 9).

organisms (189). In doing so, Beebe encourages readers to "imagine some unusual method of observation," such that one might learn about and do something with "[the] birds about us that every *Isn't-nature-wonderful person is not doing*" (*Beneath Tropic Seas* 187, emphasis mine). Here, Beebe suggests that attending to habitat formation with an attention to the aesthetics of a site's composition is an antidote for a natural history that traffics in mundane vocabulary of wonder:

> Admitting that we have increased interest by limiting the field of work, let us consider still another new phase. Take a small field surrounded by woods. If we occupy some point of vantage for a whole day our sense will record a multitude of sights, sounds, and smells produced by living creatures ranging, say, from crickets to skunks. Now comes the exciting part, when we begin to realize something more than facts contained in our list of birds. Not only are there four robins within this domain, but these birds hold very definite positions and exert distinct influences. Take color for example, and grade it from the extreme of dullness to that of brilliancy on a scale of one to ten—a song sparrow at one end and a male scarlet tanager at the other. With this in mind, your census list becomes a pallid effect, and the most important thing is the new idea of a temporary neglect of names, substituting a thought of the birds as bits of pigment. From this point of view, compare them as a whole with the common butterflies of this same field. Then do the same thing with sound, and with subdivisions of sound—which species ranks as ten in regard to loudness or persistency or sweetness of tone? What insects or amphibians equal or excel them? // When you have learned the name of the indigo bunting and then can and will discard it in place of some

> physical attribute, you have increased a thousandfold the interest of any place on earth. (189-90)

Beebe reiterates the ecological practice of switching one's point of view from data towards formation, encouraging his readers to take in the composition of the whole scene as influence, color, timbre, and various other "physical attributes." This kind of observational practice—which relies on an aesthetic understanding of color, form, and sound—is accompanied by further points of view that cohere into a map of bird life: in addition to "color and pattern," remarking habits,[156] comparisons of species "personality" and embryological observation are also critical perspectives for cultivating interest beyond the "overcrowded ranks of those who have photographed a chickadee perched on a pipe or a cigarette full of seed, or who can proudly exhibit a film of a warbler feeding from the hand" (191-192). Avoiding these superficial snapshots, "you" can now "watch the visitors at a foodpan. . . at close range and study the change in the size of the iris, or the muscular control of feathers from crest to tail, or use the toes and beaks as tools, or the shifting psychological balance of fear and confidence;" in short, we can attend to the life form itself, and all the energy and work of which it exists (192). The whole picture of an ecosystem's biodiversity emerges here among the "force field" created by scientific writing and aesthetic experience. This kind of documentary practice appears as undoubtedly poetic. Sound, color, and form mingle among the shapes and sounds of language: to put it differently, language becomes a vehicle for sound and color, lending interest to a depiction, to be indicated within the same document of a field's ornithological biodiversity.

It is this kind of observational and descriptive poetic practice that helps Beebe redesign the species list. For while he remains skeptical of the form, he also recognizes its centrality to

156 "Give your interests in the habits of birds a focus, your efforts an objective, and limit the field of activity, and instantly the possibility of complete achievement will add immeasurably to your enthusiasm" he states (190).

scientific study. “If you insist on lists however, for lists’ sake,” he admonishes, “at least leaven the linear results with some unusual point of view” (188). The ornithological species list in Appendix D of *Beneath Tropic Seas* puts this strategy into practice. The Appendix does feature a list of species organized by geographical area and family. And it begins with a two-paragraph description that notes the sounds that suggest the presence of limited bird life on this semi-arid island. “Seldom have I seen such abundance of life under water as in the Gulf of Gonave, and such dearth of living organisms as above it,” Beebe begins, “. . . If I were deaf to all but human sounds there would be only silence. Then my straining ears catch a call quite out of place—*whu! bob-white!* from far up in the mountain slope, and we have Haiti’s ornithological face saved by this member of the northern quail family” (216). This list could not be described as intensely interesting: his use of numbers for example, including numerations of both species and sightings, lends a sense of reserve to the affective encounters described here. “If the tide is falling, continual watching will be rewarded by a single great blue heron or a solitary egret, or one Louisiana heron winging its way to some shoal, or more rarely a sharp-winged royal tern flying past,” Beebe states, “Once, and once only, in three months, a laughing gull was seen perched on a coral crag, and was an event” (216). The precise nature of this “event” is unclear here; Beebe’s language suggests only mild surprise—even if it also prompts intrigue as to the bird’s appearance within this particular environment. If the intrigue of the list is mild, however, Beebe also leavens this list with poetry; alliteration, consonance and assonance link these disparate species together here, suggesting ecological kinships—and creating sonic relationships—among the single great blue heron and solitary egret, the shoal in which the Louisiana heron finds recluse and the illusive royal tern. The list is patterned after the American Ornithologists’s Union (third edition, 1910) which allows room for descriptions of rare species— “stragglers or accidental visitors”—

to be "designated by the matter relating to them being bracketed" (12).[157] In this formal revision to the list, Beebe finds a resource for poetry that infuses his list with the cognitive and affective experience of interested ecology.

Beebe's adaptations of species lists lend interest to his underwater descriptions in *Beneath Tropic Seas* as well; the form's poetics are fluid enough to describe life in any milieu, in any place on earth. We might note, for example, that Beebe conducts a similar color-grading experiment in reference to sea fish in earlier pages of *Beneath Topic Seas*, no doubt a dry-land practice adapted for underwater environments (152). The following passage, from one of the book's underwater chapters, "No Man's Land Five Fathoms Down," takes a somewhat different tack, but sustains a poetic relationship to this interesting form:

> I was still in the canyon of brain corals and leaning upon one, I could look across at a half dozen others, appearing for all the world like a cluster of African huts in a tree-shadowed kraal. The wandering lines and paths of this well-named *Moeandria* coral recalled the furrowed, rain-worn gullies and terraced slopes of the western Himalayas. From the crevices between mounds sprouted tall, waving shrubs of horny coral, sea plumes, not only aping vegetation but reversing the manner of plants. One long branch which waved across my helmet-glass was deep furred with thousands of dull, mouldy-brown polyps, aligned along the stem. At a touch from my hand all vanished and revealed the clear, bright purple of the bark and trunk. Sea-fans waved less pliantly, like starched portieres, or like English fruit-trees broken away from their flat garden walls. Many of these showed

[157] See *Check-List of North American Birds,* 3rd edition revised. American Ornithologists' Union. 1910. The revisions include new organizations of species and subspecies, as well as new information on geographical ranges (12-13).

> parasitic growths among their branches, mistletoe-like, sponges and shells and tall stately hydroids. (43-44)

A series of metaphorical snapshots, this species list is a series of fractured views, loosely collected. Here again, Beebe's keen use of consonance and assonance forges kinships among these man-made landscapes from across the globe and the species listed here. "Coral recall" the meandering furrows of Himalayan farms; Beebe's only use of scientific nomenclature in this passage, *Moeandria,* makes much of this sonic kinship to evoke a formal relationship between a terrestrial ecosystem and this oceanic species.[158] Likewise, sea plumes "ape vegetation" while "reversing" their manner; that is, they share a formal similarity with plant life, even if their biologies metabolize nutrients like animals do. And when Beebe reaches for that quintessential picturesque object—the broken, interesting fruit-tree—to envision a stand of sea-fans, he facilitates this cross-species kinship through consonance and hyphenation. Here, Beebe's variations on the species list develop a formal poetics that works to describe an indescribable world.

The subtle charisma of these formal relationships among ocean and terrestrial life operates in several ways throughout the text. Often, Beebe attaches a botanical simile to organisms that appear drab and common, lending interest to a variety of uncharismatic species: "Two grey tubes had variegated flower worms blossoming in them—like glorious lilies in drab flower-pots" (49); the afore-mentioned sea cucumbers make magic when planted in an aquarium, "chang[ing] to a semblance of a rolling field all aglow with a dense crop of tansy in full bloom" (58); and the common sponge, "that pleasantly squeezable accompaniment of our bath" is also "the wonderfully colorful race of living creatures dotting the coral reefs of the world, much as

158 This is not unusual; scientific names are often descriptive of certain formal characteristics.

the clumps of violets and marigolds brighten our terrestrial gardens" (133). Beebe colors these fish out of water with terrestrial interest, teaching readers to envision their position within an underwater iteration of this landscape tradition.

And dry-land ecology is also attached to passages that traffic in dreamy, otherworldly, and marvelous language, passages that attempt to rupture readers' previous knowledge of ecological concepts with exposure to underwater life forms. Familiar and varied lists of plant communities root these fantastic landscapes, lending them the contrast necessary to set their marvels into relief. In one final and particularly telling example, Beebe relies on a list to bring one "Martian" reef to life: "Within sight were pebbles, boulders, cliffs, fields of heather, beds of ragweed and phlox, single plants in full bloom of chrysanthemums and forget-me-nots, as well as shrubs, giant ferns, and mosses, and yet there was not a single strand of vegetation, of algae even,—all were living animals" (41). Here, the seafloor doesn't simply "ape" dry-land plant life: it "reverses its manner" by documenting a world of animal beings mimicking plants' alien form and motion. The rupture—that reefscapes could not follow the laws of dry-land succession because this landscape is *animal,* not vegetal—is smartly placed following Beebe's dash, a short gasp of novelty attached to this familiar form.

But if marvelous descriptions gasp for breath without an interesting mooring, then interest is also pleasantly suspended by moments of rapture, of rupture. In latter moments in *Beneath Tropic Seas,* species lists become adaptable for landscapes that skirt the line between observed and imagined, real and surreal. In this way, the sea floor itself teaches Beebe to treat the species list differently, creating room within the craggy associations of interesting knowledge work for moments of wonder. One final entry in the list of species in "No Man's Land Five

Miles Down," a description of a spirograph worm immediately following the series of Earthly and Martian species and landscapes featured above, helps to make this point clear:

> The thin plate of nacre had been drawn with lightning swiftness after the vanishing worm, and dove-tailed exactly into the entrance of the narrow tunnel. We may now compare it more logically with the operculum of a snail or the trap-door of a spider's nest. Rather, I chose to think of it as some secret entrance, where the cunning touch of a spring rolled away a boulder and displayed the silver stairway to a fairy palace. Here in the midst of the East End of Polypdom, typificing in their eternal monotony of meanderings the socialistic, standardized equality of the coral builders, was the winding palace tunnel with its silken-smooth lining of mother-of-pearl, and its aristocratic inhabitant of forget-me-not-blue. The whole was only another under-sea 'Exile's Club:' a submarine glimpse behind the looking glass—this time of the flower going back within its stem. Lest this momentary flight of fancy should seem to dominate our vermiceous emotions I take occasion properly to introduce this worthy being as a member of the order of *Polychaete* worms, branch *Cryptocephala,* sub-order *Sabelliformia,* family *Serpulidae,* and species *Spirobranchus tricornis.* Its maroon and buff clusters of gills, which seem also to serve as sensory organs, are one of the commonest objects to be seen scattered over the surface of the great coral heads. (45)

This moment of listing suggests that the species list, at least for Beebe, entails cognitive and affective fluidity in the processing of information, as indicated by the conditional tense. On the one hand, "We may now logically compare" this species with others who retract into spiral cases relating the worm to its dry-land kin via physiological structures and patterns of behavior. To a

certain extent, the passage does choose to do this kind of relational work in its mere suggestion of this formal—and again consonant—connection among spirograph, snail, and spider. But Beebe instead chooses to compare this organism with the architectural detail of Lord Dunsany's home for fallen gods in his short story, "The Exile's Club" (from the collection, *Tales of Wonder*).[159] Undoubtedly, this is a moment in Beebe's writing where Cohen's excavation of fantasy writing in underwater exploration bears out. Tellingly, however, he reaches for an architectural form described within this story to elucidate this physiology. It is a moment where the action of listing is suspended for a moment, to wonder at the confluence between observed actuality and fantasy, at the meeting of organic and imaginative design. This is a different kind of association entirely—it ruptures the "logical" ordering of scientific knowledge work, and quite literally makes a room for wondering at the confluences of design that exist among our words and worlds.

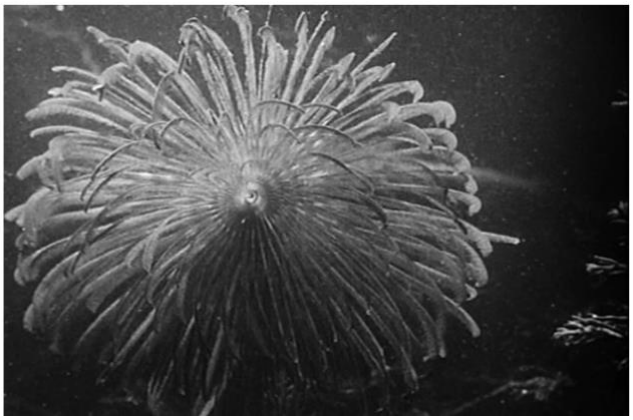


Figure 22: Film Still: Spirograph worm, still from *Hyas et Stenoriques* (1929) dir. Jean Painlevé

[159] Cohen, Matsen, and MacLeod also offer us some great glimpses of Beebe's bookshelves, which mingled science with fantasy: *Alice in Wonderland* was his favorite book, and traveled with him alongside and works on the history of modern science including Henry Osborn (the director of the NY Zoological Society) and Whitehead's *Science and the Modern World*, oceanography, and A.A. Milne's *Winnie the Pooh* (Matsen, Kindle Location 323). But to read Beebe is also to read Kipling, Wells, Lord Dunsany, and Jules Verne, writers that likewise speculated simultaneously in scientific and fantastic idioms.

Just before our "vermiceous emotions" take hold upon us, however, Beebe recalls us to the task at hand by introducing the spirograph's scientific names. Beebe doesn't often use scientific nomenclature in his popular writing—it does, of course, feature prominently in his lists in Appendix D and E—and thus this sentence functions to situate readers once again within this fluid prose form, and the task of listing in front of us. We should note, too, the mundanity of the spirograph's wonder here; it is "only another Exile's Club," suggesting the workaday nature of wonder for this researcher, who has likely counted the worms' number. The affective impact is clear—these merely interesting descriptors retract our emotional response to the passage, drawing us back into the lists' coils just as the spirograph's alluring petals recoil into their mother-of-pearl enclosure. Beebe's lists, then, are an interesting architecture within which wonder can bloom and blossom—and indeed, can do so because of interest's unfinished, fractured, cognitive and affective knowledge work.

What happens when this dry-land documentary form gets wet, then, is the design of a descriptive language that forges kinships among science and poetry, among reason and rupture, among researcher and research, and among material bodies and representative media. If Beebe attaches interest to wonder to solve for wonder's banal colloquial usage, the other part of this relationship is defined by the reef itself, the branching, ongoing, interesting design of which is filled with nooks and crannies, and which houses novel beings, experiences, and relationships. As my opening epigraph suggests, the ontological purpose of Beebe's species lists are to create a "line"—less of a linear structure, and more of a lineage—that encourages us to find unique relations across time and space, on land and in the sea, allowing those relationships to shape our descriptions. The result is that our documents look like the brothers of the beings they describe: they retain a trace, as indexes do, of these beings and environments. As Beebe states in

"Brothering Fish:" "you answer" the syllables of the fish who hail us as brother "*in kind,*" even if you also "spea[k] from the safe, dry, airy room of your helmet" (5, emphasis mine). For Beebe, these documents teach us to see these brothers, too, as interested thinkers prone to moments of wonder, as in the case of the blue shark, whose "look is of quiet wonder, and if one must carry an unchanging expression throughout life, I know of none better; it is dignified, fearless and indicates an interest in life,—that is a happy combination" (*Nonsuch* 183). Readers of *Beneath Tropic Seas,* too, seemed to express this happy combination, as one reviewer for the Royal Geographical Society's *The Geographical Journal,* demonstrates: the book is "an interesting and instructive narrative, since it tells of an effort to open up a new field of biological investigation" (179-180). And as the reviewer suggests in the next sentence, the designs of this new field happen to be entirely, and wonderfully, novel: "What a field is here opened up!" he exclaims (rather inarticulately) (R.W.G.H. 180).

In the next section, I explore how this happy combination of interest and marvel, designing ecological Surrealism, interacts with the incessant movements of another scientific knowledge affect circulating among the waters of 20th century ocean ecology, and science education and practice more generally. Jean Painlevé's innovations on the species list grapple with the incessant movements of a brand of *curiosity* that is, oddly, insatiable and lazy, relentlessly focused and yet cognitively quite shallow. While Beebe is particularly indebted to altering a practice of representing wonder so as to rescue its *expression* from banality, Painlevé takes a somewhat more fundamental approach, which is to revalue moments of marvel/wonder as knowledge affect in its own right. Painlevé harnesses the descriptive kinship that Beebe figures in *Beneath Tropic Seas* to revalue wonder's reputation as a "low, bumptious form of pleasure," asserting it as essential to the conduct of modern science (Daston and Park 328). And here again,

the form of the interesting species list underwrites his experimental efforts, in both prose and film.

Shallows: Jean Painlevé

> 9. You will not substitute words for images in any way.
> —Jean Painlevé, "Ten Commandments" (1948)

The intentions behind Jean Painlevé's 1948 list of documentary film commandments are hazy: circulated as part of his touring "Poets of the Documentary" program, the commandments appear, at the same time, to guide a particularly profound filmmaking practice, while also operating as shallow puns, platitudes, and ironies ("The Ten Commandments" 158). Indeed, the list is meaningful only in communication with his films, as these merely interesting statements provide almost no context upon which one might operationalize them. What, after all, does it mean to "1. not make documentaries unless you feel the subject"? Or to "3. not influence the audience by unfair means?" Number Eight— "you will not show monotonous sequences without perfect justification"— is also fuzzy, and evokes the difficulties of identifying and categorizing affective experience that so vexed Breton and Eluard: what counts as monotonous, and how and when is it justified? Describing a cinematic poetics, this interesting list is full of puzzles that can be solved, variously, by reading them in precise relationship to the images that illustrate them. Painlevé's films enact these commandments, but never consistently, exposing the fluidity of this list as a linguistic form, and the knowledge it makes. And if the images of his marine films demonstrate the variety that exists within this common form, then linguistic attachments to his films also solve for the pedagogical slipperiness of cinematic grammar, serially organized. For Jean Painlevé, the serial form of the species list is a source of cinematic poesis, and it is at the

intersection of language and cinematic image, but notably not the substitution of these media, that the contours of his ecological Surrealism become clear.

Painlevé has become increasingly well-known for his startling and Surreal science films, what Jim Knox describes as "a fabulist's account of the enchanted marginalia of animal life and behaviour" ("Sounding the Depths" n.p.). Operating somewhere between lesson and fairy tale, between knowledge work and dream state, his body of scientific films feature many of the life stories and physiologies of the underwater creatures whose designs are so full of avant-garde instruction for William Beebe. Aesthetically, Painlevé's works undoubtedly speak to the filmmaker's participation among certain Surrealist circles: as his biographers note, Painlevé appeared active among both primary strains of Surrealism in the 1920s and 1930s, including the publication of his prose-poem, "Neo-zoological Drama" in the first and only issue of *Surrealisme,* providing images for Man Ray's *L'etoile de mer,* and printing images of crustaceans in Georges Bataille's *Documents.*[160] For obvious reasons, these works tend to emphasize the role of photographs and moving images in articulating Painlevé's species of Surrealism: as Cahill has argued, there are many moments throughout the filmmaker's work where photographs and films "prepare humans 'to escape the principle of identity,'" as Breton states, and to "play with a sense of identity as nonidentical, as defined by dynamism, exchange, and difference rather than a stable and coherent essence" (6). Cahill argues that Painlevé's camera work, operating at the intersection of optical, zoological, ethological, and aesthetic

160 Quite a bit of historical work has been done to link Painlevé to Surrealism: Scott MacDonald notes that the filmmaker became most active in Surrealist circles through his involvement with Paris ciné-clubs, even producing his own Surrealist film, *Methuselah,* in 1927, *before* the release of his earliest popular science films (MacDonald 9). By 1949, the filmmaker was still involved with the group, including providing the narrative text for Georges Franju's *The Blood of the Beasts* (*Le Sang des bêtes,* 1949) (MacDonald 9). See Bridgette Berg's excellent short biography in *Science is Fiction: The Films of Jean Painlevé,* James Leo Cahill's *Zoological Surrealism,* the first English book-length exploration of the filmmaker's archive (2019), as well as Oliver Gaycken's "Surrealist contagion: *Le Vampire." Screen* 56:1 (Spring 2015): 88-94.

research, make forms of "cross-species contact" perceivable and thus, thinkable (18).[161] Patricia Chu, focusing most recently on Painlevé's microcinematography, articulates the relationship between his science and Surrealism this way: "Both the medium of film and the mediation of vision effected by filming through magnifying instruments have the effect, new at the time, of establishing the spectator-scientist-artist as creating by looking. Images are not the product of direct visual representation but the knowledge that comes from moving around in a world" (Chu 194-195). I extend and amend these readings by emphasizing the centrality of field work—that is "moving around in a world"— and its written documents to the understanding of Painlevé's science and aesthetics, and thus situating this thinker within the history of interested ecological thinking. For Painlevé's films also encourage viewers to get their feet wet among France's tide pools, bays, and harbors, facilitated and produced by an interested, ecological field work practice.[162]

Trained in Lamarckian comparative anatomy, emphasizing ecological study, Painlevé's "intéressants documentaires avec une spirituelle abondance" as Pierre Lazareff describes them in *Cinémonde*, are informed by species lists, infusing his ecological Surrealism with interested ecological thinking and feeling (471).[163] Lazareff's syntax goes on to suggest this very point:

[161]See also Patricia Chu's recent essay, focusing on micro-cinematography: "Sea Urchins and Circuses: The Modernist Natural Histories of Jean Painlevé and Alexander Calder." *Modernist Cultures* 13.2 (2018): 187-211.

[162] See Painlevé's essay on underwater cinematography and its challenges, titled, "Feet in the Water." "Les pieds dans l'eau." *Voila* (May 4, 1935): 5.

[163] James Leo Cahill has done the most to contextualize Painlevé's cinema within the context of his contemporary science education; while Cahill's explication of the course of study in comparative anatomy in which Painlevé enrolled at La Sorbonne in the 1920s was beginning to reflect the shift towards ecological field work that British and American botanists and zoologists had been pioneering throughout the early twentieth century. As Cahill notes, on the one hand, comparative anatomy was less an "organizing logics for research in the field as useful institutional titles;" the field was quickly following Lamarck's "emphasis on the metamorphic potential of organic life and gave the milieu an increasingly important causal role in transformations, thus leading the imagination, if not always the researcher, to move beyond the walls of the anatomist's cabinet, gallery, and laboratory to consider the natural world from an ecological perspective," as Cahill states (40). Under Paul Marie Joseph Wintrebert at La Sorbonne, Painlevé completed fieldwork as part of this laboratory training (40). Indeed, Wintrebert's pedagogy is an interest pedagogy, as I have been explicating it: "Wintrebert encouraged methodological flexibility among his students," Cahill writes,

“Nous cúmes ainsi le roman du Bernard l'ermite, les amours de La Daphne, la vie effroyable et décorative de La Pieuvre, etc., etc., tous ces films merveilleux que nous pouvons applaudier en ce moment” (471). Indeed, the form of species lists are critical to Painlevé’s presentation of individual life forms as not only documents of “a singular creature,” as Cahill writes elsewhere, but instead as “a scintillating plurality of life” (“Forgetting Lessons” 278).

“Neo-zoological Drama,” for example, the essay published in *Surrealisme,* and which “revealed” Painlevé to be a “Surrealist,” can certainly be read as an interesting species list (“Neo-Zoological Drama” 116). Punctuated with semi-colons, each fresh line of “Neo-zoological Drama " introduces a new organism into the sometimes clear, sometimes obscure action presented here, creating a reading experience that is both orderly and disorderly. If the essay “barrage[s] the reader with a wave of strange words and situations,” as Cahill suggests, then it also draws on his readerships’ understanding of the species and anatomy here: “it was playful but not purely random or nonsensical,” Cahill states (43-44). The reading experience, too, suggests interest’s flitting and flickering among a variety of details, as Cahill notes: “The economy of attention in the text zigzags as zoological facts and details collide against each other in a manner suggestive of the seemingly chaotic and spasmodic blind encounters of the sightless Prorhynchus. The sudden insertion of a telegram’s “Stop” serves to rupture the anthropomorphic reverie and refocus attention” (44). For Roxanne Hamery, the essay explores the “latent poetry” of the scientific document as revealed by its insertion in a non-scientific journal, a poetry that inheres in the fragmented relationships among these “facts” (31).

and when educating naturalists, “‘the greatest freedom must be allowed for all to choose their own working methods according to their temperaments’” (Cahill 36).

This is, of course, precisely what species lists do—they are full of potential relationships that might contribute to an organized whole, but which primarily build relationships among seemingly disparate entries. Painlevé plays on the fluidity of this form and its aesthetic response here to populate Surrealism with poesis: indeed, Painlevé's species lists locate poesis within the experience of interested scientific documentation and inquiry. Unlike Beebe, however, whose innovations on the species list were designed to recreate the affective experience of ecological Surrealism for his readers, Painlevé's work demonstrates a variation in its cognitive experience, situated within the discourses of institutionalized science education as much as within circles of Surrealist practitioners. From hermit crabs to daphnae, from octopi to species yet to be listed, Painlevé's lists assert interest as a counterweight to the diligent, if decidedly uncritical *curiosity* also circulating among contemporary science pedagogy. Designed to slow this roving, positivist emotional style, his species lists in film and prose introduce ecological lingering into Surrealist experience and science education alike. If this form of ecological Surrealism happens to recreate the experience of ocean environments for viewers, it does so in order to temper other educational paradigms adrift in the same tide pool.

Lists are frequent throughout Painlevé's grammar, but the 1931 essay, "Mysteries and Miracles of Nature," published in the photojournalist magazine, *Vu,* is notable for the bustling array of life forms that aid in Painlevé's articulation of the affective character of scientific knowledge work. One way to understand the serial form of "Mysteries and Miracles of Nature" is as a response to the history of curiosity and wonder as scientific affects. As Lorraine Daston and Katherine Park have narrated, post-Enlightenment notions of scientific disinterestedness reformed these "cognitive passions" (Daston and Park 328). While the two had previously been tethered, wherein moments of rapt wonder secured curiosity's penchant to rove, this move split

these close kin along lines of industriousness: curiosity could be harnessed in service of objective observation, while wonder became devoid of knowledge work entirely. As Daston and Park put it, "noble curiosity worked hard and shunned enticing novelties; vulgar wonder wallowed in the pleasures of novelty and obstinately refused to remedy the ignorance that aroused it" (328). As notions of objective disinterest, then, became *de rigueur* in scientific practice, curiosity became positively connotated with hard work, while wonder reveled in knowing very little at all.

"Mysteries and Miracles of Nature" appears to mend this division by adopting an interesting pedagogical aesthetic that first revalues, and then draws together, these coexisting cognitive passions. The essay begins by asking and answering this question: "Does the complete understanding of a natural phenomena strip away its miraculous qualities?" (119). "It is certainly a risk," the author answers, "But it should at least retain all of its poetry, for poetry subverts reason and is never dulled by repetition. Besides, a few gaps in our knowledge will always allow for a joyous confusion of the mysterious, the unknown, and the miraculous" (119). The passage asserts a familiar Surrealist play between objectivity and lyricism, between rationality and irrationality here, but I am more interested in Painlevé's description of poesis: it provides the critical aesthetic, interesting *variation* necessary to unseat modes of scientific exploration that have become calcified by repetitive methodological and descriptive structures. These are the purview of a curiosity defined by constant, incessant motion, a kind of indexical fever that is constantly attentive to filling out the documentary register (119).[164] Notably, however, this incessant search for increasingly accurate indexes of actuality is distinctively *lazy:* "we all seek, more or less consciously, to increase our knowledge of the unknown—if only out of a lazy desire

[164] Or, as Painlevé puts it, "predict[ing], from a safe distance, phenomena in a variety of fields and [producing] more numerous and more fruitful hypotheses that we hope will finally explain Nature once and for all. It is the preservation of our species that is at stake, and incites this eternal curiosity" (119).

to turn something that once required thought into something that no longer does," he suggests (119). Wonder, on the other hand, is defined by encounters with stasis, which aim not to know, but "to dream each moment without imposing coherence on us" (123). *Both* affective experiences are critical to forwarding scientific research, Painlevé suggests—what is wanted is a mode of thinking, feeling, and representing that can tether and temper these species of scientific thought. In the form of poetry, interesting aesthetics come to his aid, varying the patterns of a calcified curiosity and opening up space for the rupture of the unknown within knowledge work. Here, poetry teaches scientists how to think and feel with interest.

This pedagogical relationship should not be understood as a kind of separate aesthetic intervention operating on science writing from without; rather, Painlevé reaches for the species list as the formal device for this pedagogical effort. Indeed, he teaches us to understand this ecological document as a resource of poetics. A listed aesthetic patterns this essay's "disorderly" "journey" through "wonders, charms, and horrors" (119). While interest does not appear in Painlevé's list of affects, its aesthetics underwrite the syntax of the essay: this journey follows an interesting, serial form, in that it is a list of "subtle variations in food and environment" that "have the power to play endless tricks on us" (120). Parallel and simple subject-verb syntax pattern the array of variation that follows, echoing Beebe's second-person directive to see—and thus to understand—with interest. "We see" variations in reproductive patterns, instigated by environmental factors like temperature and food supply, and a startling set of variations on parent-child relationships (120); "we see," too, variations in sex assignment and expression, even within the same species (120). This series of views is diversified with a slight alteration of the simple syntax on the following page, extending this series to feeding behaviors: "And when they attack, we see more variations still" (121). The interesting variations of this essay's syntax are its

disorderly rule, and they serve to both make and unmake order, generating and simultaneously undoing relation.

On the one hand, Painlevé's lists encourage readers to generate associations and to note patterns among seemingly disparate entities, that is, generating relationships broadly across life in all of its forms, as in the case of the following passage:

> The serpent crushes its prey in its coils before serving itself. The cat tears its victim apart and swallows the feathers and hide. The duck seizes a snail in its bill and swallows it whole, dilating its esophagus in the process. The anteater, when it is tired, sticks its viscous tongue in a nearby anthill and withdraws it when it is covered with ants (who had unwittingly become stuck to it, having gathered around it to discuss its strange and sudden appearance). The toad snatches its prey dolefully while closing its eyes. The salamander tilts its head to the side as it contemplates a little worm crawling by, then slowly approaches it, coming within a millimeter, and finally lets loose in a skillful spasm. If a stickleback fish were to arrive at this moment, it might steal the worm but only swallow it halfway, appearing to be playing with it as it swims away. With eyes like two pivoting turrets in perpetual motion, the chameleon lances its prey with a certainty and a swiftness that belies its appearance. The dragonfly larva deploys its articulated mask and in a flash ensnares its prey between two hooks. (121)

Covering quite a bit of territory within the animal kingdom, the passage reads as one moment where Painlevé feels nudged, perhaps, by the incessant movements of his own curiosity. However, the knowledge work here is not about imposing order upon these beings, but about allowing their movements to define their point of relation—after all, as Painlevé argues,

"compared to Nature, Man's imagination produces weak revelations" (119). Thus, in characteristically interesting form, the passage's aesthetics echo in form the movements of its animal bodies, mimicking its doleful toad, who snatches our attention with quick flicks of visceral evocation, tempered with tired repetitions. In this paragraph and the next—two long descriptive sections that generate about a quarter of the essay—simple syntax is the rule, and slight variations in that syntax the theme, as we see here in the instance of the stickleback's mischievous—and conditional—appearance within the salamander's hunting grounds. Another theme-and-variation throughout the passage is the choice of verb, which imbue these simple sentences with violence and speed, lending charisma to subtle form. If the verbs lend drama to subtle syntax, then the syntax also makes common the brutality of consumption. Indeed, it is the contrast between the violence of the images and the fact of their commonality, reinforced by repetitive listing, that forges the contextual relationship among these images. We learn to see nature's brutality not simply everywhere, but as the profound pattern across animal life that it is.

In this instance, interesting aesthetics teaches us to treat this broad series of observations with depth, resisting our impulse to move too quickly across the field—this is not simply a collection of curiosities, but a list that invites and imagines relation (as in the case of that mischievous and hypothetical stickleback). It creates comparisons among behavior and ecosystemic function, positioning these species as common, if surprising, predators. Interesting aesthetics, then, encourage a curious reader to develop and imagine relationships from among its catalogues of observed information, by brothering the form of the beings they document. However, the serial form of the essay is not only designed to temper curiosity's hasty efforts, but also to move wonder's rapture towards relational knowledge work. In later moments, the essay suspends movement entirely, allowing another listed series to create a sense of static rapture, of

informational vacuity, where the relational knowledge work suggested by the list is much less clearly marked:

> From the enigmatic facies of the cat to the sadness of the seahorse that has lost its arms; from the fireworks of a giant fan worm to the dance of the starfish; from the oblique walk of the crab to the balled-up attention of the spider; from the charming games of the otter to the ethereal pulsation of the jelly-fish; from the color of butterflies to the song of birds, from mollusks that cover the sea with veils of blue to animals in the shape of leaves, branches, or flowers; there is an infinite field of magnificent and continual joys that prevents us from completely elucidating the mystery or the miracle. (123)

This passage's long sentence encourages readers to linger within a listed series that suggests relation, but which does not require it. Indeed, the "From…to…" prepositional phrases, separated by semi-colons, remove the action that serves as the relational center of the essay's previous listed forms, editing out the verbs that structure the point of relation among disparate cats, ducks, and chameleons. Rather, the nouns in this sentence *don't move*, for "all this action can be distracting," Painlevé states, "and sometimes nothing is more astonishingly splendid as the most static forms of life, which allow us to dream each moment without imposing coherence on us" (123). Here, the comparisons of function invited by the inclusion of verbs are redacted, and we pause in the essay to peer at a wonderful, because incoherent, species list.

Notably, however, these verb-less prepositional phrases are stilled, not static; what moves, slightly, is the rapt attention of the researcher, marking out points of orientation within an infinite field of potential relation, creating a gap of meaning for readers to map—and in which we wander. The prepositions lend this subtle passage the impression of motion, imbuing this

moment of wonder with the subtle loosening of attachment that interest structures. Read together, these two species lists demonstrate how Painlevé deploys interesting aesthetics to allow the movements of curiosity and wonder to blend into each other's intellectual contours. Wonder takes on subtle vacillations and pulsations, becoming a site where potential relations might be gleaned and ordered; curiosity grows slower, but in doing so, does more work. This is where the species' list poesis resides: in its fluidity as register of observed entities and of potential relations, where known and unknown quantities mingle thanks to the "gaps in knowledge" that are indicative of the form. Indeed, "Mysteries and Miracles of Nature" teaches us to read the species list as a poesis that "is not dulled by repetition"— but which, in many ways, also relies upon it in order to do some work. It is a poetics of interest, taught by the form of the species list.

This poetics extends to his filmmaking as well; in fact, in a move that echoes Beebe's own innovations on this often dry medium, Painlevé often reaches for language as both prose and poetry to address the slippery relationship between cinema and its ability to cultivate scientific thinking and feeling among his viewers. As Painlevé states in the 1955 essay, "Scientific Film," in an educational environment defined by rote memorization and the observational confirmation of pre-stated fact, film "is actually a double-edged sword: while film can spark interest in a certain subject matter, it can also gloss over details and suppress curiosity by fostering the dangerous illusion that one has *understood,* when in fact, one has not" ("Scientific Films" 161).[165] Two case studies from Painlevé's early career, the 1928 film *Sea Urchins,* and the 1927 film, *The Octopus,* explore alternative solutions to this unique problem for the science film at the intersection of image and word. While the films are undoubtedly characterized by a variety of scalar registers that "teach spectators to view familiar scenes with an eye for the strangeness they

165 Note, here, how Painlevé's curiosity is now tethered to interest, taking on positive exploratory connotations.

may harbor" and thus "alter what seemed at first glance to be of the known;" they often do this work in conversation with scientific writing (Cahill, *Zoological Surrealism*, 85). These films redesign cinema and prose as mediums wherein curiosity and wonder are tethered and tempered by interest's formal patterns, including its serial structuring: I contend that the production of interest as ecological Surrealism is the source of these films' poetics.

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One of the earliest popular science films in Painlevé's *oeuvre*, *Sea Urchins* posed the filmmaker some distinctive pedagogical problems. It is a short species list; the film covers the physiology and eating habits of two species of urchin (sand and rock), and places us within this idiom via its opening intertitles, which first suggest a series of species, and then introduces the first in that list. Indeed, the film could be read as a list organized around taxonomy and ecological function, which are particularly intertwined categories for urchins. The film aims to correct a misunderstood fact of rock urchin locomotion: namely, that its movement is ecological in function, involving a complex interplay not between the wavering spines that so attract our attention, but the tiny white ampuls that fill with and eject water in order to reach out for and adhere to surfaces upon which they may hoist the urchin's body.[166] Audiences, however, appeared to habitually miss this fact, as Cahill has explicated, thanks to a trenchant commitment to rote memorization over *understanding* ("Forgetting Lessons" 268). Critically, Painlevé emphasizes that understanding is a function of being interested. Speaking to Patricia Hutchinson for *Sight and Sound*, Painlevé frames this distinction with a precisely-placed pun:

> Certain shallow minds have declared . . . that the introduction of films into the school, except as a distraction, is *la perdition de l'esprit*. This is a misconception

166 Of the film's 10 minutes, only about 2:45 are spent on the sand urchin; the remaining minutes are devoted to explicating his fact concerning the rock urchin.

> of the real problem. There is no question of doing away with individual effort on the part of the student. The aim is to ensure that fundamental understanding will replace that learning *without* understanding which has brought us where we are to-day, and, to make study easier and more interesting. The peevish will shudder at such a statement, being incapable of imagining constructive effort without pain, or the association of ideas *par une caresse au lieu d'un coup de pied.* (Hutchins 101).

Painlevé puts his interest-based educational values on display here, arguing that building associations via interest's pleasurable caress builds the kind of profound thinking that inscribes understanding: a deep mind is made through the cultivation of this seemingly shallow knowledge affect. Perhaps more importantly, elsewhere, Painlevé frames interested understanding via cinema as a kind of *scientific* training, one that contemporary viewers likely lack as products of their contemporary educational environment: "While higher education or technical training may equip a viewer with skills similar to those required in scientific research, this is not so for primary or secondary education where *learning* often takes precedence over *understanding*" (Scientific Films 161). *Sea Urchins* bears much of the iconography and organization of the interested ecological film, sharing with *Secrets of Nature* a commitment to teaching and training this particular brand of scientific thinking and feeling.[167] However, its situation within an environment defined by curiosity's uncritical devotion to learning highlights the pedagogical

[167] I will note a few of these in what follows, but the film also includes the distinctive situation of the organism within the environment via short successive shots of (rather picturesque) landscapes at both the front and back end of the film's footage, many moments where hands and instruments manipulate and interact with the organisms at hand, and, often, a sense of the trademark affective bristle that is constructed via close-but-distant beckonings. His films do, however, tend to be more affectively varied, dabbling with disgust and the early conventions of horror, as in the case of *Le Vampire* (1945) and even trafficking in slapstick, as in the case of the hilarious *Shrimp Stories* (1964). The programming of interested ecological thinking is, then, rather less strictly organized in his body of work than in the case of *Secrets of Nature,* and is one major difference between these contemporary series.

slipperiness that media can introduce into interested ecological epistemology. As a case study, the film emphasizes the importance of understanding scientific affect variously for Painlevé's cinematic aesthetics, and elucidates his commitments to the forms and attachments of his contemporary ecological science as a solution to this pedagogical problem.

The opening sequence of the rock urchin section suggests that the film's visual logic is dictated by interested ecological thinking, positioning viewers within Painlevé's flippers. After intertitles, one listing the species name *L'Oursin de roche* and another indicating the maximum magnification of the film's microcinematography, the sequence's third shot figures Painlevé himself, knee-deep in a tide pool, reaching underwater for an urchin that we don't see. A subsequent fade in to a medium close-up of an urchin in water follows, and in the duration of this longer take, our eyes become trained to move with the incessant wavering of the crustacean's spines. This first long take is, then, an effort to teach viewers how to linger by creating a documentary form that redesigns our visual apparatus through the form of the urchin itself. And the film does not only construct visual movement and attention through the form of the fish here: this sequence also suggests that we look as Painlevé does through the suggestion of an eye-line match. After this long take, the next shot shows the filmmaker in the same posture, stooping over a pool, but this time, lifting an urchin out of the water for closer examination. Anna Gibbs's exploration of mimesis and embodiment in Painlevé's films is helpful here; for Gibbs, moments like these, wherein the form of the fish and the form of scientific experience begin to echo each other's movements forward a means of scientific inquiry based on certain understanding of anthropomorphic mimesis. "Mimesis is not a property of either subject or object, spectator or film" Gibbs writes, "but a mode of action" (47-48). I take issue, however, with Gibbs's assertion that this is a "non-cognitive way of knowing:" what is suggested by this grammatical

organization is a kind of scientific inquiry that could easily be construed as a reinforcement of curiosity's incessant motion, attaching visual and cognitive attention to the wrong point of movement (52).

For the urchins are, of course, *rooted*, but vacillating in these opening shots: in this way, the urchin's form mimics interested epistemology. That the organism's motion is eco-systemic, relying on water to move its body across the ocean floor, underscores this point: this is the critical *relational* error that viewers of the film fail to identify. The subsequent shots reinforce this error. Just after Painlevé lifts the urchin out of water, a straight-on close up of a dry and unmoving urchin fills the screen, its spines as static as the camera. The shot that immediately follows animates the urchin yet again, but it too is shot on dry-land; there is no water here, even as its spines continue to vacillate. For viewers with a devotion to pre-established fact, this opening sequence confirms what they have already thought: that an urchin's movement resides in its spines, and does not require a reliance upon its ecosystem to shuttle itself across its rocky environment. If, as Cahill writes, "the presentation of the urchin as alternately an autonomous spiny creature, a vast forest landscape, and a Medusa-like republic of creatures demonstrates how shifts in scale can produce documentary footage of a being as non-self-identical," then these shifts in scale also create some epistemological slipperiness with which the filmmaker and his audiences grappled (*Zoological Surrealism* 82).

To be sure, the film is explicit about stating the contrary throughout: its longest takes—an intertitle stating the source of movement, a subsequent shot of the urchin's white ampuls waving amidst the spines, reaching out for something to which they might adhere, an animation that demonstrates the mechanics of ampul motion, and a very long take presenting an urchin walking up a rock face—encourage viewers to refashion their visual habits and cognitive patterns through

extended interactions with the facts of urchin locomotion. Throughout, however, reiterations of the opening sequence's visual logic deflate these efforts: the shot immediately following the animation, and preceding the long take of the walking urchin, for example, is once again a straight-on urchin in medium close-up, spines wavering, but not walking. This shot's visual pattern is also repeated *after* the long take of "Le marche d'oursin," subverting the film's efforts once again to retrain our understanding of movement and relation.

This subversive patterning is a specific construction of camera work throughout the film, and one final example serves to demonstrate the ways in which the camera work of *Sea Urchins* misplaces the cognitive and affective work of Painlevé's interested ecological epistemology. The film's first use of microcinematography includes three shots just after the first long take of the urchin's ampuls wavering, if not moving, that magnify these physiological characteristics at increasing registers. The aim of this exercise is to attach our attention to them, attempting to fix these limbs as the source of movement. The suckers seem to emphasize this pedagogical goal, as they, too, are affixed to the camera's lens. However, as the camera magnifies them in quick succession, the urchin becomes increasingly out of focus, and viewers instead gaze at levels of magnification that have, once again, made them motionless. As we fix our vision to the microcinema here, in ways that discourage us from seeing as a mimic of the urchin itself, the point of the urchin's ecological patterns of locomotion are once again obscured.

Sea Urchins reminds us that interested ecological epistemology is prone to alteration via the ecosystem of media infrastructure and knowledge work within which it resides, a fact that Painlevé appears attentive to as he continued to describe this film in prose throughout his long career. Speaking to the British critic James Maddison, for *Sight and Sound* in 1950, Painlevé reaches for the language of interest to shore up the facts of locomotion that this film exhibits.

Maddison, who cites the filmmaker's "acute awareness of pictorial values" translates Painlevé for his audience here, thus perhaps inflecting a picturesque tenor to this piece. But if he is correct in noting that Painlevé himself called *Sea Urchins,* "*La Promenade en Forêt,"* then we find ourselves loosed in a forest *sous l'eau* (251):

> As our thoughts range idly over this crust, we see only an impenetrable forest. Then we notice that the spikes do not serve the creature for his locomotion. This is done by a system of hydraulic feet, extremely specialized. Over the many hundreds of holes in the carapace, there pass tiny flexible threads, ending in suckers. Beneath the carapace, all these hollow threads swell out into ampuls or bulbs, and these ampuls are themselves linked by channels filled with water. As they contract, they send water into the elastic threads. The threads stretch forward and the forest is in flower!" (Painlevé, in Maddison 251).

An "idle" curiosity might range over an "impenetrable forest," but "then we notice": interest encourages us to pay attention to the work that the vegetation of this forest performs, and to do more work ourselves. This written attachment remains consistent in encouraging viewers to linger with visual information as opposed to ranging idly over it, encouraging rough and spiny *forms* to arrest our intellectual movement—and to change the data we have recorded. The film, too, employs a reference to this interesting ecological tradition, in prose, in the form of an intertitle that precedes the film's microcinematography of the diverse and moving forms that live in the "increasingly strange" landscape of the urchin's carapace (Cahill, "Forgetting Lessons" 278): "Dans la forêt des piquants, on perçoit d'innombrables *pédicellaires:* trois mâchoires reliées à l'Oursin par un axe calcaire." This intertitle cues viewers to perceive the images that follow with the sense of wonder-filled poesis that is indicative of a landscape-on-the-move, quite

specifically listing the inhabitants of this landscape, and suggesting—but clearly, not articulating—their relation to the organism as a whole. And yet, something problematic remains: that Painlevé chose to describe this film yet again, almost 20 years after its release, in interesting terms, suggests that the idly roving viewer would not have perceived this list as a document of potential relation, but as an archive of beings, ordered and organized.

Indeed, the intertitle doesn't include a critical element that the *Sight and Sound* description does present: the final exclamation—"the forest is in flower!"—evokes a breathless marvel, as we watch a forest not simply bloom, but *move*.[168] These oddly moving forests, walking up rocks and shimmying into sand, are powerful icons of the marvelous-curious-interesting relationship I bring forward here. They arrest our roving curiosity via their interesting formal contours, and they evoke wonder by taking on movements, rupturing viewers' notions of agency and locomotion. As in "Mysteries and Miracles of Nature," interesting prose tethers and tempers curiosity and wonder, here, a pedagogical attachment to the film's history that works to realign its epistemological goals and objectives with those of its contemporary ecological science—and its contemporary Surrealism.

Sea Urchins illustrates the fact that interest—and thus Surrealist poesis—is a fluid cognitive and affective experience across media, and that interest is often carefully structured by a multi-media understanding of grammar. Here, language reasserts the interest of *Sea Urchins* because of camera work's slippery relationship to informational presentation and display. But there are other moments in Painlevé's *ouevre* when camera work revitalizes the written form, and encourages us to read it for the document of potential poesis that it is. *The Octopus* is a

168 In true serial form, the pattern holds for Painlevé's description of a subsequent film that features the locomotion of tide pool crustaceans—the 1929 documentary, *Hyas and Stennorynchus.* Starring two varieties of crabs who tend to landscape their shells by transplanting local flora and fauna upon them, thus becoming walking gardens themselves—the film is labeled *La Promenade Au Jardin* (Maddison 250).

notable example: the issues of *Sea Urchins* set this experiment with grammatical structures into relief, as Painlevé explores another way in which serial prose-on-film might accomplish some marvelous work amidst the currents of curiosity.

Unlike *Sea Urchins,* which begins by placing viewers within the familiar species list, *The Octopus* appears committed to subverting our understanding of scientific documentary as devoted to rationalism at the outset. Consistently cited as one of Painlevé's most legibly Surrealist efforts, *The Octopus* features enthralling *sous l'eau* and *à terre* footage of its star's movement in an opening montage that defies easy assumptions concerning the filmmaker's commitments to reason and knowledge-work.[169] An octopus falls from a laboratory window. It crawls uncomfortably across a doll's body, then tumbles from a tree. Under water, the fish swirls violently round a human skull, suggesting that this being defies efforts to classify, rationalize, and categorize, and in fact, finds vitality in the watery death of this epistemological model. This last scene fades into an establishing shot of the seascape, stitching these unusual points of view to a wide open beach scene. As the skull blurs into the horizon line of the establishing shot, eye sockets becoming boulders on the coast, the film broadens the horizon of the film's pedagogical purpose: this opening sequence marks out a field of unusual orientations in which viewers wander just before we are situated within the octopus's more familiar milieu.

While Lauren Fretz claims "an octopus crawling over a mannequin has little to do with science and everything to do with the juxtaposition of Surrealist imagery," I would counter that this opening montage is directly concerned with the issues of scientific thinking and feeling that I

169 Cahill ties this film to the history of the octopus as a source of Surrealist hallucination, via Victor Hugo's and Georges Bataille's descriptions of this species: "Painlevé's zoological Surrealism brought together a cinematic enlargement of comparative anatomy with a Hugo-inspired poetics of natural history as mysterious, entropic, and concerned with singularities and monsters in addition to taxonomic orders," he argues (76). For Bataille, the creature is a particularly adept embodiment of *informe,* or the formless, "which 'declassifies' and deranges whatever it encounters" (72).

have been rehearsing here (52). We can read this opening montage as a cinematic version of Painlevé's prepositional phrases, orienting readers in a field whose only rule of relation is the unknowable. Even so, the film is precisely organized by the kind of interested lingering inscribed within the species list, consistently foregrounding how static gaps among listed quantities generate moments of wonder. For while the film is full of movement, the camera itself refuses to pan with an actor that is never entirely within the frame. Tentacles are seldom contained within any one shot, fish recede into craggy nooks and nestle into sand beneath rocks, and when an entire octopus is visible on the screen, it jets with its brother across tide pools to disappear entirely from the line of vision. Straight-on or overhead camera angles mark out a series of static views within which viewers encounter not simply the fish in motion, but gaps of incoherence in which no information is registered at all. Indeed, if in "Mysteries and Miracles of Nature," Painlevé leaves out verbs to construct a moment of stasis in which no relation exists, then in *The Octopus*, the camera angle performs a similar task, imbuing the film with a punctuated sense of space that never quite allows its documentation of movement to cohere. The only relation among the opening shots is the fact of the fish's evasion—it's ability to slip into gaps that we can only ponder.

Painlevé seems insistent on encouraging us to wonder at the limits of our ability to see and know actuality, *despite* the perceptual power of our machines. Instead, *The Octopus* suggests that camera work's marvelous character lies not only in its ability to see what we cannot, but to redesign our descriptive technologies. This includes language. The film's informational intertitles, written in pithy, simple syntax, orient viewers within the often quite unfamiliar close-ups of this cephalopod whose eyes are like our own, as one intertitle suggests. But these titles are not the most interesting use of black film leader and white script. In the film's final minutes,

brief, almost imperceptible, flickers of film leader featuring illegible, swirling, and often vertically oriented script, punctuate images of encounters between man and octopus. This leader creates graphic matches with a series of the film's most scientifically codified images, dark spaces of twisting prose inserted between cuts of various octopi wriggling out of science's grasp. They echo a severed, but still moving, tentacle responding to a researcher's touch on a glass plate, an octopus slithering out of its net, and the final close ups of an octopus in shallow water, writhing under the camera's observation. Taking on a new descriptive purpose, the script slithers and flickers, linguistically inarticulate, but brothering the form of the octopus here, as it squirms against, and still defies, our efforts to see and know it better.[170] Indeed, it is notable that the editing of the leader lends this script some movement: at least three shots per insertion, the script is quite literally animated by film's apparatus, and it registers at speed as an evocative tentacle, reaching past the frame of the lens and into dark frames not yet documented.

[170] As Matthew Soar has noted, film leader prior to the 1930s would have been rich sites of paratextual writing, including "statements of identification and ownership" (25). As Soar goes on to suggest, the text-heavy frames were "too few to be legible to theatrical audiences during projection" and were rather "most likely intended to be seen only by lab technicians, exchanges, projectionists—and competitors" (25). This makes Painlevé's use particularly notable, in that it is just perceptible enough to pattern the sequence. Soar is particularly interested in US film stock, but his observation that there were no standardizations for leader placement until 1930 in any case seems to hold up here, as Painlevé experiments with this material part of the medium. Notably, within my account of Painlevé's films, no other such use of leader is featured.

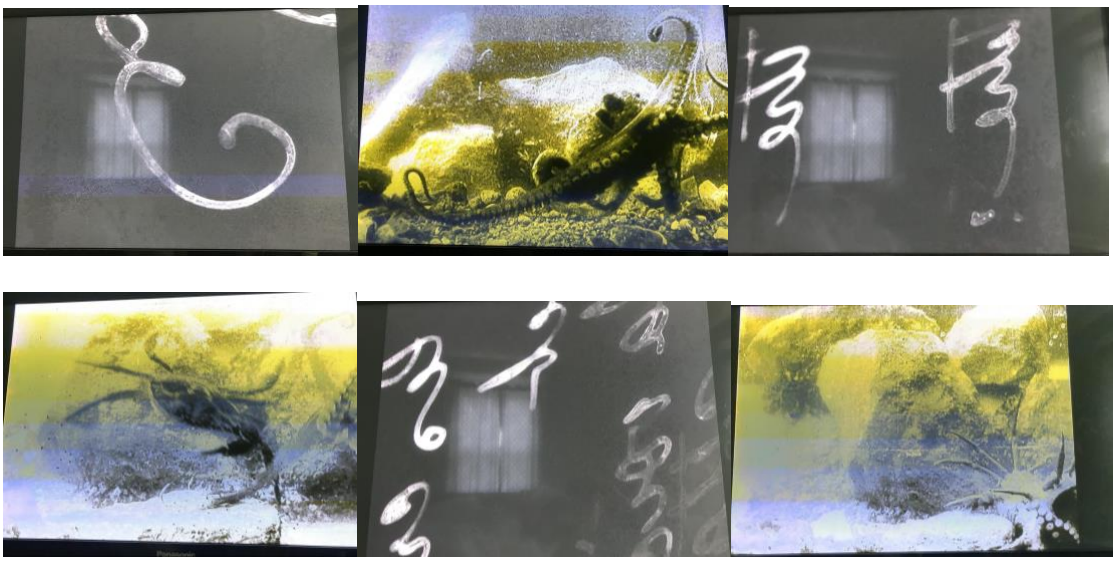

Figure 23: Film Stills: Black leader interrupting images of octopi, filmed in tanks and tide pools, The Octopus (1929)

That Painlevé pairs this leader, a manipulation of writing, with images of scientific manipulation is no mistake: I read this moment as a cinematic experiment with scientific writing and image-making that re-orients what description might look like in script, via film. The insertion of this leader allows the form of the fish and the form of human writing to mingle with each other in the gaps between frames, where the presentation of information gives way to the presentation of sheer form. We wonder at the novelty of this new descriptive, and undoubtedly poetic, practice, which encourages us to pay attention to flickers of evocation—if not sense—among so much informational delivery. In this way, the leader mimics the poetics of the interesting species list, serving as the variation for the film's representations of science. The leader creates seriality in the final minutes of *The Octopus* in ways that are similar to the interesting, variegated prose in "Mysteries and Miracles of Nature": it punctuates these scientific sequences, inserted precisely when takes of longer duration require a different point of view, encouraging us to continue to peer at the encounters between science and its subject. The first three instances of leader break up a comparatively long take of a piscatore manhandling—and

being manhandled by—a small octopus on the shore line, pointing first towards the fish's location, then towards its motion and strength, and finally, towards a different kind of intimacy with humanity, plopped into a bucket and on its way to a plate (petri or china). Boredom is mitigated by the slither of the script, echoing the fish, but also returns us to the site of science, with a different view in each succession. We linger here, looking successively, at scientific knowledge work made poetically interesting.

But if this cinematic iteration on the list suggests a wonderful representative new design for language, then words also become a source of wonder within the film's efforts to refigure the affective character of scientific study. The film's final sequence, a sparsely jump-cut, straight-on sequence of an octopus simply living in a tide pool, swimming, hunting, eating, is a case in point. In one wonderful final instance, the animated leader evokes movement after a shot that is clouded with debris, where the movement of the fish is only evident as sand and ink thrown in the camera's eye. Here, prose-on-film encourages viewers to *imagine* what lives in the interstices of serial form, to imagine what happens where we cannot see—indeed, to see serial form as an opportunity for doing this kind of work. Language, then, once again comes to Painlevé's aid in forwarding the epistemology of *The Octopus,* which aims to lead its viewers along the borderline of known and the still unknown: the primary protocol of modern ecological Surrealism.

The Surrealism of Breton, Beebe, and Painlevé teaches us to see a capacity for poetry within modern ecological fieldwork: to understand this science as a source of poetry, produced at the intersection of its words and images. Indeed, to put a finer point on this conclusion, the poetics of ecological science exist in the field's commitments to interested thinking and feeling, and interesting aesthetics, produced by its documentary protocols and technologies across a

variety of media. *Fieldwork* has shown that modern ecology is a lyric behavior, artfully taught throughout modernist aesthetics, and within a modernity attuned to the vitality—and interaction— of materiality, language, images, and ideas. This science is situated within a rich environment of aesthetic innovation working to recreate the human kinship with the nonhuman world: for the writers, artists, and scientists brought to bear here, this kinship is respectful of the entanglement among forms of life and thought while remaining sensitive to the disparities of form and experience that distinguish these embroiled species. Indeed, forms of description and representation are critical to this work, as words and images facilitate the near-distance that defines the position and comportment of this lyricism: modern ecological thinking cannot exist in the same way outside of this media ecology. These descriptions, images, and fictions construct a modern ecological subjectivity that is enlivened by interest's cognitive and affective lessons; its practitioners learn to temper explosive feelings, tether rapacious thoughts, and lend movement to experiences that shock them into stasis. If interest manages emotions about and attention to the material world, it does so in order to encourage further association, inquiry, and knowledge work. Its flexibility and adaptability—to present data, to document formation; to build patterns and relationships; to encourage us to feel, but not too much; to design new solutions for understanding our world; to model a selfhood that decenters but does not erase our humanity—are especially useful in a contemporary moment wherein, like the modernists I explore here, we struggle to perceive and thus to understand the scale of change on our planet, our personal roles in effecting that change, and our own affective attachments to this existence. I hope we might turn to its cognitive and affective lessons when we struggle to make sense of the (in)formation around us, when we need to feel something, again, about our relationship to this planet and the many lives that coexist with us here, and as we imagine the scientific and aesthetic innovations

we will need to sustain us. This is a powerful future for this humble form of thinking that has long forged relationships between the human and the nonhuman world, and it will, undoubtedly, linger.

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