Media Ecologies of Plant Invasion

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Abstract In popular conservation discourse, *Rhododendron ponticum* is portrayed as an alien invader let loose on the British countryside by misguided gardeners. In Scotland, eradication campaigns tend to be favored over more pragmatic approaches to management, even though the methods employed can be destructive and long-term success is often limited. Building on recent work critiquing categorical approaches to invasive species management, we argue that such campaigns obscure not only the underlying conditions but also the ongoing *production* of plant invasiveness. We focus in particular on the way perceptual processes shape and are shaped by plant "invasions" over time. Noting that the majority of plant invasions worldwide are initiated by the horticultural trade, and that visual appearance is a major factor in the selection of plants for trade, we present a framework for critically analyzing the visual conditions of horticulturally led invasion ecologies. Working from the perspective of a more-than-human, materialist media ecology, we cast rhododendrons as entities that modulate light, or "photomedia." Our analysis explores how their invasiveness is materially produced via the cultural and socioeconomic as well as vegetal relations in which they are entangled. The site of our analysis is an abandoned country estate in western Scotland that has recently undergone *R. ponticum* removal. By examining the production of visual effects by rhododendrons, cameras, and other media employed there, we identify relations to land that, far from being limited to the period of *R. ponticum*'s "escape" into the Scottish countryside, continue in present-day projects of eradication. This yields critical visual strategies for a gentler, more experimental re-mediation of *R. ponticum* and invaded landscapes in general.

Keywords invasive species, media ecology, plants, landscape photography, wild garden

Introduction

As summer approaches in western Scotland, the bright pink flowers of *Rhododendron ponticum* line roadways and drop their petals on forest floors. It is a sight at once beautiful and ominous—for this large evergreen shrub is considered highly invasive in the British Isles, where it thrives in wet, temperate conditions, forming impenetrable thickets of dense shade where little else can grow.

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However, as recent critical work has shown, when species are labelled invasive, there is often more than biodiversity at stake and more than one species to blame. This article builds on research problematizing categorical responses to invasive species by developing methods for critically analyzing the way perceptual processes shape and are shaped by plant "invasions" over time. Our approach is based in part on a strategic abstraction of certain plant behaviors: working from the perspective of a more-than-human, materialist media ecology, we characterize *R. ponticum* and invasive plants generally as entities that modulate light, or "photomedia." We describe what and how they mediate, focusing in particular on human visual perception. Worldwide, the horticultural trade is the main pathway for plant invasions,[1] and how plants *look* is a major factor in their selection for trade. We contend that, wherever those plants become invasive, vegetal processes and visual effects are inextricably entwined. Analyzing an invaded landscape from a media-ecological perspective is a means of showing how invasiveness is materially *produced* via cultural and socioeconomic as well as vegetal relations. This can in turn help to identify alternative ways of responding to the problems invasive species pose.

We develop these arguments from research at Kilmahew, an abandoned woodland estate west of Glasgow. Kilmahew is notable for its dramatic topography at the confluence of two small rivers, its scenic views onto the surrounding countryside, and a unique series of ruins: remnants of a small castle; woodland gardens planted in the mid- to late nineteenth century; and St. Peter's seminary, a spectacular work of modernist architecture built in the 1960s and abandoned in the 1980s. In 2010, a public arts organization called NVA initiated a project to reinvent Kilmahew as a space for arts and education.[2] One of the early interventions addressed the presence of *R. ponticum*, whose excessive growth had made many former paths and viewpoints inaccessible to visitors and community members, and was restricting the regeneration of trees and other plants. The funding NVA acquired to address this situation required that they pursue complete eradication.[3] Consequently, a comprehensive removal process was carried out by forestry contractors in 2014, using a mini-excavator and tractor with mulching head to mechanically shred debris and turn it into the soil, as well as chainsaws and fire on steeper terrain. The operation lasted several weeks, and in some areas resulted in substantial loss of trees and other plant life. It was followed by a program of herbicide spraying to control regrowth, completed in 2017.

1. Dehnen-Schmutz et al., "The Horticultural Trade."

2. van Noord, *To Have and to Hold.*

3. The funding came from the European Regional Development Fund, administered by Forestry Commission Scotland. We should note however, that after an extended negotiation between NVA and the commission, a rhododendron tunnel highly valued by members of the community was temporarily retained until a suitable alternative could be sourced and planted.

Our knowledge of the removal process is based in large part on our attempt to document its effects by producing "before" and "after" photographs.[4] This work drew our attention to how the removal drastically altered the balance of light and darkness at the site, reopening viewpoints designed into the nineteenth century landscape, while turning many areas of the woods into relatively barren "tree gardens," leaving little trace of the events that had led to the removal, or even some that occurred during it. For us, and for others who knew the site well, these effects were shocking and disorienting. But they were also instructive, revealing the landscape as a site not only of invasion and eradication, but also the ongoing production of visibilities.

The pursuit of eradication in invasive rhododendron management is problematic for several reasons: it can result in high levels of collateral damage; it has a low likelihood of lasting success since the plants have multiple strategies for regrowth; and it erases landscape history, shredding and burning evidence of the human-plant interactions that produced the invasions in the first place. It not only fails to address the underlying conditions of invasion but obscures them: wholesale removal of a species naturalizes the idea that invasiveness is a property of specific plants, rather than an emergent quality or historical event arising from the interaction of numerous agents and circumstances.

This article works in a different direction, attempting to see more than rhododendrons (or their absence), by casting them not as discrete biological organisms but as constituents of media ecologies. *Media* is understood here in expansive terms—in the first place as that which mediates; and secondly, drawing on materialist media theory, as lively and more-than-human. When we say that rhododendrons are a kind of media, we mean that, similar to cameras and other environmentally responsive media technologies, their interactions with their surroundings produce effects that shape how people see particular places and landscapes.[5]

To speak in terms of media *ecologies* is to highlight the relations in which rhododendrons are embedded; to see what they do as both an expression of their specific needs and capacities, and something produced with and for others. But it is also to recognize that this doing has a history—a pattern of interactions with responsive others that has changed over time. The media-ecological analysis we present is thus materialist in concrete, site-specific, and cultural-historical senses. In this context, *landscape* points at once to the material composition and visual appearance of land, and the cultivation of historically specific perceptual dispositions through representational, horticultural, and land-clearing practices. This multifaceted but visually focused approach allows us to show some of the ways in which invasiveness is actively produced as

4. One of the authors also contributed to the work of the Invisible College, a research network that hosted a variety of activities at Kilmahew-St. Peter's in 2012 and 2013.

5. Which is to say nothing of how their domestication has also had profound and wide-reaching influence on the organization of human societies. See Drayton, *Nature's Government*; and Tsing, "Unruly Edges."

opposed to merely enabled, and in turn to identify a realm of practices capable of re-mediating invaded landscapes in a manner that is not only gentler and more site-responsive but also critically attuned to the social and political work required to sustain and extend the effects of such practices.

We begin by discussing critiques of invasion biology and arguments for more nuanced approaches to invasive species management and outlining some of the key perceptual dimensions of the rhododendron problem in the UK. We then provide further background for our treatment of plants as media, and introduce the work of Matthew Fuller and Jussi Parikka, noting the ways in which their theories of media ecology enable a critical analysis of media that is oriented toward creatively engaging it. This is followed by our definition of *photomedia*—a strategic abstraction that enables us to identify visual relations in which plants and cameras alike are implicated. Although the two demonstrate a generally analogous relation to light, there are some differences that their encounters with landscape make clear. This provides the basis for an analysis of the media ecology of invasiveness at Kilmahew, in which we argue that landscape photography, "wild gardening," and rhododendron removal alike take part in intersecting, light-based practices of landscape that obscure the labor of its production. This analysis provides an orientation for gentler, more open-ended responses to invasive species, which we illustrate through discussion of a plant survey carried out at Kilmahew and its potential role in an experimental re-mediation of the land. We conclude by pointing to the larger cultural and socioeconomic challenges entailed by such an approach and suggest that it is in these terms that the problem of invasive species should be framed in the first place.

Problematizing Invasiveness

In popular conservation discourse and mainstream invasion biology, humans are seen as responsible for introducing problematic species and thus for controlling them. At the same time, "invasiveness" is seen in part as a property of those species, expressed in characteristics such as small seed mass, short juvenile period, short interval between large seed crops, wide latitudinal range, and resistance to herbivores.[6] There is also growing recognition that invasions are shaped by environmental factors, referred to collectively as "community invasibility," and that invasions are facilitated by events such as soil disturbance and agriculturally enabled increases in the availability of resources.[7]

Research in invasion biology has, however, been critiqued for its reliance on a reductive nature/culture binary, which masks how cultural and socioeconomic factors enable and shape invasions. It has been argued that definitions of native versus alien species reflect particular human values; that those values are contested, with cultural

6. Rejmanek and Richardson, "What Attributes Make Some Species Invasive?"; Hovick, Peterson, and Carson, "Predicting Invasiveness"; Moravcová et al., "Getting the Right Traits."

7. Richardson and Pyšek, "Plant Invasions."

importance often attached to nonnative and invasive species; and that in some cases invasions may have ecologically valuable consequences.[8] Further, simplistic, value-laden narratives of invasion are seen to conceal problematic socioeconomic relations and/or underlying conditions of invasion,[9] often deploying vocabularies that echo racist and xenophobic discourses.[10] Meanwhile, categorical prescriptions for control have been critiqued as practically ineffective, socially divisive, and implicitly colonialist.[11]

Meanwhile, a growing body of critical work is drawing attention to how invasiveness is less a property of particular species or environments, and more something that emerges within assemblages of human and nonhuman forces and bodies.[12] As the introduction to a recent collection of such work puts it, "it is the way species interact within biocultural environments, rather than their individual biological characteristics, that results in the formation of invasion ecologies."[13] There is increasing recognition of the socioeconomic and cultural factors that enable plant invasions,[14] and the histories of particular invasion ecologies are increasingly the focus of critical research, not only within the environmental humanities but also in biology and the ecological sciences.[15]

Many researchers now advocate for more nuanced approaches to invasive species management. On the one hand, some ecologists argue for more pragmatic, less normative formulations of the problem, in terms of "novel" or "recombinant ecologies";[16] on the other, invasive species management may already be less dogmatic than discourses of eradication suggest, with "accommodation and coexistence" often considered the most viable approach.[17] There are also numerous studies evaluating the effectiveness of collaborative approaches to invasive species management, under the banner of "adaptive comanagement."[18] Aiming to complement this applied research while contributing

8. Rodriguez, "Can Invasive Species Facilitate Native Species?"; Larson, "An Alien Approach to Invasive Species"; Warren, "'Alien' versus 'Native' Species"; Tassin and Kull, "Broader Dimensions of Biological Invasions." For a compelling popular account of these issues, see Mabey, *Weeds.*

9. Lidstrom et al., "Invasive Narratives."

10. Warren, "'Alien' versus 'Native' Species."

11. Evans, Wilkie, and Burkhardt, "Adaptive Management of Nonnative Species"; Head and Muir, "Nativeness, Invasiveness, and Nation."

12. For example, Robbins and Moore, "Ecological Anxiety Disorder"; Everts, "Invasive Life"; Gibbs, Atchison, and Macfarlane, "Camel Country."

13. Frawley and McCalman, *Rethinking Invasion Ecologies*, 4. See also Stanescu and Cummings, *Ethics and Rhetoric of Invasion Ecology.*

14. For a comprehensive review, see Head "Social Dimensions of Invasive Plants."

15. For those in the environmental humanities, see several of the essays in Frawley and McCalman, *Rethinking Invasion Ecologies.* For those in the ecological sciences, see Dehen-Schmutz and Williamson, "Rhododendron ponticum"; and Rotherham, "Times They Are a-Changin'."

16. Hobbs et al., "Novel ecosystems"; Rotherham, "Times They Are a-Changin'."

17. For example, see Atchison, "Experiments in Co-existence"; Barker, "Flexible Boundaries in Biosecurity"; and Head et al., "Living with Invasive Plants."

18. For example, see Evans et al., "Adaptive Management"; Graham and Ernston, "Comanagement at the Fringes."

to the critique of invasiveness in general, we read invasion ecologies in terms of media relations as a way to connect critical historical insights regarding the underlying conditions of invasiveness with practices of re-mediation in the present.

A media-ecological approach is particularly appropriate in the case of a species such as *R. ponticum*, the perception of which has varied dramatically since its introduction to the British Isles as a horticultural import in the 1770s.[19] At that time it was not considered as attractive as other rhododendron species,[20] and it was not widely planted until its capacity for self-seeding was discovered in the early nineteenth century.[21] Its visual impact on the forest understory subsequently became highly valued on country estates—first for practices of "woodland embellishment," and later as game cover.[22] By the 1860s, it seems to have become almost ubiquitous, no longer warranting mention in the gardening press,[23] but sold in large quantities for low prices.[24] In the first half of the twentieth century it entered a period of relative invisibility, all but disappearing from nursery catalogues and ignored by naturalists and botanical recorders who did not perceive the process of its naturalization until it was well underway—not only on country estates but also across the landscapes adjacent to them.[25]

Today in the British Isles, *R. ponticum* is perceived by many as a dangerous invader to which the pursuit of eradication is the only adequate response. While longer-term, volunteer-driven approaches to management do exist,[26] Scottish Forestry Commission guidance presumes eradication to be the objective of intervention and advocates a variety of mechanical and herbicidal methods for removal.[27] In a report prepared for the commission, the authors acknowledge that no control program has "successfully achieved 100% eradication at a landscape scale"[28] but argue that, "in the long-term, the most cost-effective strategy for rhododendron control is to aim for eradication at a population scale."[29]

19. Drower, *Garden Heroes and Villains*. It is worth noting, however, that there is evidence that it was present in Irish forests prior to the last ice age. See Cross, "Biological Flora of the British Isles."

20. Drower, *Garden Heroes and Villains*.

21. Dehnen-Schmutz and Williamson, "Rhododendron ponticum."

22. Elliott, "Rhododendrons in British Gardens." It also seems to have gained in frost-hardiness during this time, through processes of natural and/or artificial selection. See Dehnen-Schmutz and Williamson, "Rhododendron ponticum."

23. Elliott, "Rhododendrons in British Gardens."

24. Dehnen-Schmutz and Williamson, "Rhododendron ponticum."

25. Ibid.

26. For example, the nonprofit Trees for Life runs "conservation weeks" wherein volunteers help to remove *R. ponticum* from degraded ancient forests. Trees for Life, "Conservation Weeks." And on a National Trust estate in Northumberland, some areas have been subject to complete eradication while in others, foliage is harvested for sale to the floristry trade. Fortnam, "The Rhododendron's Road to Redemption."

27. Edwards, *Practice Guide.*

28. Parrott and MacKenzie, *A Critical Review*, 9.

29. Ibid., 44.

The characterization of rhododendrons as "invasive" contains some telling obfuscations. For example, it implies a rapid movement across new territories. In fact, *R. ponticum* spreads through processes of growth and reproduction that are relatively slow.[30] The plants take between ten and twenty years to produce blossoms and set seeds,[31] which allows a large window of time for the removal of unwanted plants or control of their reproduction. We suggest that, unlike more quickly reproducing species, *R. ponticum* can really only be considered invasive in conjunction with circumstances of neglect. This is clearly true in a historical sense, since the presence of rhododendrons in cultivated and uncultivated landscapes alike is directly related to the fact that many country estates in Scotland were neglected and fell into disrepair after WWII.[32] However, we suggest that it is also true in a normative sense: if, at the moment of planting or self-seeding, the reproduction of these plants could have been controlled through common horticultural practices, they should be seen as neglected or inadequately tended rather than invasive—that they aren't suggests both the need for critical analysis, and the potential to develop alternative approaches to their management.

In general, characterizing rhododendrons as invasive foregrounds their relations to land and landscape, while obscuring the role of their relation to other beings and processes. At the scale of landscape, eradication measures obliterate rather than address the relations that enable invasion (e.g., not only neglect, but also bare soil and the presence of grazing animals).[33] Thus, for example, the only available response to the plants' capabilities for reproduction and adaptation (i.e., their prolific production of wind-born seeds with a high germination rate and their tendency to produce blossoms more quickly after pruning) is to require repeated application of control measures that are only partially successful and often harmful to insect, bird, and other plant life.[34]

All this said, our aim here is less to "fix" perception of the *R. ponticum* problem and more to investigate the ways in which specific perceptual effects—including the relative invisibility of alternatives to eradication—have been produced through different media practices. We contend that this approach may be applied wherever invasion involves plants with social or cultural significance and/or land treated as land*scape*.

Materialist Media Ecologies

In a general sense, *media ecology* refers to the interconnectedness of media forms.[35] The term has seen a variety of uses over the years—most relevant for us are those that

30. *R. ponticum* grows horizontally as well as vertically, especially in low-light conditions. When branches become too heavy and reach the ground, they may root (i.e., layer) and clonally form another plant.

31. Higgins, *Rhododendron ponticum.*

32. Dehnen-Schmutz and Williamson, "Rhododendron ponticum"; Edwards, *Practice Guide.*

33. Seedlings are less likely to establish on densely vegetated ground. At the same time, they are more likely to outcompete other seedlings in the presence of grazing animals (which avoid *R. ponticum*). Cronk and Fuller, *Plant Invaders*, 116–17.

34. Edwards, *Practice Guide*; Higgins, *Rhododendron ponticum*.

35. Heise, "Unnatural Ecologies."

foreground the environmental character of media technologies (i.e., their imperceptible conditioning of social relations and processes of perception).[36] While most media ecologists maintain a distinction between natural and cultural systems, Matthew Fuller and Jussi Parikka do not. In order to foreground the ethicopolitical stakes of this theoretical choice, we begin by briefly situating it in relation to materialist approaches to media studies more generally.

While the field of media studies is often narrowly associated with research on the production and consumption of cultural content, there is a growing body of work focusing on questions about what media *do* as opposed to what they *mean*, and how they practically work, as opposed to what people want from them.[37] This research demonstrates the historical and political rather than teleological nature of technological change. It has also drawn attention to the direct environmental interventions that media make and require, which has led to suggestions that mediation can no longer be viewed as limited to the realm of the human.[38] Some authors go as far as to foreground the heterogeneity of the more-than-human agencies involved in processes of mediation, as a means to theorize their contribution to social and environmental change.

For example, Fuller presents analyses of media technologies whose "active materials" make them unruly contributors to the evolution of forms of expression and associated social relations.[39] Similarly, Sarah Kember and Joanna Zylinska argue that media objects (both works and technologies) emerge from a larger, ongoing process of mediation in which human intentions are always accompanied by nonhuman forces.[40] Most relevant to our interests, Parikka suggests that mediation originates with nonhuman beings. He notes that "plants and animals constitute their being through various modes of transmission and coupling with their environment" and suggests that media can be seen most generally as "a contracting of sensations into a certain field of consistency."[41] For these authors, media practice has an "ethico-aesthetic" potential that implies a participation in something larger than the human projects it feeds, and whose effects *matter*, in the double sense of the word.[42] They all write extensively about media art and experimental media, demonstrating the ways in which open-ended media practices can generate not only new forms of expression but also new values, sensibilities, and social relations. For example, as Parikka writes of artistic engagements with animal modes of communication, media experiments can help us "understand the ontological

36. For example, McLuhan, *Understanding Media.*

37. For a review see Casemajor, "Digital Materialisms."

38. Peters, *The Marvelous Clouds*; Parikka, *A Geology of Media*.

39. He writes specifically about pirate radio, turntablism, hacking, and circuit bending. Fuller, *Media Ecologies*.

40. Kember and Zylinska, *Life after New Media*.

41. Parikka, *Insect Media*, xxi, xiv.

42. The term *ethico-aesthetic* is from, Guattari, *Chaosmosis.*

processuality of the world" while also opening new possibilities for human/nonhuman relations.[43]

In the context of materialist approaches to media studies, the term *media ecology* has both ontological and methodological significance. Ontologically, it assumes that media do not exist independently of their relations to other media and that those relations are inherently *situated*—in conditions that are historically, geographically, and/or socially specific as well as constantly in flux.[44] Methodologically, the commitment to prioritize those relations—over, for example, media objects in isolation, or the practices and experiences of individual users—implies a different way of doing research, since the methods employed must be capable of grappling with situated but open-ended processes.[45] Such methods tend to yield critical as opposed to empirical insights—that is, new ways of seeing, rather than new facts about, media technologies and practices.

In the works we draw on, Fuller and Parikka treat networks of experimental media practice and/or media art as sites where what is otherwise obscured by habits of use and received categories of analysis—that is, the unruly, open-endedness of media as process—can be revealed, and its sociopolitical potential assessed. Although the ontological and the analytical tend to overlap in the work of both authors,[46] the series of analyses presented in Fuller's *Media Ecologies* elaborates a generally replicable approach: that is, he describes how media relations are materially composed and how they *work* in a given setting, which enables him to identify constraints and affordances of specific media and, in turn, the realm of social and political possibilities opened at the site in question. For example, he discusses a project in which a light switch was installed on a streetlight in a residential neighborhood. This turned the streetlight from a taken-for-granted piece of infrastructure into a social problem, for the possibility of turning the light on or off led residents to discover that they had different interpretations of its utility, and had to negotiate its use. Fuller's analysis then shows how this in turn helped to make certain affordances and constraints of the streetlamp more clear (e.g., the creation of a sense of security for those fearful of criminal activities vs. an increased use of electricity and decreased ability to view the night sky), and how this amounted to a politicization of taken-for-granted capacities of perception (since, e.g., it was the wealthier residents who wanted the light to remain on all night long). He then discusses the ways in which centrally controlled lighting systems both mediate and obscure social relations, and how, in general, the repurposing of standardized technologies has an open-ended sociopolitical potential.[47]

43. Parikka, "Media Ecologies."

44. As Kember and Zylinska observe, media ecology implies a spatial orientation to media, which they distinguish from their temporally focused approach. Kember and Zylinska, *Life after New Media*, 12.

45. Parikka, "Media Ecologies."

46. In part because the socially novel processes that occur at the site of experimental media art require theorization as well as critical analysis.

47. Fuller, *Media Ecologies*, 88–93.

Parikka's analyses blend aspects of Fuller's approach with media archaeological methods,[48] in part because it is through the history of media technologies that their intertwinement with nonhuman processes of mediation becomes more clear.[49] He argues that works of media art that engage nonhuman modes of communication and perception can improve our understanding of environmental problems: in the context of environmental crisis, "the animal is not only an object of concern but is itself a surface of registration, storage media, and a signal of the processes concerning pollution and waste."[50] However, in order to fully "hear" what animals (and, we suggest, plants) have to say, we need to develop new ways of listening; this is the potential his analyses seek to excavate from works of more-than-human media art.

It is important to note that, while we endorse the ontological premises of a materialist media-ecological approach in a general sense (i.e., with respect to processes of mediation), the treatment of plants as media is intended as an analytical as opposed to ontological intervention. Particularly in the context of the growing body of research concerned with articulating the specific agency and manifold meanings of plant life,[51] our analysis is partial in what it accounts for with respect to the way plants are and what they do in the world. Thus, though we agree with much of the literature in plant studies (that plants are capable of perception and cognition and sustain a great variety of complex relations with other species)[52] we focus on the way specific kinds of interaction between plants and people (as well as land, cameras, excavators, and chainsaws) produce effects that contribute to the perception of invasiveness as a primarily biological problem. We think this can help us to see the problem of invasiveness differently—in a manner that prepares the way for more open-ended engagements with invasive plants, while directly addressing the relations and conditions that have enabled their proliferation.

How Our Analysis Works

In the case of the landscape at Kilmahew, where mediating practices have changed over time, a historically broad range of things and processes are influential in its media ecological functioning. Though we cannot identify all of these here, we track particular visual relations to land across different historical periods and domains of practice to see their effects and how they have been produced and reproduced. This makes our analysis materialist in a manner that is cultural-historical and semiopragmatic as well as

48. Most generally, the material study of old media technologies. As Parikka notes, media ecology and media archaeology are both concerned with the *transversal* potential of media, whether in the form of inhuman technologies capable of transmitting effects across different historical periods, or in the crossing of boundaries between human and nonhuman worlds. Parikka, "Media Ecologies."

49. Parikka, *Insect Media*.

50. Parikka, "Insects and Canaries."

51. The scope and stakes of this literature is well summarized in the introduction to a recent anthology. See Vieira, Gagliano, and Ryan, "Introduction."

52. To support these claims, plant studies scholars read research in the plant sciences through the lens of larger philosophical questions. See, for example, Marder, "Plant Intentionality."

media-ecological, for the visual practices, dispositions, and events we consider had the effects they did because they were received and reproduced as meaningful.

In this sense we are guided by N. Katherine Hayles's interpretation of the concept of intermediation, whereby "a first-level emergent pattern is captured in another medium, and re-presented with the primitives of the new medium."[53] Furthermore, her observation that analogue (i.e., biological) and digital processes increasingly function in "dynamic heterarchies" within which "different levels continuously in-form and mutually determine each other"[54] is a helpful way to think about how media ecologies of rhododendrons in western Scotland are implicated in other, differently composed ecologies. We explore in particular the way specific patterns of growth and movement are taken up and reproduced in the mediating practices of gardening, in turn reproduced in the form of concepts and percepts propagated through garden literature. From this perspective, a designed landscape "invaded" by rhododendrons is the site not of a single event (i.e., the introduction of an alien species with excessive tendencies) but an ongoing intermediation of mutually influential systems of meaning and matter.

In summary, we propose to treat what seems like a biological—or at best a socioculturally enabled biological problem (invaded landscapes)—not as a work of art exactly, but as a more-than-human material-cultural *production*. We propose that the unruliness of media may be revealed, not only in artistic experiments, but also in an accidental manner, wherever processes of mediation go awry. At the points where different media cannot be adapted to one another, the specific affordances and practices associated with those media become visible, and the relations they imply become available for critical analysis and creative intervention. In our case, a photographic failure, which originally seemed due to the rhododendrons at Kilmahew, provides the occasion to analyze cameras and rhododendrons alike as "photomedia."

Before entering into this analysis, we expand on the concept of photomedia. We then describe the failed project of photographic documentation that inspired it, and present the preliminary analysis of media relations it enabled. Our more fulsome analysis tracks the cultural-historical trajectories of some of the visual effects, practices, and technologies caught up in the light-based media ecology this analysis implies, asking how specific effects are produced, and what relations between people, plants, and land enable or underlie them. We finish by suggesting that similar relations recur across a variety of invaded landscapes, and that the alternative mode of response our analysis facilitates is applicable to other sites.

Cameras and Rhododendrons as Photomedia

In her pioneering work on the history of container technologies, Zoë Sofia suggests that the most general function of media such as vinyl records and photographs is continuous

53. Hayles, "Intermediation," 100.
54. Ibid., 101.

with that of shipping containers and archives: they all store something of value.[55] Similarly, J. D. Peters defines media as a continuum that includes plants and animals as well as technologies, characterizing plants as "the first storage media" since photosynthesis uses sunlight to transform water and carbon dioxide into energy stored as carbohydrates (made visible in the form of foliage and flowers).[56] The camera functions in a similar manner: by exposing light-sensitive surfaces to the world, it produces images capable of storing a variety of sociocultural goods (e.g., visual and spatial information, memories, aesthetic value).[57] However, as Sean Cubitt puts it, "photography is not, *as apparatus*, interested in the semantics of the objects it depicts. . . . Photography does not intrinsically deal in meanings, only in quantities, wavelengths, and the management of light."[58] Similar to the way flowering plants gain their social and cultural significance via their incorporation in gardens and designed landscapes, photographs are only meaningful to the extent that they are embedded in a history of photographic practices and discourse.

Conceptualizing both plants and cameras as photomedia is meant to emphasize not only a shared dependency on light, but also their involvement in analogous processes of transduction resulting in the production of something new. Just as leaves are packed with organelles (chloroplasts) that use light to produce sugars from carbon dioxide and water, the camera's sensor is packed with light-sensitive silicon diodes, each producing a pixel in the resulting image. Despite what is implied by the etymology of the word "photo*graphy*," these processes of transformation are responsive rather than inscriptive: both photographic sensors and chloroplasts have particular operating ranges, requiring neither too little nor too much light in order to thrive. They each generate visual effects by responding to its changing availability.

55. Sofia, "Container Technologies."

56. Peters, *The Marvelous Clouds*, 149. Of course, just as "storage" does not exhaust the potential uses and value of vinyl records and shipping containers, the fullness of vegetal being is in no way captured by this characterization. The point in both cases is to use a functional abstraction to see their effects differently.

57. Greg Uhlin draws similar analogies between plants and (cinematic) film, noting that the material base of celluloid film is vegetal in origin: "The organic roots of film stock link it, both literally and metaphorically, with the plant stalk, as the rigid yet flexible base that allows each to reach out to the light." Uhlin, "Plant Thinking with Film," 203.

58. Cubitt, *The Practice of Light*, 94–95, emphasis added. Some will object that the participation of a photographer distinguishes the functioning of camera and plant. However, this is less and less the case. On the one hand, increasing automation in the production of photographs has dramatically decreased the role of human skill and intention, culminating in a variety of nonhuman photographies, at the same time that the algorithmic circulation of images in social media automates aspects of their consumption (see Zylinska, *Nonhuman Photography*; and Rubenstein and Sluis, "A Life More Photographic"). On the other hand, there are few remaining environments where the composition of plant communities is not significantly influenced by human intervention. More importantly, while there are differences in the kind of intentionality that can be attributed to plants and cameras, this is precisely what is bracketed in a materialist analysis, the point of which is to show how things like landscape photography and invasiveness are *collectively* produced and sustained, regardless of personal intentions.

That said, there are some important differences in the way plants and cameras mediate light. For example, while the camera requires a relatively precise balance of light to render a clear and detailed photograph, *R. ponticum* will tolerate a wide range of situations, generally seeking to maximize access to light.[59] At the same time, plants and cameras have different capacities with respect to movement, which shapes their strategies for accessing light, and their relations to land and other plants. Most notably, the camera incorporates within itself light-modulating capacities (aperture, shutter speed, and sensor gain) that minimize its need to change locations, whereas rhododendrons are constantly changing their positioning and direction of growth in order to access light. As we discuss below, it is in part the visual relations established by the resulting forms and patterns of growth that made rhododendrons desirable additions to nineteenth-century wooded landscapes.

At Kilmahew in the present day, the meeting of cameras and rhododendrons points to a conflicted light-based media ecology that seemed to call for the intervention of excavators and chainsaws to restore balance. However, as we argue in the following two sections, the conflict is due less to the inherent or immutable functioning of either element, and more to the practices of landscape that accompany them and shape their effects. In this light, the specific techniques of the removal can be shown to continue rather than interrupt a central perceptual condition of invasion.

A Photographic Failure

Our involvement with *R. ponticum* at Kilmahew began with efforts to photograph areas of the site dominated by the plants. We were interested in the visual impact the removal would have on the landscape and thought that "before" and "after" photographs could be of historical value. In discussion with the landscape architect working with NVA, we selected viewpoints where the removal would produce substantially altered views of the woodland. We employed a full-frame, digital SLR camera to gather high-resolution images, with a wide-angle lens (20mm) to show the plant's lateral spread.[60] A tripod and shutter delay were used to avoid motion blur from camera shake. Despite this carefully chosen setup, on-site we soon encountered problems. The contrast between light sky and dark vegetation was so great that correct exposure proved difficult and in many cases impossible to achieve.

Exposure is the extent to which the film or electronic sensor inside the camera is exposed to light entering the lens, determined by a combination of film speed or sensor gain (ISO), shutter speed, and lens aperture. If too much light is let in, lighter areas of the photo will lack detail, with blocks of undifferentiated flat white. Too little light and

59. Of course, like all plants, rhododendrons are also sensitive to a wide range of other environmental factors.

60. ISO was set to 200 to capture fine detail, aperture to f/8 for a relatively deep depth of field, and shutter speeds varied to give correct exposure at these settings, generally 1/10th to 1/30th of a second.

Figure 1. The vegetation in this photo is correctly exposed, but the sky is severely overexposed.

the darker parts of the photo become blocked up, with solid black swamping the shadows. "Correct" exposure becomes tricky when the range of intensities of light is greater than the range of intensities the camera can encode in a single exposure. At Kilmahew, when we set exposure so that the details of the *R. ponticum* showed up clearly, the skies were overexposed (see fig. 1); adjusting the exposure to fit the skies left the *R. ponticum* underexposed (see fig. 2). Some shots had both overexposed skies and underexposed vegetation. In short, the camera was unable to adequately register the variations in light at Kilmahew.

While this is a common problem in landscape photography, and there are a number of technical fixes, we are interested here in the constraints it makes visible. In this case, it was the failure of the camera in relation to the shade cast by rhododendrons that led us to recognize its fundamentally responsive, as opposed to inscriptive, relation to light. At the same time, there was a resonance between this failure and the difficulties experienced by those plants that struggle to survive in the shade of rhododendrons. In its production of over- and underexposed images, the camera pictured Kilmahew as a landscape darkened by rhododendrons. This view accords with their characterization as aggressive invaders; it is also perfectly answered by the excavator, mulcher, and chainsaw, which were supposed to bring light back to the landscape, return the land to other plant species, and restore its historic, photo-worthy views.

However, the perfect circularity of these relations gave us pause, for we knew that the history of the camera is thoroughly intertwined with that of landscape. The concept

Figure 2. In this photo the highlights are no longer blown out, and detail on the protruding tree branches has been retained, but the rest of the shot is severely underexposed, with many of the rhododendrons invisible in the shadows.

of landscape and its associated "way of seeing" first appeared in sixteenth century drawings and paintings used to survey land and interpret it from an aristocratic point of view—that is, from a distance, as a possession or aesthetic composition in which the physical tending of the land was either invisible or romanticized.[61] The subsequent rise in popularity of landscape gardening, writing, and tourism in the eighteenth and nineteenth centuries taught a much wider range of people to *look for* something in land, while the increasing accessibility of photography toward the end of the nineteenth century further entrenched a landscape "way of seeing" by taking it for granted as a starting point. As Douglas Nickel writes, "Photography was born into a pre-existing, albeit incipient, notion of the photographic, one based on conceiving of the world as already containing an infinite number of latent pictorial compositions awaiting discovery."[62] It is therefore not insignificant that "landscape" (as opposed to "portrait") is the default orientation in 35mm photography and its digital derivatives.[63] As an increasingly pervasive sociocultural practice that frequently turns land into an aesthetically pleasing backdrop (in calendars, greeting cards, and social media images), photography continues to

61. Cosgrove, "Prospect, Perspective"; Nickel, "Photography, Perception, Landscape."
62. Nickel, "Photography, Perception, Landscape," 22.
63. Giblett, "Preface, Part One."

naturalize an aestheticized relation to land. Seeing land from a distance, in terms of aesthetic properties taken as natural, has thus become an embodied perceptual disposition whose influence can only be detected through concerted effort.

From this perspective, it is clear that at Kilmahew, an estate designed to provide both horticulturally rich woodland spaces and scenic views of the surrounding countryside, the camera and the landscape colluded to make it difficult to see rhododendrons as something other than barriers to light. Approaching the task of documentation from the perspective of landscape change, we took for granted that our photographs must include a skyline. However, had we been photographing only rhododendrons, or only the skyline, we would not have had such a significant exposure problem; it was the requirement to include both that presented a variation in light too extreme for the camera to accommodate. The failure of the camera must therefore be seen as due not only to the shading effects of the rhododendrons and the material limits of the camera's sensor chip, but also the conventions of landscape photography.

When we looked more closely at the murky shadows we thought had been cast by rhododendrons alone, we discovered other highly absorptive, evergreen plant species (such as bay laurel). We began to wonder if understanding the rhododendron problem was similarly oversimplified by the historically specific conditions of their perception. Might a consideration of how their visual effects were materially and culturally produced help us to see their invasiveness differently? Toward this end, we turn now to discussion of how *R. ponticum*'s strategies for maximizing access to light were enrolled in nineteenth-century practices of woodland gardening.

Wild Gardening and the Cultivation of Invaded Landscapes

Most elements of the designed landscape at Kilmahew were created after its purchase in the 1850s by a retired ship owner named James Burns. In the years of his and his son's improvement of the estate, rhododendrons were widely employed in British practices of "woodland embellishment." These included massing for "landscape colour," "underwood planting," and displays of rare specimens. *R. ponticum* was also used as rootstock for more tender varieties.[64] While all of these uses contributed to the proliferation of *R. ponticum* in western Scotland, we focus on underwood planting because it foregrounds their responsiveness to light, and their displacement of other woodland species. This involved the broad distribution of *R. ponticum* in tree plantations and woodlands, where it was valued for the color, texture, and fullness it brought to the understory, and/or its provision of game cover. Through underwood planting, *R. ponticum*'s visual effects became thoroughly intertwined with its metabolic and reproductive processes: it

64. Elliott, "Rhododendrons in British Gardens." At Kilmahew, *R. ponticum* lined a section of the main drive and one of the woodland walks (where the interlacing branches formed a tunnel). Now that they have been removed it is hard to say with certainty where else they were planted originally, though their distribution was suggestive of a widespread use.

was made to grow and permitted to reproduce precisely where the visual effects of those processes were desired and appreciated. As the head gardener at Dropmore estate in England enthused about it in 1841, "When in bloom nothing can surpass the beauty of Rhododendrons in woods; last year the woods here were quite enchanting with them."[65]

The broader aesthetic and cultural value of these visual effects were articulated in William Robinson's *The Wild Garden* (first published in 1870).[66] While the book does not discuss *R. ponticum* in particular,[67] its central aesthetic device—that of the "plant picture"—served to aestheticize and naturalize the intertwinement of the biological and the visual in other plants like it (i.e., hardy exotics capable of self-reproduction). In the practices of underwood planting it describes, processes of vegetal growth and reproduction were re-presented in terms of their visual effects. Viewing this intermediating practice from the perspective of light relations, the invasiveness of *R. ponticum* can be seen as continuous with specific visual effects and the socioeconomic relations their production presumed.

Practically speaking, the concept of the wild garden referred to the cultivation of naturalized groupings of hardy exotic species so as to produce aesthetically pleasing "plant pictures" in settings beyond the traditional flower garden. These pictures featured plants growing together in unexpected but naturalistic formations, "relieving each other in delightful ways."[68] Ideally, the plants were "surrounded by some degree of graceful wild spray—the green above, and the moss or grass around," thus filling in otherwise "empty" or underappreciated spaces, those otherwise "devoted to rank grass and weeds."[69] Robinson privileged those plants that could be counted on to self-seed and "take care of themselves" (i.e., to naturalize) and in the process create novel relations with existing constituents of wood and meadow.[70] Though it happened on a scale imperceptible to human eyes, such plants created the visual effects valued by Robinson in part as a result of their mobility. Through expansive growth, and through reproduction—wherein layered shrubs or new seedlings appeared at a distance from the parent plant—these plants caused the boundaries around and within given groupings to shift. The wild garden thus required care, not of individual plants, but their specific capacities for movement. The unpredictability and mutability of the results was portrayed as a source of aesthetic pleasure.

65. Quoted in Elliott, "Rhododendrons in British Gardens," 163.

66. While the concept of the wild garden was new, many of the practices described by Robinson were already well established within the tradition of woodland embellishment. Elliott, "Rhododendrons in British Gardens."

67. This is perhaps due to the fact that *R. ponticum* was so common by this time that it no longer warranted specific mention. Several authors have noted the book's contribution to *R. ponticum*'s proliferation. See, for example, Drower, *Garden Heroes and Villains*; and Rotherham, "Times They Are a-Changin'."

68. Robinson, *The Wild Garden*, 7.

69. Ibid., 4.

70. "The best plants are those that give bold effects and are very hard to kill." Ibid., 79.

However, as much as Robinson wished to attribute the beauty of plant pictures to plants "in a free state"[71]—that beauty also depended on careful management of the relations between plants. For example, the plants had to be positioned so that each would be visible in relation to the others. At the same time, to enable the aesthetically pleasing evolution of a given composition through self-reproduction, an adequate availability of light was required—something that changed over time as larger shrubs and trees matured or died.[72] Wild gardening thus required a close observation of the results obtained from planting in a given location, as well as periodic interventions in response to changing conditions. Managed correctly, self-reproducing exotic plants invented forms and arrangements that filled or overflowed formerly unnoticed or utilitarian spaces in a visually pleasing manner.

In the case of *R. ponticum*, sensitivity to light is a central factor shaping the direction and character of plant movements. Rhododendrons have several light-maximizing strategies that involve movement across space or changes in positioning. For example, the spiral positioning of leaves and branches not only minimizes self-shading,[73] but also provides structural support for growth in search of light. In shaded woodlands with damp soil, rhododendrons can grow very long branches that extend horizontally, either intertwining with other branches, or, where they touch the ground, growing roots and creating a new (clonal) plant. Some varieties, such as *R. ponticum*, also demonstrate extensive leaf plasticity, acclimatizing to shady conditions by changing the quantity, composition, and positioning of their leaves to maximize access to light.[74] Thus, in addition to processes of self-seeding—which also follow the light—intertwining branches and carefully positioned leaves permit the gradual spreading of the plant and its bright purple blossoms across openings in its vicinity, enabling a slow, colorful, and increasingly tangled dance toward the light. On Scottish country estates in the mid- to late nineteenth century, these strategies gave *R. ponticum* a particular media-ecological affordance: that is, for filling in visually empty spaces and, in contrast, making unembellished woodlands appear less beautiful.

Given the ways in which practices such as underwood planting would change the distribution of light across a given space, one of the most significant—though clearly underappreciated—differences between "wild" and conventional gardens was the transitory nature of the former. Wild gardening effectively extended the design process indefinitely into the future, requiring the gardener to pay attention to the progress of naturalizing and maturing plants, making adjustments to a given composition over the years. However, Robinson repeatedly downplayed the work involved. He also did not acknowledge the substantial social and economic resources implied in the continuation of such undertakings, frequently making reference to the men who worked on his

71. Ibid., 4.

72. A soil conducive to these processes would also have been required.

73. Cullen, *Hardy Rhododendron Species.*

74. Esen, Nilsen, and Yildiz, "Ecology, Competitive Advantages," 411.

estate and casually observing the importance of maintaining a nursery of suitable plants, but in no way acknowledging the substantial cost of doing these things. The wild garden thus required a stability of socioeconomic relations that were all but invisible—supporting not only the ownership of land but also the work of cultivating it over time.

As it turned out, in Scotland these relations could not be sustained beyond the early twentieth century. Today, an astonishing proportion of rural land in Scotland is owned by a relatively small number of families.[75] Much of it is untended, and the grounds of many estates have been neglected since WWII. Meanwhile, in partnership with the wind and rain and open soil, *R. ponticum* has continued to grow in the manner once desired of it: slowly but surely filling in the spaces that surround it, inventing new vegetal forms as it goes. In some locations, where rhododendrons have spread from cultivated into more pristine spaces, their movement gives the impression of an invasion. In others, such as Kilmahew, it is easier to see that it is less that *R. ponticum* has invaded the woodlands it now dominates and more that it has been neglected there.

While we are not the first to note the extent of human complicity in the production of *R. ponticum*'s invasiveness,[76] we propose that viewing it from a media-ecological perspective enables more than a cautionary tale—it shows us the specific ways in which our complicity continues in the present. As we noted at the outset, within a media ecology, the production of particular effects—the movement of plants across open space, for example, or the generation of a particular kind of image—are always in part *for others*. In the case of media such as cameras, the effects they produce and the relations they sustain are cared for in part through technical fixes—for example, in the form of editing software or graduated filters that correct for the excesses of highly contrasting subjects and thus enable the continued propagation of landscape aesthetics. There have been no such "fixes" for *R. ponticum*; there has been no attempt to accommodate the excesses their visual effects entail.[77] If we now seek to violently extract them, this is more a diagnosis of the problem than a solution to it, for it signals a refusal to address the problematic relations in which rhododendrons are entangled. As a remedy, we need to ask, why are these relations—these failures of tending and care—not being questioned? What sustains the perception of rhododendrons as dangerous invaders, thus prioritizing simplistic and destructive responses and obscuring other possibilities?

The Excesses of Eradication

For the most part, the rhododendrons at Kilmahew were not physically removed from the site but were instead mulched or burned. As the foreman explained, "It is possible

75. As of 2014, 50 percent of rural land in Scotland was owned by 432 families, or .008 percent of the population. Elliot et al., *The Land of Scotland*, 159.

76. Dehnen-Schmultz and Williamson, "Rhododendron ponticum"; Rotherham, "Times They Are a-Changin'."

77. Interestingly, Robinson advocated the pruning of rhododendrons. However, this and other practices of tending are absent from the guides to rhododendron control discussed above.

to leave the cut Rhododendron to rot down naturally but if you do this it is very difficult to keep track of which bits you have cut and very difficult to walk back through the site later. . . . Mulching is the cheapest and most efficient [method of disposal] on the flatter ground."[78] Much of the surrounding undergrowth and many trees received the same treatment, leaving behind a homogeneous layer of woody debris and removing visual traces of the woodland's former complexity.

The visual comprehensiveness of the removal process thus not only returned light to the landscape, but also helped to constitute two forms of invisibility in relation to the rhododendron's role within it. First, for those who had experienced the density of the woodland before the removal, the felling and mulching of undergrowth and other tree species made it seem as if that density was due entirely to rhododendrons (which was by no means everywhere the case). Second, the mulching erased traces of the histories in which the rhododendrons were implicated—most importantly for us, that of their original distribution and their neglect. After the removal, the impetus and the means for untangling such questions was lost. In these senses, the removal provided a kind of visual confirmation of that conception of the problem it purported to resolve, reinscribing the illusion that the darkness was due solely to rhododendrons.

The use of excavators and forestry mulchers thus constitutes a practice of landscape that mediates perception in ways complementary to Robinson's "plant pictures" and landscape photography: in all these interventions, the work of *producing* landscape is obscured. In fact, in this sense the mulching of uprooted rhododendrons is a mediatic event par excellence, since it confirms that not only has the *land* been shaped by diverse machinic, horticultural, and vegetal labors but so has *what we see* of it. This reminds us that the way of seeing enshrined in landscape photography only becomes embodied in habit as the result of repeated practices of engagement with the world, and that the vegetal forms created by light-seeking movements of rhododendrons trace multiple absences—not just of other plant species, but also the humans who once accompanied them. Thus, while the removal seemed at first to resolve the conflict between cameras and rhododendrons, it in fact reinscribes the common logic of the practices that gave rise to that conflict in the first place.

In this context, perhaps it is not surprising that the results of the removal should be undermined by the underlying conditions it both failed to address and actively obscured, for the woods at Kilmahew are situated next to a golf course within which a considerable number of *R. ponticum* are growing—often right up to the fence line where the removal ended. Thus, even if there are no new seedlings or regrowth from stumps on-site, the woodland will still play host to thousands of seeds from the golf course every year. Because the funding from the Forestry Commission only covered three years of follow-up spraying, and because NVA announced it would be closing and

78. Graham Newport, e-mail communication, November 21, 2014.

ending its involvement at Kilmahew in 2018, the work needed for managing the problem in the long term remains unaddressed.[79]

This situation is not as unique as it might seem. The failure to see, and tendency to undervalue, the work of producing landscape is a condition of invasiveness in a variety of settings. For example, because we take them for granted as necessary, and consider them to detract from landscape views, we often don't really see roadways, railways, and power lines—but these interventions structure landscapes in powerful ways, and often serve as staging grounds for invasive species (due to their provision of disturbed, untended soil). At the same time, the privileging of a landscape "way of seeing" (i.e., from a distance), via tourism, nationalist discourse, and certain environmentalist traditions, helps to obscure vegetative change in its earlier stages, when gentler modes of intervention, such as weeding and pruning, might suffice.

However, while the concept of landscape points to a series of highly problematic perceptual dispositions toward land, its history also reminds us of the possibility for seeing otherwise—by consciously re-mediating our relation to land through the strategic use of media technologies and practices. For example, if, as observed above, the use of landscape photography to document changes in the woodland reinforced the perception that it was (simply) darkened by rhododendrons, might using different visual media, or different media practices, help to challenge or complicate that perception? We turn now to an example of how a more deliberate approach to visual mediation can provide a starting point for more site-specific and experimental approaches to invasive species management.

Alternative Modes of Visual Mediation

When NVA began discussing its vision with the local community, concerns were expressed that intensive removal of *R. ponticum* would damage other species in the woodland. Alan Grey, a vocal critic of this approach, volunteered to undertake a comprehensive survey of plant life at Kilmahew. This involved practices of looking that were markedly different from our photographic documentation. As Grey wrote in an explanatory text accompanying the survey, he sought to document "not just what you can see when walking around the woodland estate, but what is behind and below the tangled layers of vegetation."[80] This was a work of physical and visual searching, close examination, comparison, and the noting of small differences.

The survey lists 186 species (not including rhododendrons), with notes regarding distribution, time of blooming, ethnobotanic uses, and cultural significance. As a tool of spatial, visual, and practical differentiation, it attests not only to the unevenness of

79. After it failed to raise sufficient funds to realize its vision for the seminary *and* lost its core funding from Creative Scotland, NVA decided to withdraw from its involvement at Kilmahew. The latter turn of events also led to the organization's decision to close in September 2018. See Carrell, "Scottish arts firm."

80. Grey, "Cover Letter for Inventory," 1.

R. ponticum's distribution prior to the removal, but also the surprising diversity of undergrowth in certain areas and the persistence of a variety of other shrubs and trees alongside rhododendrons. Grey hoped it would provide both the impetus and the information required to protect the considerable vegetal heritage of the woodland. Though he half wished the woods could be left in their wild state, with all their "undisturbed . . . little known sanctuaries," he also recognized the need to stop the continued spread of *R. ponticum*: "It is important, however, that this be done without losing the diverse flora and fauna in this unique natural environment."[81] Looking closely at the land, he saw a multitude of beings, qualities, and processes worth protecting.

While the brutal efficiency of the removal ensured that Grey was only modestly successful in this regard, his work provides an example of visual practices enabling the perception of a fine-grained diversity in the landscape, as opposed to scenic views and/or a generalized darkness (as our photographic survey revealed). On the basis of Grey's painstaking work, and with the help of rhododendron experts brought in by NVA to identify non-*ponticum* species, volunteers flagged 121 noninvasive rhododendrons for protection.[82] In different circumstances, the survey could also have provided guidance for a mixed approach to management, with wholesale removal in some areas and pruning, thinning, and deadheading in others.

It could also have guided more experimental interventions to increase the density and resilience of undergrowth in select areas, so that rhododendron seedlings could not so easily establish themselves.[83] Undertaken with a humility appropriate to the history of woodland gardening at Kilmahew, but in a creative spirit, such interventions might help to evolve new, more open-ended ways of engaging with plants and land. Particularly if practices of tending begin and end with practices of *attending*, such as those demonstrated by Grey, they may have the potential to mediate changes in human-plant relations, turning a site of human-dominated management into a place of experimental cultivation and cohabitation.[84] In this context, the work of producing landscape might be made both more visible and more inclusive, making it possible to recognize, value, and engage the labor of plants (and insects, animals, microbacteria, etc.), as well as people.[85]

That said, the beautiful, emotionally charged descriptions peppering Grey's explanatory text attest to the fact that the survey was a labor of love; in the long run,

81. Ibid., 5.

82. Sadly, not all these plants were successfully protected, as many of the flags went missing or became concealed before the removal began.

83. Bare soil is a decisive factor in establishment of *R. ponticum* seedlings. Cronk and Fuller, *Plant Invaders*.

84. We point here toward practices informed by philosophies of "ontological pluralism": that is, those that strive to recognize the existence of not only multiple perspectives but multiple *worlds*. Stanescu, "Alien Ecology." Artistic practices involving the tending of plants provide some suggestive starting points for how such experiments might proceed. For example, see Marder, "The Place of Plants"; and Read, "The English Garden Effect."

85. Hamilton, "Labour."

the exceptional nature of his commitment points to a complex of organizational and cultural problems. How do we find and motivate enough people to sustain the work of re-mediation over time? Who will make decisions about what to do, when? More difficult than finding starting points for alternative approaches to invasive plant management is the development and care of the relations—both human and nonhuman—required to carry them out.

Conclusion

Our main objective in interpreting invasive rhododendrons as photomedia has been to render the future of the landscapes they occupy more open-ended. By deconstructing how certain visual effects associated with invasion are produced, we see both that it was not inevitable and that it is not reversible. In this context, materialist media ecology provides us with an ethico-aesthetic orientation to the future, showing us how plants such as *R. ponticum* are emblematic of a broader imperative to reinvent our relations to plants, land, and one another.

To a certain extent, this is to commend existing research on "adaptive comanagement" approaches to invasive species. But it is also to suggest that such work could be more radical in the way its questions are formulated. We need to practice not only "experimental pluralism" but also *ontological* pluralism.[86] This is because the process of making research and decision making participatory and open-ended holds the potential to produce new social forms and practices that may have benefits beyond the problems at a particular site. Specifically, a pluralistic approach may contribute some of the practical and social building blocks for reinventing relations to land more generally. Further, given that dysfunctional relations between people, plants, and land tend to be deeply entrenched in taken-for-granted socioeconomic structures, the work of making time and space for those processes is itself of value in a more political and cultural sense.[87]

In the case of *R. ponticum*, it is not only through practices of gardening and neglect but also through a reliance on capitalist modes of land tenure—wherein a small number of people shape the land to their purposes and are only marginally accountable for the outcome—that it is not only possible, but *normal* to create landscapes that exceed future resources to care for them. So normal is it, that at sites such as Kilmahew, the solution to invasive species often re-creates the conditions of the problem in the first place, leaving behind acres of disturbed soil and no one to tend it. From this perspective, what invasive plant species call for above all else is a way of relating to land that acknowledges the labor implied in what we want to see. Even in those situations where what

86. Experimental pluralism is an approach to invasive species management based on participatory, site-specific scientific study. As a philosophy, ontological pluralism implies a different form of experimentation and a more inclusive sense of participation. Evans, Wilkie, and Burkhardt, "Adaptive Comanagement"; Stanescu, "Alien Ecology." We thank one of the reviewers for pointing out this connection.

87. Plummer and Armitage, "Crossing Boundaries, Crossing Scales."

we want is "simply" more biodiversity or other indicators of ecological well-being, after centuries of global horticultural traffic, this implies a substantial work of *ongoing* cultivation and care. If it is too expensive or time-consuming to accomplish that work through traditional labor relations, then it is time to invent new ones.

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