‘the languo of flows’: Ecosystem Services, Cultural Value, and the Nuclear Legacy in the Irish Sea

John Brannigan, Frances Ryfield, Tasman Crowe, David Cabana Permuy
University College Dublin

Abstract

‘Flow’ is a key concept in our era of liquid modernity, across a broad range of ecological, economic, and cultural discourses. In this essay, we examine the material flows integral to naturecultures through the specific case study of Seascale on the Cumbria coast in the UK. Through an analysis of cultural representations, we show the construction of Seascale as a seaside resort in the 19th and early 20th centuries, and the rapid and irrevocable sinking of its cultural value since the commissioning of the nuclear power and reprocessing plant at Sellafield in 1947. By following the ‘flows’ of pleasure, emotion, energy and waste through Seascale, we explore the legacies of nuclear contamination for coastal communities, and the limitations of dominant models of environmental stewardship. This essay emerges from a transdisciplinary research project to investigate the cultural influences and impacts of ecosystem change in coastal environments around the Irish Sea. A collaboration between environmental humanities and ecological sciences, the project sought a materialist intervention in the conceptualisation and practice of ecosystem assessment so as to capture and map a more inclusive and multidirectional sense of the flows which are integral to ecosystems. In contrast to the ways in which flow metaphors have been employed in contemporary economic and environmental discourse, the project attempts to analyse the material flows integral to naturecultures through particular places, perspectives, and agencies.

In her essay on ‘The “Mechanics” of Fluids’, Luce Irigaray poses a question to science about its ‘*historical lag in elaborating a “theory” of fluids*’, noting that in fluidity we have ‘a *physical reality* that continues to resist adequate symbolization and/or that signifies the powerlessness of logic to incorporate in its writing all the characteristic features of nature’.[1] The failure to attend historically to theorising fluidity is linked for Irigaray to its disruptive, unstable, and aporetic properties, the specific dynamics of fluid states as ‘continuous, compressible, dilatable, viscous, conductible, diffusible … unending’.[2] Irigaray makes this argument, of course, in the service of a critical understanding of gendered subjectivity, and one that is situated within a broader philosophy of the natural world, in which the movement of sexual difference ‘resembles that of the heart, of the circulation of blood’, and is a movement which ‘is true of the entire universe, but can already be seen in the sap of the plant world, in the behaviour of animals, just as in the movement of the sea, in the alternating of the seasons, in the respective intensities of the light and of the heat of the sun, in the cycles of humidity and

[1] Luce Irigaray, *This Sex Which Is Not One*. Trans. Catherine Porter with Carolyn Burke. Ithaca: Cornell University Press, 1985, 106-7.
[2] Ibid., 111.

dryness, of the winds, of cyclones'.[3] The theorisation of flows, for Irigaray, is driven by an environmental ethics, which is itself founded upon a conception of the natural world which corresponds to perceptual and subjective experience as much as empirical and scientific reality, or what we might call, to follow Felix Guattari, mental ecologies as well as environmental ecologies.[4]

For this, as Irigaray knows, we must understand what James Joyce called in *Finnegans Wake* 'the languo of flows', as well as their mechanics, the currency, circulation, and changeability of language and culture, and so too of ecology and economy.[5] The etymology of 'flow' itself is thoroughly fluid, the word in English deriving from Old English, *flówan*, with shared roots in Old Norse, *flóa*, Dutch, *vloeijen*, and Low German, *flojen*, and traceable to Germanic, *flô-*, and pre-Germanic, *plō-*, for the verb to swim or float, and hence to Latin, *plōrāre*, and Sanskrit, *plu*. The OED notes, perhaps rather guardedly, that 'The sense-development of the verb in English shows traces of influence from the like-sounding but etymologically unconnected Latin *fluĕre*, of which it is the usual translation.' Hence, the flow of language becomes fluency, and demonstrates in doing so that language itself is in flow, as Derrida showed in his revision of Saussure's spatially-chained model of language. Indeed, the movement of time and in time is more essential to our theorisation of fluidity than its spatial dimensions, and this is why Zygmunt Bauman considers fluidity and liquidity to be 'fitting metaphors when we wish to grasp the nature of the present, in many ways *novel*, phase in the history of modernity'.[6] Bauman is quick to acknowledge in his book on *Liquid Modernity* that modernity has always been about fluidity, about melting the solids, and generating flows – of capital, labour, goods, language, culture – but usually only with the ambition to solidify again into something more permanent, more trustworthy. Yet, in our latest phase of modernity, fluidity is as much the desired outcome as it is the condition of power: 'For power to be free to flow', writes Bauman, 'the world must be free of fences, barriers, fortified borders and checkpoints. Any dense and tight network of social bonds, and particularly a territorially rooted tight network, is an obstacle to be cleared out of the way'.[7] In the course of these metaphorical flows, as Stuart Alexander Rockefeller has argued, the material interactions of people, places, and things are often forgotten, 'swept up into what seems like a crystal-clear invocation of dynamism'.[8]

The watery metaphors of this 'liquid modernity' – with its currencies, flows of cash and capital, circulations of wealth, 'flooding the market', pools of resources, and investment streams – are abstractions with very potent ideological significance, which go almost unnoticed in contemporary political discourse because, as Janine MacLeod argues, capital has 'to some degree usurped water's place in the dominant cultural imaginary as an unquestionable and irrefutable source of life'.[9] In psychology and educational theory, 'flow' has been conceptualized as the 'optimal experience' of 'achieving happiness through control

[3] Luce Irigaray, *Democracy Begins Between Two*. Trans. Kirsteen Anderson. New York: Routledge, 2001, 111-12.

[4] Félix Guattari, *The Three Ecologies*. Trans. Ian Pindar and Paul Sutton. London: Bloomsbury, 2014.

[5] James Joyce, *Finnegans Wake*. Oxford: Oxford World's Classics, 2012, 621.

[6] Zygmunt Bauman, *Liquid Modernity*. Cambridge: Polity Press, 2000, 2.

[7] Ibid., 14.

[8] Stuart Alexander Rockefeller, 'Flow', *Current Anthropology*, 52.4 (August 2011), 568.

[9] Janine MacLeod, 'Water and the Material Imagination: Reading the Sea of Memory against the Flows of Capital', *Thinking with Water*, ed. Cecilia Chen, Janine MacLeod, and Astrida Neimanis. Montreal: McGill-Queen's University Press, 2013, 43.

of one's inner life' through activities which balance challenge with ability.[10] Such figurative language of flows has also seeped into environmental discourse, and is particularly evident in the dominant model for assessing and managing ecology, the ecosystem services framework. The most influential conceptual model of ecosystem services, developed by Haines-Young and Potschin, is known as the 'cascade model', and it figures as a series of flows the 'contribution' which nature makes to human well-being (ranging from basic necessities such as food, water, and clean air, to recreational and aesthetic pleasure).[11] Developed as a conceptual framework by ecologists to educate policy-makers about the dependencies between biodiversity and socio-economic systems, 'ecosystem services' has always been controversial for its adoption of an economic terminology of 'natural capital', 'services' and 'benefits' which, while strategically useful for environmental lobbyists in translating biodiversity loss into economic consequences, risks making nature readable only as a theatre for human consumption. As a management tool, the 'cascade model' is intended to show the link between what we value in our environment and the health and stability of the ecosystem on which such values depend: 'Changes in benefits and values … shape the way that people deal with the various drivers of ecosystem change'.[12] Less readily acknowledged in the ecosystem services framework is that the conceptualisation of the relationship between biodiversity and human benefits and values as a cascade restricts attention only to those aspects of an ecosystem which directly contribute to human well-being, and, in the case of what are called 'cultural ecosystem services', broadly and misleadingly defined as 'the nonmaterial benefits people obtain from ecosystems',[13] replicates a dualistic understanding of nature and culture in which humans benefit from a natural environment over which they exercise technical and managerial control. The cascade model also tends to hierarchize value according to what can be measured, artificially distinguishing the 'tangible' and quantifiable values of food and energy production, for example, from the supposedly 'intangible' and vague benefits of aesthetics, traditional ecological knowledge, and spirituality.

This essay argues for a materialist understanding of the flows of what Donna Haraway calls 'emergent naturecultures', by which she means the inseparability of biological and social processes, and the recognition that human beings do not have a monopoly on agency.[14] In the context of environmental humanities, materialist scholars such as Bruno Latour, Jeffrey Jerome Cohen, and Stacy Alaimo have argued for the recognition of agency in the non-human.[15] Alaimo calls this 'transcorporeality', not in the sense of transcendence, but as 'a new materialist and posthumanist sense of the human as perpetually interconnected with the

[10] Mihaly Csikszentmihalyi, *Flow: The Psychology of Happiness*. New York: Harper and Row, 1992, 6.

[11] Roy Haines-Young and Marion Potschin, 'The links between biodiversity, ecosystem services, and human well-being', *Ecosystem Ecology: A New Synthesis*, ed. David G. Raffaeilli and Christopher L.J. Frid. Cambridge: Cambridge University Press, 2010, 110-139.

[12] M. Potschin-Young, R. Haines-Young, C. Gorg, U. Heink, K. Jax, and C. Schleyer, 'Understanding the role of conceptual frameworks: Reading the ecosystem service cascade', *Ecosystem Services*, 29 (2018), 430 (428-440).

[13] Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Synthesis*. Washington DC: Island Press, 2005, 40.

[14] Donna Haraway, *The Companion Species Manifesto: Dogs, People and Significant Otherness*. Chicago: Prickly Paradigm Press, 2003, 1-3.

[15] See Bruno Latour, *Politics of Nature: How to bring the sciences into democracy*. Cambridge, MA: Harvard University Press, 2004; Jeffrey Jerome Cohen, *Stone: An Ecology of the Inhuman*. Minneapolis: University of Minnesota Press, 2015; and Stacy Alaimo, *Bodily Natures: Science, Environment and the Material Self*. Bloomington: Indiana University Press, 2010.

flows and substances and the agencies of environments'.[16] The essay emerges from a transdisciplinary research project to investigate the cultural influences and impacts of ecosystem change in coastal environments around the Irish Sea. A collaboration between environmental humanities and ecological sciences, the project sought a materialist intervention in the conceptualisation and practice of ecosystem assessment so as to capture and map a more inclusive and multidirectional sense of the flows which are integral to ecosystems. In contrast to the deterritorialising, even amnesiac, tendencies of contemporary economic and ecological uses of flow metaphors, the project has attempted to analyse the material flows integral to naturecultures through particular places, perspectives, and agencies. In this essay, we examine the relationship between ecosystem change and cultural value in the small Cumbrian village of Seascale. Through narrative, poetic, and visual representations, we consider how aesthetic engagements with Seascale register a history of affective connection between people and nature.

The Lure of the Sea

Seascale derives its name from Norse settlers in the 9th or 10th century, comprised of the Old Scandinavian words *sær* and *skáli*, meaning huts or shelters by the sea.[17] As Norman Nicholson observes, the Norse settlers left their imprint on the land and the language of the Cumbria coast for many centuries, accounting for a distinctive dialect and sense of regional identity which persisted within living memory, and survives in its place names.[18] The relative remoteness of the Cumbria coast from the rest of England can be explained in large part by its geographical features. The mountains and lakes of the Cumbrian Fells prevented easy access from the East, and the passage north or south entailed the crossing of estuaries and bays which, in the case of Morecambe Bay and the Solway Firth especially, required expert guides to avoid the dangers of quicksand and rapid tidal flows. West Cumbria was compelled to be a sea-facing community, therefore, and the ports and shipbuilding industries of the region grew to accommodate the global exports of coal from Whitehaven, to the north of Seascale, and of haematite iron from Millom and Barrow to its south. Seascale remained a small rural settlement, however, until the middle of the nineteenth century, when the Furness Railway Company extended its line along the coast, and made plans for it to become a seaside resort. This is when it first becomes the subject of a specifically aesthetic and affective register.

Seascale is the subject of several poems by Hardwicke Rawnsley from his collection, *Sonnets Around the Coast* (1887), which attest to how the village had become associated with the newly emergent pleasures of seaside recreation. Rawnsley was an Anglican minister, as well as a poet and hymn writer, who was a founder member of the National Trust, and an advocate of ecological and cultural conservation in the Lake District. His Seascale sonnets dwell upon pleasurable interactions with the sea:

> As if the salt-sea-blood that years ago
> Won the fore-elder Vikings Cumberland,
> Leapt in their veins, the glad tumultuous band
> Sped to the shore, and gleaming, to and fro

[16] Stacy Alaimo, *Exposed: Environmental politics and pleasures in posthuman times*. Minneapolis: University of Minnesota Press, 2016, 112.

[17] 'Seascale', *A Dictionary of British Place-Names*. Oxford: Oxford University Press, 2011.

[18] Norman Nicholson, *Greater Lakeland*. London: Robert Hale, 1969, 15-16.

The bathers hurried; some, more grave, would know
What treasures lay upon the generous sand,
And here and there the lover with his hand
Would trace a name the waves should hide at flow.
Ah, happy feet; this fresh, unwrinkled shore
Forgives all mischief ye shall make in play,
And though to-morrow's sun shall find no trace
Of all your frolic – tides must rise apace,
Sorrow and pain – yet to the bitterest core
Of life's drear sands, shall sink the memory of to-day.[19]

'Seascale Memories' is a compendium of the pleasures which Alain Corbin associates with the invention of the beach as a leisure space in the nineteenth century: the mass ecstasy of sea bathing, the amateur passions for geology and marine biology, the stimulation of romance and sexual desire, and the idea of freedom from social inhibitions.[20] Rawnsley wraps these pleasures together in the Wordsworthian sentiment that they persist in memory as a bulwark against the 'sorrow and pain' of daily life. The same psychic structure of remembered pleasure gave rise to the commodification of seaside memories in the form of postcards and souvenirs (see Fig.1). The beach constituted a remembered space of desire, joy, and wonder, reified through the shells, stones, driftwood, as well as the trinkets and postcards, which ornamented people's homes. For Rawnsley, these memories remain as tokens of the flows which connect human bodies to the sea. The sonnet abounds with figures of the movement of bodies at the shore, bodies of water as well as of people – the 'play' of 'happy feet', the hand of the lover in the sand, the 'salt-sea-blood' in the veins of the bathers, the rise and fall of the tides, the 'flow' of the waves, and the constant motion of the unnamed treasures which lie upon the 'generous sand'. The 'salt-sea-blood' may be taken as a conventional symbol of the presumed Viking genetic ancestry of the Cumbrian people, but it is also a striking image of shared biophysical kinship with the sea. It makes the poem not simply a depiction of how people take pleasure from the sea, or 'benefit' from nature's 'services', but a figure of complex interrelation.

In 'At Seascale', Rawnsley contemplates a different kind of pleasure in the shore, one which is closer to a notion of the sublime, or spiritual inspiration:

Here, as we walk along the quilted shore,
Dusted with diamond, rich with shell's inlay,
We watch the fringe of foam, that far away
Broiders the hem old ocean ever wore,
Remade each moment, lovelier than before:
So gold the grassy banks at shut of day,
'Twixt red Saint Bees and Black Combe, sailors say
Grey Cumbria's coast is barred with molten ore.
But not the salt sea broidery, nor the beach
Purpled by shifting light, with murmur loud,
Enchants him most who wanders wrapt in thought;

[19] H.D. Rawnsley, *Sonnets around the Coast*. London: Swan Sonnenschein, Lowrey & co., 1887, 96.

[20] Alain Corbin, *The Lure of the Sea: The discovery of the seaside, 1750-1840*, trans. Jocelyn Phelps. London: Penguin, 1995.

> But, as he hears the ocean's marvellous speech
> And sees in mirrors wet the flying cloud,
> Heaven's wings, Heaven's voices, nearer him are brought.

The poem begins in picturesque mode, using the language of fabric decoration and a painterly palette of colours to describe the spectacle of the sea and the shoreline. The picturesque is somewhat troubled at the end of the octave by the image of sunset striking the banks of the shoreline as a bar of 'molten ore' which, given the extensive and devastating effects of iron and coal mining on the coast north and south of Seascale, can hardly sustain the tone of aesthetic harmony. In any case, Rawnsley proposes that it is not such picturesque sights and harmonious sounds which 'enchant' the contemplative shore-walker, but the spiritual feelings to which they give rise. It is a common convention in Victorian verse to find in the spectacle of the sea a sublime demonstration of the power and beauty of divine creation. In Rawnsley's poem, a more subtle use of heavenly metaphors prevails, with such spiritual experiences brought 'nearer', but not made manifest or exposed. The sensual pleasures of the seashore are portals to a sense of the numinous, although the poem does not resolve whether 'Heaven's wings, Heaven's voices' are the material manifestations of a transcendent realm, or merely the effect of appearances. Regardless of the poet's own sense of religious belief, 'Heaven' in the poem may simply be the name he gives to the feelings of wonder, unity, and well-being experienced on the shoreline.

The question of how art transposes experience or emotion from one person to another, from one place to another, has been of some significance in ecocriticism. In Jonathan Bate's influential study, *The Song of the Earth*, for example, he proposed that representational works may themselves be regarded as 're-creational space in which we can walk and breathe and play', that poems can be 'imaginary parks in which we may breathe an air that is not toxic and accommodate ourselves to a mode of dwelling that is not alienated'.[21] This act of transposition is an important qualification of the distinction made in ecosystem services between in-situ and ex-situ benefits, for such works of art or literature are both generated by and dependent upon the integrity of specific environments, while also conveying their benefits elsewhere. Bates's proposal may be idealistic, but it does acknowledge the agency of artworks in generating flows of energy, ideas, and feelings, rather than regarding representational works as passive end-products. This idea of art as generative of the flow of ideas was central to the work of John Ruskin, who came to Seascale on at least two occasions, in 1881 and 1889, for a rest-cure from his deteriorating mental and physical health. In Ruskin's words, Seascale was at this time 'a railway station on a beach – with three attached lodging houses and seven shops: in a row'.[22] In his magisterial study of art, *Modern Painters* (1843-60), Ruskin set out the principles by which he thought great art should be judged, and it is in relation to the sea, clouds, and water that he deems so many artists to have failed. In particular, Ruskin marvels at the 'infinite agency of water':

> If we think of it as the source of all the changefulness and beauty which we have seen in clouds; then as the instrument by which the earth we have contemplated was modelled into symmetry, and its crags chiselled into grace; then as, in the form of snow, it robes the mountains it has made with that transcendent light which we

[21] Jonathan Bate, *The Song of the Earth*. London: Picador, 2001, 64.

[22] Tim Hilton, *John Ruskin: The Later Years*. New Haven: Yale University Press, 2000, 425-6.

> could not have conceived if we had not seen; then as it exists in the foam of the torrent, in the iris which spans it, in the morning mist which rises from it, in the deep crystalline pools which mirror its hanging shore, in the broad lake and glancing river; finally, in that which is to all human minds the best emblem of unwearied unconquerable power, the wild, various, fantastic, tameless unity of the sea; what shall we compare to this mighty, this universal element, for glory and for beauty? Or how shall we follow its eternal changefulness of feeling? It is like trying to paint a soul. [23]

Ruskin's own watercolour sketch of *Seascale* is no more than a sketch, and was made in 1889, one of the last paintings he ever attempted (Fig. 2). In terms of composition, it shows his abiding interest in cloud forms, waves, atmospheric light, and the reverberation of colour. During the same stay in Seascale, he was writing 'Joanna's Care', the final section of his *Praeterita*, in which he attempted to pay tribute to Joan Severn, his niece who cared for him in his final years. The sketch indicates that Ruskin remained enchanted by the challenges of expressing the aesthetic and inspirational qualities of the shoreline, even if, as his biographer attests, the seaside holiday was a failure.[24] He neither enjoyed nor benefitted from the rest in Seascale: he struggled to find order in his writing, and it marked the last occasion when he attempted any creative work. A massive stroke later in the year confined Ruskin to his home in Coniston, until his death in 1900. His protégé, and husband of Joan Severn, Joseph Arthur Palliser Severn, had chosen the same scene in Seascale for one of his own paintings (Fig. 3), which was undoubtedly based on Ruskin's ideas.[25] Such paintings of specific locations and views undoubtedly confer cultural value upon place, and may be argued to indicate that pleasure has been derived from nature. But they are conveying and constructing as well as conferring value, defining and extending the flow beyond the immediate location, and inviting others to share in appreciation of an environment they may not have known or visited. As is evident from the history of the nearby Lake District, cultural representations can place an aura of value around the places they depict, inspiring people to cherish and care for the natural beauty from which such art and literature derives, although this might be regarded not so much a reciprocal flow of care as a selective construction of what constitutes 'natural beauty' in the first place.

In Gernot Böhme's work, such aesthetic qualities attributed to nature in artworks are not wholly conceivable as projections, however, but are experienced bodily as if nature is revealed to us: 'nature shows itself to human beings insofar as they themselves belong to it through bodily sensuous presence'.[26] This 'self-revealing' of nature may appear to be no more than anthropomorphism on Böhme's part, except that his account of agency in nature is as much ecological as aesthetic: 'A specific self-revealing can be intended for a specific partner and nevertheless be perceived by others. The scent of flowers may address itself specifically to insects and nevertheless it is also noticed by us'.[27] In the context of the visual spectacle, for example, of a sunset across the waves on a beach, it might be argued then that the artwork

[23] John Ruskin, *Modern Painters*, *Volume One*. Orpington: George Allen, 1898, 345.

[24] Hilton, *John Ruskin: The Later Years*, 579-80.

[25] The relationship between Ruskin's sketch and another of Severn's paintings, *Sunset* (1887) is too close to be coincidental: see https://www.the-athenaeum.org/art/detail.php?ID=232283

[26] Gernot Böhme, 'An Aesthetic Theory of Nature: An Interim Report', trans. John Farrell. *Thesis Eleven*, 32 (1992), 99 (90-102).

[27] Ibid., 96.

is co-producing this act of 'self-revealing', bringing us as perceivers into the 'sensuous presence' of nature.[28] For Böhme, this may account for why ostensibly subjective perceptions – that a sea-view encourages tranquillity, or a walk along the beach fosters romance – are experienced as 'common reality', or at least are shared by many people, although Böhme does not account for the historical specificity of such common experiences. In cultural representations, Seascale follows a pattern common to many seaside resorts in being associated with romance. It is the setting for an important scene in George Gissing's novel, *The Odd Women* (1893), in which the heroine, Rhoda, believing herself to be one of those 'odd women' of late Victorian society destined never to marry, meets with her lover, Everard, on the beach at Seascale. She waits for him on the sands: 'The tide was rising; she went down to the nearest tract of hard sand, and stood there for a long time, a soft western breeze playing upon her face'.[29] He remarks upon this effect when he arrives: 'The sea has already touched your cheeks'. The setting is not incidental. He asks her to return to the same spot, at sunset, the following evening where, in the 'warm-coloured twilight', he asks her to marry him.[30] The romantic scene on the beach is conceived as the perfect end to the day they have spent together. Seascale also appears in Hugh Walpole's novel, *Vanessa* (1933), as the location for another marriage proposal:

> [Benjamin] and Vanessa started to walk across the long, shining sands. It was a day of perfect peace. Chroniclers may define that moment as the final peaceful one in English country life – a moment of historic tranquillity when the cornfields lay placid beneath the sun, the hedgerows slept, woods were untrodden, and every village sheltered under its immemorial elm while the villagers slumbered off their beer on the parochial bench. At the final moment, then, before the trumpet of the new world sounded, Benjamin and Vanessa crossed Seascale sands! … They were standing at the sea-edge on a floor of mother-of-pearl. The incoming tide drew thin lines of white as with a pencil on the shore and beyond the line the sea heaved without breaking, as gently as a sigh.[31]

In Walpole's novel, the ways in which environments may register emotions is hyperbolised. The marriage proposal on the sunlit beach is, of course, a cliché, a well-worn convention with which we are familiar from movies, advertisements, and romantic novels, but it is a convention based on an underlying assumption that certain environments, at certain times, exude an aura which works upon the senses to produce particular feelings – awe, solace, or romance, for example. Böhme glosses Walter Benjamin's concept of 'aura' along precisely these lines, that aura 'appears in natural objects. Aura proceeds from them, if the observer lets them and himself be…. To perceive aura is to absorb it into own's own bodily state of being. What is perceived is an indeterminate spatially extended quality of feeling'.[32] Similar arguments have been made in landscape theory, that 'the effects of different landscape types … and effects of different personal-social situational activities or concerns' combine to

[28] Ibid., 101.

[29] George Gissing, *The Odd Women*. Oxford: Oxford World's Classics, 2000, 283.

[30] Ibid., 291.

[31] Hugh Walpole, *Vanessa: A Novel*. New York: Doubleday, Doran & co., 1933, 97-8.

[32] Gernot Böhme, 'Atmosphere as a Fundamental Concept of a New Aesthetics', trans. David Roberts. *Thesis Eleven*, 36 (1993), 117-18 (113-26).

'elicit aesthetic experiences', which are also, of course, affective experiences.[33] Such affective flows are socio-natural, materially co-produced between natural and human processes, and demand that we think about places and their 'naturecultures' in multi-directional, contingent, and fluid terms.

Atlas of Emotion

In his topographical guide to Cumberland and Westmorland, written in 1948, the poet Norman Nicholson wrote of his anxiety about changes to the landscape around Seascale, particularly to the area just north around Sellafield:

> The spot where the Ehen and the Calder meet the sea was, until recently, one of the loneliest stretches of the coast. There was no road nearer than Sellafield Station, and that little more than a cart-track, and to get from one side of the river to the other you had to go miles inland to Calder Bridge. During the war, however, a factory was built on the wedge of the land between the two rivers, roads to carry busloads of workmen were laid down, a foot-and-cycle bridge were thrown across the Calder, and a cinder track was made past the golf course along the sands to Seascale. The factory is soon to become an atomic power plant, drawing its labour force from the half-derelict area around Egremont and Frizington. As they stand at present (1948), the factory buildings are not very conspicuous, but I am apprehensive of the town which may grow there, for nowhere could pimply-red bricks be less welcome than among the pale pinks, mauves, greens and lemon of the lower Calder.[34]

The factory built during the Second World War was a Royal Ordnance munitions factory for manufacturing explosives. When it was no longer needed at the end of the war, it was sold to the chemical and textiles company, Courtaulds, to build a new factory to make rayon, which had been developed as a synthetic replacement for cotton fibre in tyres. The Courtaulds plan was controversial, as it included an arrangement with local councils to raise the water level in Ennerdale Water, for supplying the manufacturing process, which the conservation group, the Friends of the Lake District, argued would damage the ecology and amenities around the lake. In July 1947, however, the government announced that Courtaulds had withdrawn plans for the site, to make way for an alternative proposal from the government to build the first full-scale atomic energy plant.[35] The communities of West Cumberland had suffered from high unemployment and low wages since the 1930s, which was one reason the government gave for locating the atomic plant there. The other reasons were more likely connected with the sparse population and relative geographical remoteness of the area. The local member of parliament, Frank Anderson, did not object to the atomic plant, but his questions in parliament revealed prescient anxieties about the effects of nuclear industries on surrounding ecologies. On 24th July 1947, Anderson questioned the Minister for Supply, who was responsible for atomic energy developments:

[33] Paul H. Gobster, Joan I. Nassauer, Terry C. Daniel, and Gary Fry, 'The Shared Landscape: what does aesthetics have to do with ecology?', *Landscape Ecology*, 22 (2007), 959-72.

[34] Norman Nicholson, *Cumberland and Westmorland*. London: Robert Hale, 1949, 151.

[35] 'Commons Sitting of Wednesday 23rd July 1947', *House of Commons Hansard Sessional Papers*, 5th series, Vol.440, 1124-1126 (1189-1564).

> There are all kinds of rumours abroad about what this atomic energy project will do to the countryside. Rightly or wrongly, people are very much afraid of its effect. They are wondering what effect it will have upon, say, milk production, which is a very important factor in the Sellafield and South Cumberland area. In that area there are large milk-producing districts, and people are wondering whether this will have any effect upon the farming districts, and the residential and other districts. The local people are anxious to know what is likely to happen. Will this be the cause of some other kind of industrial disease which will spring up in that area?[36]

He asked another question a few days later about the possible ill-effects of atomic energy production on livestock and grassland.[37] Another MP, Harold Davies, had already asked the Minister, on the day of the announcement, if the parliament could be assured 'that the maximum amount of research will be made into the possible effects on rivers of effluents from these atomic factories in rural districts'.[38] Against these fears of 'industrial disease' flowing through milk, and rivers, and people, the Minister gave glib assurances of containment and safety.

Norman Nicholson's first collection of poems, *Five Rivers* (1944), understands that rivers tell stories, from their source to the sea. Two of his five rivers, the Ehen and the Calder, now flow through the Sellafield nuclear site. They told different stories then. The Ehen was 'Red as rhubarb beneath the grey skin,/ For its veins are stained with the blood of the ore/ Of the mines of Egremont and Cleator Moor'. The Calder shared its name with Calder Abbey, a Benedictine Monastery, and thus, for Nicholson, 'The introspective Calder hums to the pebbles/ A memory of plainsong and choirboys' trebles'.[39] However, there is a different and more complex understanding of flows and fluidity in the poem which Nicholson wrote in the aftermath of the Windscale Fire of 1957, the worst nuclear accident in British history. Windscale was the name given to the first two nuclear reactors built on the Sellafield site, which did not produce energy, but were used to make weapons-grade plutonium instead. The fire occurred when a necessary controlled release of core temperature failed, and the resulting aerial discharges spread radioactive elements all across Northern Europe, with particular intensity in Cumberland. Milk was prevented from distribution throughout the county when it was found to contain dangerous levels of radioactive particles, and was dumped into drains running out to the sea. Rumours persist today of the hidden numbers of deaths from Leukemia and other cancers attributable to the accident, and more broadly, to the discharges and leaks from the Sellafield complex. Nicholson's poem condenses much of the fear, anxiety, and anger resulting from this foretold accident:

> WINDSCALE
>
> The toadstool towers infest the shore:
> Stink-horns that propagate and spore

[36] 'Commons Sitting of Thursday 24th July 1947', *House of Commons Hansard Sessional Papers*, 5th series, Vol.440, 1649-1651 (1565-1754).
[37] 'Commons Sitting of Monday 4th August 1947', *House of Commons Hansard Sessional Papers*, 5th series, Vol.441, 958 (955-1262)
[38] 'Commons Sitting of Wednesday 23rd July 1947', *House of Commons Hansard Sessional Papers*, 5th series, Vol.440, 1126 (1189-1564).
[39] Norman Nicholson, 'Five Rivers', *Five Rivers*. London: Faber, 1944, 7.

Wherever the wind blows.
Scafell looks down from the bracken band,
And sees hell in a grain of sand,
And feels the canker itch between its toes.

This is a land where dirt is clean,
And poison pasture, quick and green,
And storm sky, bright and bare;
Where sewers flow with milk, and meat
Is carved up for the fire to eat,
And children suffocate in God's fresh air.[40]

There were major failings in the design and operation of Windscale, largely due to the haste with which successive governments had driven the programme for producing plutonium. In Nicholson's poem, however, the politicians who promised 'clean' energy, or gave assurances that nuclear power bore no risks to human and non-human health, are not direct targets of approbation, nor are the scientists and technocrats who operate the plant. Instead, images of infestation, propagation, and canker direct our attention to ecological processes of growth and decay. Such images have long histories as figures for social processes too. The religious imagery – of 'hell in a grain of sand', the corrupted Eden of 'poison pasture', and children suffocating 'in God's fresh air' – is familiar from poetic protests against industrialisation. Yet here this imagery is used to describe a disaster which is imperceptible to the senses – the pastures are green, the sky is bright. The allusions to 'toadstool towers' and 'stink-horns' evidently echo the conventional and pervasive description of a nuclear explosion as a 'mushroom cloud', yet the fungal metaphors are used here not to signify the risk of explosion, but the everyday reality of unseen contamination and unacknowledged suffering. Nicholson's focus is not the routinely imagined horror of sudden disaster, but what Shannon Cram calls 'the slow violence of environmental contamination'.[41]

Nicholson's poem uses the language of biological hazards to counter the delusional rhetoric of containment and isolation associated with nuclear energy. Terms such as 'biological shield', 'filters', 'exclusion zone', and 'protection suit' reflect a technological vision of control through spatial containment. They mask the extent to which nuclear production depends upon flows and discharges, that there is no pure separation of 'dirt' and 'clean'. The same 'air' in the phrase, 'air-cooled reactor', flows through lungs as well as the irradiated graphite core. The water used to cool spent fuel rods is 'purged' out to sea through pipelines which run 2.5km from the high watermark, where tidal flows and currents carry and deposit radioactive material all around the shores of the Irish Sea, and up the Western shores of Scotland and the Hebrides. Investigations into the 'Seascale cluster', an unusually high number of children diagnosed with leukemia in Seascale, were based on the understanding that radioactive exposure could encode disease in the genes, potentially triggering cancers in generations to come. From its inception, the Sellafield complex was fully entangled with the terrestrial, aqueous, aerial, and corporeal ecologies of its location and surroundings. Technological management of Sellafield has included the identification of 'permissible' levels

[40] Norman Nicholson, 'Windscale', *A Local Habitation*. London: Faber, 1972, 31.

[41] Shannon Cram, 'Wild and Scenic Wasteland: Conservation Politics in the Nuclear Wilderness', *Environmental Humanities*, 7 (2015), 93 (89-105). The term 'slow violence', of course, is borrowed from Rob Nixon, *Slow Violence and the Environmentalism of the Poor*. Cambridge MA: Harvard University Press, 2011.

of radioactive elements in marine organisms, bathing water, aerial discharges, and milk, as well as in children's teeth, and the livers and bones of adults.[42] It has included also the frequent 'culling' of seagulls, pigeons, and other species which make their homes in the chimney stacks, storage ponds, and buildings of Sellafield. In 1998, a cull of 1500 pigeons followed the discovery of dangerous levels of radioactive caesium in a Seascale garden which belonged to two sisters who were fond of feeding the birds – the pigeons were found to be contaminated from roosting in Sellafield.[43] The culled birds of Sellafield are reportedly stored frozen on site, because there are currently no safe ways to dump them without the risk of entering into the food chain.[44] The company responsible for decommissioning the Sellafield site has also acknowledged the problems faced with 'legacy' storage ponds which have developed their own complex ecosystems, with algal blooms making the water too opaque for visual monitoring, the effects of coastal wind and rain exacerbating the corrosion of waste material, and leaks occurring in decaying 'containment' facilities.[45] In each such instance, it is the unanticipated and unintended agency of pigeons, seagulls, and algae which have undone ineffectual attempts at radioactive containment.

Since the construction of the nuclear complex at Sellafield, the coastal village of Seascale has become associated in cultural representations with a different register of emotional attributes and geographies. Seascale and the coastline just south of it have appeared as the setting for political thriller novels, the plots of which have revolved around fears of global terrorism, state violence, and biosecurity. In Bob Langley's *The War of the Running Fox* (1978), for example, a police constable patrolling the rain-drenched seafront of Seascale discovers an abandoned diving suit, and a satchel containing drawings of the Windscale plant.[46] These clues unfold into a terror plot to steal plutonium from Windscale to tip the scales of war in Southern Africa. Likewise, in Jack Higgins' thriller, *Touch the Devil* (1982) a plot to steal a nuclear missile brings a group of mercenaries and agents to the shores of Ravenglass. Of a different genre, Richard Adams's novel, *The Plague Dogs* (1977) tells the story of two dogs who escape from a secret and disturbing animal research facility in the Lake District, tracked by soldiers and helicopters, to the coast south of Seascale. In Ruth Sutton's historical novel, *Fallout* (2014), which is set in Seascale during the Windscale fire of 1957, the village is shown to be materially and emotionally inseparable from the Sellafield complex. The novel's protagonist, Jessie Whelan, leaves her job in Windscale to join the protests against the plant, protests which make her see that her life in Seascale is intimately and precariously bound up with 'Macmillan and the Yanks', and the dangerous currents of global politics.[47] The fire and resulting contamination compel her to withdraw, fearful of the new scales of damage in which even household dust no longer seems innocent, in which an accidental discharge can take years, or even generations, to find its victims. As Ursula K. Heise argues in her analysis of the permeation of the fallout from Chernobyl into everyday life, 'Radioactive contamination

[42] J. Gray, S.R. Jones, and A.D. Smith, 'Discharges to the environment from the Sellafield site, 1951-1992', *Journal of Radiological Protection*, 15.2 (1995), 99-131.

[43] Rob Edwards, 'Air Raid Warning', *New Scientist*, 14th August 1999. Web: https://www.newscientist.com/article/mg16321995-100-air-raid-warning/

[44] Jason Nisse, 'Sellafield struggles with radioactive gulls', *The Independent*, 11th September 2005. Web: https://www.independent.co.uk/environment/sellafield-struggles-with-radioactive-gulls-311821.html

[45] Matthew Gunther, 'Stuck in the Sludge', *Chemistry World*, 15th September 2015. Web: https://www.chemistryworld.com/feature/stuck-in-the-sludge/8953.article

[46] Bob Langley, *The War of the Running Fox*. London: Sphere Books, 1979, 78-9.

[47] Ruth Sutton, *Fallout*. Waberthwaite: Hoad Press, 2014, 63.

is the most obvious indicator that the natural and the domestic can no longer be decoupled from the technological and transnational'.[48] In these fictions, the association of Sellafield and its adjacent coastline with a dark history of nuclear weapons development, biological contamination, and state security contribute to a malignant sense of place, a sense in which the West Cumbrian coast is a hazard-prone area.

The history of West Cumbria has been strongly tied in the modern era to industrial processes of extraction and manufacturing, which have left their scars on the ecology and aesthetics of the landscape. Since the demise of coal and iron industries, however, former pits and mines along the coast have been 're-wilded', and become protected sanctuaries for precious species of wildlife, embodying a narrative of restoration. The language of restoration and landscape management is pervasive in state documentation about Britain's nuclear legacy. The process of dismantling Sellafield takes place within sight of Seascale every day. It is a process which the Nuclear Decommissioning Authority, which now owns the Sellafield site, estimates will last around 120 years, the final phase of which is described as 'remediation of land'.[49] There is no mention of radionuclides in the sea, nor of how they are sedimented in the muds and sands and marine life of the coast around the Irish Sea. To follow the story of just one type of artificial radionuclide discharged in high doses from Sellafield since 1952 – Technetium-99 – is to trace a map of deposits around the coasts and seabeds of North-West Europe, to chart interaction with biotic organisms including seaweeds, fish, shellfish, and through the food chain to humans, and to imagine the potential for that interaction across and beyond the two hundred millennia of its radioactive half-life.[50] There is no mention either of how the contamination of the land extends to the aquifer in the underlying sandstone geology of the site, which had been reported in previous environmental assessments.[51] The facilities for final 'disposal' of high-level radioactive waste from Sellafield do not yet exist, and the management of waste materials from the site over that period is dependent upon a viable and secure means of disposal. The UK government decided in 2014 that its solution to long-term high-level radioactive waste management, which is expected 'will remain hazardous for hundreds of thousands of years', was the construction of a 'Geological Disposal Facility', an engineered complex deep underground in which waste materials are stored in multiple forms of containers.[52] Much of the consultation conducted with local communities about the need

[48] Ursula K. Heise, *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*. Oxford: Oxford University Press, 2008, 185-6.

[49] Nuclear Decommissioning Authority, 'Nuclear Provision: the cost of cleaning up Britain's historic nuclear sites', 19 July 2017. Web: https://www.gov.uk/government/publications/nuclear-provision-explaining-the-cost-of-cleaning-up-britains-nuclear-legacy/nuclear-provision-explaining-the-cost-of-cleaning-up-britains-nuclear-legacy

[50] See Agnieszka I. Olbert, Michael Hartnett, Tomasz Dabrowski, and Kevin Kelleher, 'Effects of complex hydrodynamic processes on the horizontal and vertical distribution of Tc-99 in the Irish Sea', *Science of the Total Environment*, 409 (2010), 150-161; Stuart B. Jenkinson, David McCubbin, Paul H.W. Kennedy, Alastair Dewar, Rachel Bonfield, and Kinson S. Leonard, 'An estimate of the inventory of technetium-99 in the sub-tidal sediments of the Irish Sea', *Journal of Environmental Radioactivity*, 133 (2014), 40-47; Magne Simonsen, Øyvind Saetra, Pāl Erik Isachsen, Ole Christian Lind, Hilde Kristin Skjerdal, Brit Salbu, Hilde Elise Heldal, and Justin P. Gwynn, 'The impact of tidal and mesoscale eddy advection on the long term dispersion of ^{99}Tc from Sellafield', *Journal of Environmental Radioactivity*, 177 (2017), 100-112.

[51] Sellafield Ltd, 'Strategic Environmental Assessment: Site Specific Baseline – Sellafield' (December 2012), 4. Web: http://www.cumbria.gov.uk/eLibrary/Content/Internet/538/755/1929/42117105219.pdf

[52] Department for Business, Energy and Industrial Strategy (UK Government), *Consultation: National Policy Statement for Geological Disposal Infrastructure* (January 2018), 15. Web:

for underground disposal focuses on the 'legacy' of early nuclear technologies, and the failure to fully prepare for safe waste management processes in the rush to design and build Britain's nuclear energy and weapons production facilities. However, the provision of underground disposal is also envisaged 'to support a new generation of nuclear power stations in the UK, by providing a safe way to dispose of the waste they produce'.[53] Among this new generation of nuclear power stations, there are plans to build three new water-cooled reactors at Moorside, just north of the Sellafield complex. The marketing of West Cumbria in government publications as 'Britain's Energy Coast', heavily focused on the 'energy and environmental expertise' of Sellafield and its satellite businesses, seeks to turn a history of environmental and social damage into commodifiable global assets.[54] Seascale is destined to live in the shadow of the region's nuclear legacy for many generations, its future mortgaged to an unimaginably long process of nuclear remediation.

Conclusion

The history of Seascale embodies a key contradiction in the fate of coastal communities in modernity, caught between the pleasures of the sea as a common space to be gazed upon and enjoyed, and the functional integration of the sea as a territorialized space of production, waste disposal, and concealment. There is no better way to understand this contradiction, and the consequences of rapid and irreversible environmental change, than to walk along the beach at Seascale on a warm summer's day. It retains its Victorian seafront façade, and there are signs of an attempt to preserve its seaside traditions. The wooden jetty was restored as a relic of Victorian beach furniture in 2000. A small café facing the sea continues to sell ice cream. The beach looks splendidly clean, its reddish golden sand stretching for miles, yet although it is a beautiful, sunny day, there are hardly any people (see Fig. 4). A couple of men pass by walking their dogs. A small child runs on the beach with her grandparents. It is warm, in the mid-twenties Celsius, but people have all their clothes on. There is no one having a picnic. No one is swimming in the sea. No children have brought buckets and spades to build sandcastles, or search among the rockpools. There are no water-sports, and no one is sunbathing. A train stops at the station, but no one runs down from the station to the sea. It is as if we are on the cusp of returning to a time in which, as Alain Corbin describes, the sea was 'a damned world', associated with 'repulsive images', and for an illustration of which he quotes from the Roman philosopher, Seneca, to say 'It is in the nature of the sea to cast back on its shore every secretion and every impurity'.[55]

'Nature' continues to deliver the same 'services' which made Seascale a seaside resort in the nineteenth century, and which brought hundreds by train to its shores. The environmental assessments produced by Sellafield, and the scientific publications monitoring levels of radioactivity in the Irish Sea, maintain that radioactive discharges are within acceptable limits of health and safety, although there are campaign groups, such as Cumbrians Opposed to a Radioactive Environment (CORE), who vigorously contest this from

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/676402/Final_NPS_Consultation_Document.pdf

[53] Ibid., 15.

[54] Cumbria Partners, *Britain's Energy Coast™: a masterplan for West Cumbria - executive summary* (2007). Web: https://www.copeland.gov.uk/attachments/britains-energy-coast-masterplan-2007

[55] Corbin, *The Lure of the Sea*, 7, 13.

sediment samples taken from Cumbrian beaches.[56] Yet, no matter how clean or pristine the beach at Seascale appears, no matter how much it promises as a seaside location, its cultural value has been severely damaged by the pervasive perception that it is contaminated. No amount of carefully planned management of other aspects of the environment, provision of amenities or marketing seems likely to restore that value in the foreseeable future. To take account of the complexity of the flows which are integral to human-nature interdependencies, we need models which can understand and assess concepts and practices of perception, representation, and aura as material phenomena. This is what Latimer and Miele argue is the basis for a materialist understanding of 'naturecultures': 'there is no "nature" that is not touched by what humans do as well as think and … there is no part of being human that is unaffected by its material interaction with other materialities'.[57] We need models which can also understand how global flows of waste, energy, capital, and culture are embodied and experienced in local forms, and at the same time, how the flows of water on which we depend connect us to the life-cycles and processes of others, some of which are unexpectedly distant in space and time. We need models, too, which can trace and map the emotional resonances of ecologies across time, and which can make sense of the ways in which cultural representations are responsive to situational and environmental change.

In this article, we are suggesting that such models of human-nature interaction might learn from eco-cultural histories of places and communities which have been changed irrevocably by what Sarah Whatmore calls 'environmental knowledge controversies', in which 'an environmental disturbance of some kind forces people to notice the unexamined stuff on which they rely as the material fabric of their everyday lives, and attend to its powers and effects'.[58] Such controversies include flooding, earthquakes, tsunamis, volcanic eruptions, drought, epidemics, and hurricanes, but also oil, plastic, chemical, and nuclear contamination, both sudden and slow. By attending to narratives and stories of change, loss, and forsaken possibilities, we can better understand the dynamic confluence of material and affective processes that comprise our interdependencies with nature, and move beyond the all-too-obvious limitations of resource-management approaches.

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[56] See http://corecumbria.co.uk/ and also https://theecologist.org/2017/jul/31/veteran-cumbria-anti-nuclear-activists-recognised-nuclear-free-future-award

[57] Joanna Latimer and Mara Miele, 'Naturecultures? Science, Affect and the Non-Human', *Theory, Culture and Society*, 30.7/8 (2013), 16 (5-31).

[58] Sarah J. Whatmore, 'Earthly Powers and Affective Environments: An Ontological Politics of Flood Risk', *Theory, Culture and Society*, 30.7/8 (2013), 45 (33-50).

Figures

Fig.1 Furness Railway Company postcard of Seascale, illustrated by A. Heaton Cooper (1906-7)

Fig.2: John Ruskin, *Seascale* (1889). © Ruskin Foundation (Ruskin Library, Lancaster University)

Fig. 3: Joseph Arthur Palliser Severn, *Sunset at Seascale* (c.1887)

Fig.4: A Summer's Day on Seascale Beach (2018). Photograph by Authors.