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Science at the Seaside: Pleasure Hunts in Victorian Devon

Kyriaki Hadjiafxendi and John Plunkett

In 1858, the versatile thinker and writer, George Henry Lewes, declared that the lovely sea anemone was 'now the ornament of countless drawing-rooms, studies, and back parlours, as well as the delight of unnumbered amateurs'.¹ The mid-Victorian period witnessed a popular fascination with marine biology and, more particularly, with the ecology of the seashore. Lewes's own volume, his *Sea-Side Studies at Ilfracombe, Tenby, the Scilly Isles, and Jersey* (1858), was part of this fashion, and based on a long coastal tour made by Lewes and his partner, Marian Evans Lewes (soon to become famous as George Eliot), from May to August 1856. Their decision to begin their excursion in Ilfracombe, North Devon was no accident. They were heading to a locale that was attracting increasing numbers of natural history enthusiasts, inspired by volumes such as Philip Henry Gosse's *A Naturalist's Rambles on the Devonshire Coast* (1853), Charles Kingsley's *Glaucus; or, The Wonders of the Shore* (1855), and George Tugwell's *A Manual of the Sea-Anemones Commonly Found on the English Coast* (1856). This chapter argues that the rich history of writing about the Devon coastline played an important role in the growth of Victorian popular science. While the popularity of Gosse, Kingsley, and marine biology more generally has been well documented, little critical attention has been given to why a small, relatively remote coastal zone inspired such attention. In explaining how the rock pools and beaches of Victorian Devon were especially suited for those enthused by natural history, our aim is to illustrate a neglected aspect of the history of popular science and British seaside tourism.

This chapter focuses on two entwined spaces: the first of these is the physical and imaginative place of the Devon coast and the role it played in the making of scientific knowledge. Recent scholarship in the history of science has demonstrated that scientific knowledge is not abstract or universal, but is spatially conditioned and produced. Simon Naylor has pointed out that 'It is not always the case that science only exerts its influence onto place; places also affect science and how it is received'.² Spatial approaches have been particularly productive in analysing nineteenth-century popular science because it was conducted at so many different venues and locales. Aileen Fyfe and Bernard Lightman pose the key questions: 'where might people encounter and interact with the sciences, and what sorts of experiences might they have there?'³ A number of recent studies have examined the scientific culture of provincial towns, cities, and regions within Britain.⁴ While providing confirmation of just how pervasive the provision

¹ George Henry Lewes, *Sea-Side Studies at Ilfracombe, Tenby, the Scilly Isles, and Jersey* (Edinburgh: William Blackwood and Sons, 1858), 114.

² Simon Naylor, *Regionalizing Science: Placing Knowledges in Victorian England* (London: Pickering and Chatto, 2010) 3. See also David N. Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge* (Chicago: University of Chicago Press, 2003); and David N. Livingstone and Charles W. J. Withers (eds), *Geographies of Nineteenth-Century Science* (Chicago: University of Chicago Press, 2011).

³ Aileen Fyfe and Bernard Lightman, 'Science in the Marketplace: An Introduction', in Aileen Fyfe and Bernard Lightman (eds), *Science in the Marketplace: Nineteenth-Century Sites and Experiences* (Chicago: University of Chicago Press, 2007), 4.

⁴ See Juliana Adelman, *Communities of Science in Nineteenth-Century Ireland* (London: Pickering and Chatto, 2009); and Diarmid A. Finnegan, *Natural History Societies and Civic Culture in Victorian Scotland* (London: Pickering and Chatto, 2009).

of popular science was, such scholarship has produced a much more heterogeneous national picture than was hitherto the case.

The scientific importance that North Devon acquired because of its rich coastal ecology contrasted with its peripheral geographical position. The Victorians were fascinated by the liminal world of the seashore and the meanings they attached to this space form the second focus of our chapter. Seaside science concentrated on the biodiversity discoverable in the littoral zone between sea and land, part of whose appeal was that it was constantly being renewed and remade by the tide. Contemporary writer Linda Cracknell has described the intertidal zone as a space that 'enlivens imaginations; secreting the extraordinary in the ordinary rhythm of ebb and flow; swash and backwash. This is where transformation is possible, where nothing stays the same, where there are junctions of opportunity to gain wisdom.'⁵ Gosse and Kingsley would have approved of such sentiments; indeed, they acquired popularity as pioneers in the study of the secret life of the seashore and the exploration of its imaginative appeal. Gosse dedicated a whole volume to 'The Romance of Natural History' (1860), while in *Glaucus*, Kingsley claimed that zoophytes and microscopic animalcules found on every shore fuelled the curiosity of the public more than the large dinosaur sculptures at the new Sydenham Crystal Palace.⁶ This widespread interest was accentuated by Gosse's popularization of the aquarium; its role in reproducing, domesticating, and making mobile the space of the seashore is described in the latter part of this chapter.

1. THE NORTH DEVON COAST AND THE ROMANCE OF NATURAL HISTORY

So why did seaside science come to the fore in the specific cultural moment of the 1850s? What was behind this fascination with the Devon coastline? The answers to these questions lie in a combination of geography, improvements in transportation, a revolution in popular publishing, and changing patterns of leisure and tourism. Domestic tourism had started to blossom during the Napoleonic Wars; one area to benefit was Devon and its coastal resorts, particularly Torquay, thanks largely to its picturesque views and the widespread belief in the health-giving effects of sea air. Transport links, however, remained poor, particularly when it came to reaching North Devon. In 1817, it took Frances Burney over twenty-five hours to travel the 110 miles from Bath to Ilfracombe.⁷ It was not until the advent of widespread rail travel in the second half of the nineteenth century that domestic tourism would really take off; the attraction of North Devon in the 1850s was that it had come much more within reach for genteel visitors but still retained a fashionable remoteness.

The GWR train line to Bristol was completed in June 1841, but North Devon had to wait for its rail connection until the Exeter to Barnstaple Line opened on 12 July 1853. Less than three years later, when Marian Evans Lewes and George Henry Lewes arrived in Ilfracombe on 9 May 1856, they were able to travel on this new line via Bristol and Exeter; however, they still had to cover the final eleven miles by coach. In 1851, Ilfracombe only had a population of 3,677; but it was growing quickly.⁸ When Charlotte Chanter described the appearance of the local coastline in the summer of 1855, she noted the increase in bathing machines and the popularity of natural history exploration. The 'mushroom-like' appearance of the

⁵ Linda Cracknell and Owain Jones, 'A Conversational Essay on Tides', available at <https://tidalcultures.wordpress.com/a-conversational-essay-on-tides-by-linda-cracknell-and-owain-jones>, accessed 9 January 2017.

⁶ Charles Kingsley, *Glaucus; or, The Wonders of the Shore* (1855: Cambridge: Macmillan and Co., 1859), 33.

⁷ John F. Travis, *The Rise of the Devon Seaside Resorts 1750–1950* (Exeter: Exeter University Press, 1993), 71.

⁸ *Ibid.*, 77.

bathing machines turns them into 'novelty' specimens like the anemones natural historians sought to collect:

[the shore has] thirty five of those novel brown mushrooms, who have for the last two years have infested the sea coast, all seated together so close that you could not have passed between them: besides sundry other specimens in groups of half-a-dozen, some perched upon the rocks, some sketching, some making holes in muslin, others again diving into 'rock pools' after unfortunate anemones.⁹

Chanter was the sister of Charles Kingsley and the wife of the Reverend John Mills Chanter of Holy Trinity Church, Ilfracombe. Her own guide- book was often mentioned alongside those of Gosse and Kingsley. Her 'Ferry Combes: A Ramble after Ferns in the Glens and Valleys of Devonshire' (1856) helped to make visiting Devon for its ferns an activity to rival the search for anemones. (Articles on this subject appeared around this time in 'Good Words', 'Leisure Hour', and 'Once a Week'.)¹⁰

The development of tourism, particularly as undertaken by the genteel and educated, went hand-in-hand with the growth of popular science. The pursuit of scientific discovery, in all its forms, seeped into many aspects of Victorian cultural and civic life. As a leisure pursuit, popular science combined pleasure, curiosity, and spectacle with an enlightenment desire to better understand the surrounding world. Its success was aided by a widespread belief in rational recreation; that is, in the idea that leisure time should be used for improvement as well as for amusement. Aileen Fyfe has argued that, from the 1850s, 'there is more evidence of the sciences in tourist literature. A growing enthusiasm for the out-of-doors helped inspire popular interest in natural history, especially but not only at the seaside'.¹¹ Freed from the urban environment, rock pooling, fossil hunting, searching after local flora and fauna—all provided a hands-on method of finding out more about the natural world. At the beginning of 'Glaucus', Kingsley addresses a putative urban tourist, urging him not to join the 'ignoble army of idlers', but to earnestly examine the shore to find wonders 'around you at every step, stranger than ever opium-eater dreamed'.¹² He leads his reader-tourist away from the artificiality of cultured spaces down to the Torbay shoreline, a space of amazement and strangeness:

Follow us, then, reader in imagination, out of the gay watering place, with its London shops and London equipages, along the broad road beneath the sunny limestone cliff tufted with golden furze; past the huge oaks and green slopes of Tor Abbey....And once there, before we look at anything else, come down straight to the sea marge; for yonder lies, just left by the retiring tide, a mass of life such as you will seldom see again.¹³

As a physical, educational, and imaginative activity, science at the seaside offered multiple pleasures, while simultaneously satisfying the belief in rational recreation.

The rise of outdoor natural history pursuits, and even the social freedoms of the seashore, do not fully explain why Devon became the dominant place in the fashion for popular science. Its appeal for marine biology resided in the unique position of its coast, especially in North Devon, vis-à-vis the Atlantic Ocean,

⁹ Charlotte Chanter, *Ferry Combes: A Ramble after Ferns in the Glens and Valleys of Devonshire* (London: Lovell Reeve, 1856), 25–6.

¹⁰ 'A Summer's Study of Ferns', *Good Words*, 1 (December 1860): 423–4; 'Summer in Devonshire', *Once a Week*, 7 (26 July 1862), 121–4; 'A Trip to North Devon', *Leisure Hour* (10 May 1862), 297–8.

¹¹ Aileen Fyfe, 'Natural History and the Victorian Tourist: From Landscapes to Rock- Pools', in Livingstone and Withers (eds), *Geographies of Nineteenth-Century Science*, 380.

¹² Kingsley, *Glaucus*, 14.

¹³ *Ibid.*, 62–3.

Irish Sea, and English Channel. Gosse, like Kingsley, initially moved to Torquay, arriving on 29 January 1852 to rest and recuperate following a period of nervous dyspepsia and ill health in London, likely due to overwork. With his wife and two-year-old son, Edmund, he subsequently moved to Ilfracombe in April 1852.¹⁴ Yet his initial choice of Torquay was not just for his wellbeing, but had a scientific rationale. The littoral zoologist worked best at spring tides and the times of low water in Devon made marine biology a socially and scientifically viable activity:

In many parts of the English coast the lowest water occurs at about six o'clock in the morning or evening, a time inconvenient in many ways, and particularly to an invalid. In Devonshire, on the days of the new and full moon, the lowest tide is near the middle of the day.¹⁵

Gosse was keenly attuned to the tidal movements that made the Devon seashore an abundant source of marine life. It was a distinct if small 'bio- region'—to use Robert L. Thayer Jr's term—an area that is 'literally and etymologically a "life-place"—a unique region defined by natural (rather than political) boundaries with a geographic, climatic, hydrological, and ecological character capable of supporting unique human and nonhuman living communities.'¹⁶ As Gosse outlined in 'A Naturalist's Rambles on the Devonshire Coast', the shape of the Bristol Channel and the adjacent coasts offers 'peculiar facilities for the study of those marine animals whose proper sphere of existence is the wide ocean'.¹⁷ The prevailing westerly winds moving the surface waters of the Atlantic propelled large numbers of sea creatures along the shores of Portugal, Spain, and France; subsequently, a number of them passed through the English Channel. Another large portion was turned northward by the projecting point of Cornwall into the funnel of the Irish Sea; this marine life had to either head out into the North Sea or were forced into the narrowing confines of the Bristol Channel.

Of the three locations—the shores of the English Channel, the Irish Sea, and the Bristol Channel—it is the latter, being closed, that is most likely to retain the biodiversity of the specimens carried by the waves, linking the Devonshire coast with global tidal movements. The tides in the Bristol Channel are routinely claimed to be the second highest tides in the world. The prevailing winds pushing sea life towards the Cornish shore, combined with the current that followed the bending shore around to North Devon, ensured that the southern side of the channel would be particularly rich in marine life; 'thus the rocky coves and inlets of North Devon might be expected to be more than usually rich in those rare and accidental stragglers, which the waves bring in from their roamings in the boundless sea'.¹⁸ North Devon might have been looked down upon as a rural periphery relative to the economic and cultural dominance of Victorian London and the industrial cities of northern England, yet its coast was a privileged littoral space; a natural edge that was both boundary and receptacle for the tidal flow of Atlantic marine ecology and that fuelled a fascination, to quote Owain Jones, 'for tides and the odd world of the intertidal zone which switches from land to sea, from one space to other space'.¹⁹

Charles Kingsley's promotion of seaside science similarly sought to make the rich coastal ecology of Devon integral to its cultural identity. Kingsley, who was born in Holne, Devon, had spent much of his childhood in Clovelly on the North Devon coast; he first travelled to Torquay in South Devon in the winter

¹⁴ Philip Gosse's life in Devon is excellently described in Ann Thwaite, *Glimpses of the Wonderful: The Life of Philip Henry Gosse* (London: Faber and Faber, 2002), 170–203.

¹⁵ Edmund Gosse, *The Life of Philip Henry Gosse F.R.S.* (London: Routledge, Kegan Paul, Trench, Trubner and Co., 1890), 236.

¹⁶ Robert L. Thayer Jr, *LifePlace: Bioregional Thought and Practice* (Berkeley: University of California Press, 2003), 3.

¹⁷ Philip Henry Gosse, *A Naturalist's Rambles on the Devonshire Coast* (London: John van Voorst, 1853), 363.

¹⁸ *Ibid.*, 364.

¹⁹ Cracknell and Jones, 'A Conversational Essay on Tides'.

and spring of 1854 for health reasons, needing a respite from the ill effects of the damp Rectory at Eversley, Hampshire, his home as parish Rector. Inspired by a new-found friendship with Gosse and his belief in the healing powers of nature, Kingsley spent many happy hours fossicking on the seashore, declaring a passion for natural history: 'how I am happier now in classifying a new polype, or solving a geognostic problem of strata, or any other bit of hard Baconian induction, than in writing all the novels in the world'.²⁰ He regularly sent Gosse samples after the latter had moved back to London, and, like his friend, Kingsley's passion for natural history stemmed from his conviction that it showed a convergence of science and theology. Kingsley's work at Torquay led to an article on 'The Wonders of the Shore' for the 'North British Review' in 1854, which was subsequently expanded into 'Glaucus'.

Kingsley, like Gosse, celebrated the Torquay area for its 'delicious Italian climate', while the distinct geological 'variety of its rocks, aspects, and sea-floors' gave it 'an abundance and variety of animal and vegetable life, unequalled, perhaps, in any other part of Great Britain'.²¹ He went further than Gosse, though, in promoting a tradition of seaside science for Devon. Thanks to the pioneering work of Amelia Griffiths, Colonel George Montagu, and William Turton, Kingsley claimed that the area could lay claim to be the 'original home of marine zoology and botany in England'.²² Kingsley's 'Westward Ho!' (1855) similarly mythologizes the history of the West Country. Beginning in Bideford, North Devon, with the early life of the novel's hero, Amyas Leigh, it retells the story of his involvement in Elizabethan maritime struggles against the Spanish. The lesson is clear; the victories achieved by the men of Devon paved the way for the dominance of British imperialism founded on maritime supremacy. Famously, 'Westward Ho!' helped to popularize the North Devon coast to such an extent that a village was founded after its name to cater for the influx of tourists.

In keeping with the way their work stemmed from the study of a particular bioregion, much of the influence of Gosse and Kingsley was due to the fact that they promoted a new type of living natural history, one that was spatially orientated and not dominated by the naturalist's study or the taxidermied sample. Such an approach to the tidal life of Devon was concerned with the necessity of understanding specimens in relationship to their dynamic coastal environment, which metamorphosed on a daily basis thanks to its tidal rhythms, secreting 'the extraordinary in the ordinary rhythm of ebb and flow; swash and backwash'.²³ Prior to his arrival in Devon, Gosse had travelled and published extensively, including 'The Ocean' (SPCK, 1845), 'Popular British Ornithology' (1849), 'Natural History: Reptiles' (SPCK, 1850), and 'A Naturalist's Sojourn in Jamaica' (1851). In the preface to his Jamaica volume, he criticized the established type of natural history that he would depart from in his seashore volumes:

Natural History is far too much a science of dead things; a necrology. It is mainly conversant with dry skins, furred or feathered, blackened, shrivelled, and hay-stuffed; with objects, some admirably beautiful, some hideously ugly, impaled on pins, and arranged in rows in cork drawers....These distorted things are described; their scales, plates, feathers counted; their forms copied, all shrivelled and stiffened as they are;...their limbs, members, and organs measured, and the results recorded in thousandths of an inch; two names are given to every one; the whole is enveloped in a

²⁰ Charles Kingsley, *Novels, Poems and Letters of Charles Kingsley: Letters and Memoirs*, ed. Fanny Kingsley, 2 vols (New York and London: Co-operative Publication Society, 1899), i. 328.

²¹ Kingsley, *Glaucus*, 61–2.

²² *Ibid.*, 61.

²³ Cracknell and Jones, 'A Conversational Essay on Tides'.

mystic cloud of Graeco-Latino-English phraseology (often barbaric enough); and this is Natural History!²⁴

For Gosse, his natural history practice was definitely not a necrology. Rather, it was an evaluative discourse of tidal landscapes under a process of change, one that ‘investigates and records the condition of living things, of things in a state of nature’; it would research their affections, stratagems, wants, habit, and actions through ‘their connection with the inanimate world around them’.²⁵ This approach, which necessarily relied on understanding animal or marine life in the dynamic context of the ecosystems they inhabited, gave them a characterization: their physicality was animated on the page and they were brought to life through Gosse’s skills of observation and precise description, both verbally and visually.

Gosse’s experiences were detailed in ‘A Naturalist’s Rambles on the Devonshire Coast’ (1853) and ‘Sea-Side Pleasures’ (1853), anonymously published for the SPCK and written with his wife, Emily. These books emphasized that the seashore was a liminal space, a site of emotional epiphany and scientific wonder in which one could find, as Nicholas Allen, Nick Groom, and Jos Smith have noted, ‘forms within forms, scales within scales, and worlds within worlds’.²⁶ Gosse, like Kingsley, proclaimed the strange and beautiful miniature creatures that were by his readers’ feet on the seashore if they only knew where to look. His style of writing was not a systematic study of zoology, but rather a lively and immediate record of his exploration of the North Devon coast. The reader was his companion, evoking the romance of natural history in multiple emotive registers through the kinaesthetic of his expeditions:

I ask you to listen with me to the carol of the lark, and the hum of the wild bee; I ask you to stand with me at the edge of the precipice and mark the glories of the setting sun; to watch with me the mantling tide as it rolls inward, and roars among the hollow caves; I ask you to share with me the delightful emotions which the contemplation of unbounded beauty and beneficence ever calls up in the cultivated mind.²⁷

Gosse’s commitment to taking his audience with him extended beyond the pages of his books. On his second stay at Ilfracombe in 1855, he even ran his own regular shore class, which involved spending an hour or two on the shore every day when tide permitted; if the weather was inclement, he would run an indoor class on observing and identifying the specimens they had collected. (Gosse would repeat the exercise in Torquay in 1857.)²⁸

Gosse’s work was richly illustrated with his own beautiful and intricate drawings (his father had been a miniature painter and passed on much of his technique); his illustrations were an important extension of his aim to make visible and accessible to his readers the strange seashore world— with all the gorgeousness of its translucent colours. As the vivid detail of Figure ?? suggests, the ability to look anew into these rock pool worlds was being fostered by the availability and cheapness of good-quality microscopes, the production of which had been revolutionized in the 1840s due to improvements in glassmaking.²⁹ The refinement of dredging, a technique Gosse employed on occasion, also produced a

²⁴ Philip Henry Gosse, *A Naturalist’s Sojourn in Jamaica* (London: Longman, Brown, Green, and Longmans, 1851), v.

²⁵ *Ibid.*, vii.

²⁶ Nicholas Allen, Nick Groom, and Jos Smith, ‘Introduction’, this volume, 1.

²⁷ Gosse, *A Naturalist’s Rambles on the Devonshire Coast*, vi.

²⁸ Thwaite, *Glimpses of the Wonderful*, 231.

²⁹ See Isobel Armstrong, *Glassworlds: Glass Culture and the Material Imagination 1830–1880* (Oxford: Oxford University Press, 2008), 52–3, 317–28.

host of new marine varieties to study.³⁰ The teeming world of life in a drop of water, whether of the River Thames or the seashore, was a frequent trope of popular science; Gosse himself published 'Evenings at the Microscope' (1859), in which looking through the device became an act of revelation and a journey into an exotic land. The microscope reaffirmed and made visible more of God's glory but was equally 'like the work of some mighty genie of Oriental fable'.³¹

[insert image here - Philip Henry Gosse, 'Caryophyllia Smithii', in *A Naturalist's Rambles on the Devonshire Coast* (London: John van Voorst, 1853)]

Gosse and Kingsley both show the overdetermined meanings invested in the scientific survey of the seashore. Kingsley, an Anglican clergyman, and Gosse, a man of equally deep religious conviction and a member of the Plymouth Brethren, were part of an influential corpus of popular science books, which looked 'back to the natural theology tradition and in their writings offered new audiences a vivid glimpse of the design they perceived in nature.'³² For Kingsley, the pursuit of natural history was a means of self-improvement that was invested with a muscular Gothic heroism. Far from being a dilettante activity, fossicking among rock pools after zoophytes was a rugged, moral pursuit of God's truth and beauty:

Let no one think that this same Natural History is a pursuit fitted only for effeminate or pedantic men. I should say, rather, that the qualifications required for a perfect naturalist are as many and as lofty as were required, by old chivalrous writers, for the perfect knight-errant of the Middle Ages; for (to sketch an ideal, of which I am happy to say our race now affords many a fair realization) our perfect naturalist should be strong in body; able to haul a dredge, climb a rock, turn a boulder...

For his moral character, he must, like a knight of old, be first of all gentle and courteous, ready and able to ingratiate himself with the poor, the ignorant, and the savage; not only because foreign travel will be often otherwise impossible, but because he knows how much invaluable local information can be only obtained from fishermen, miners, hunters, and tillers of the soil. Next, he should be brave and enterprising, and withal patient and undaunted...He must be of a reverent turn of mind also...wondering at the commonest, but not surprised by the most strange; free from the idols of size and sensuous loveliness; able to see grandeur in the minutest objects, beauty in the most ungainly; estimating each thing not carnally, as the vulgar do, by its size or its pleasantness to the senses, but spiritually, by the amount of Divine thought revealed to him therein...³³

Rather than pursuing an abstract mode of knowledge in controlled, sterile conditions, Kingsley's naturalist-knight has to fully embed himself in a locality—its people and its topology—to understand its natural history. This figure is an embodiment of Kingsley's radical politics, all attentive to the neglected grandeur of the commonplace and minutiae of the world. Francis O'Gorman has argued that 'Glaucus' deploys the language of nature as exotic artefact recurrently, fashioning coastal natural history as an encounter with landscapes to wonder at and strange forms to marvel over.³⁴ O'Gorman rightly notes that Kingsley's exoticism is a kind of discourse that colonizes nature; however, it also makes the seashore a space for

³⁰ See David Elliston Allen, *The Naturalist in Britain: A Social History* (Princeton: Princeton University Press, 1976), 115–17.

³¹ Philip Henry Gosse, *Evenings at the Microscope; Or, Researches among the Minuter Organs and Forms of Animal Life* (London: SPCK, 1859), v.

³² Bernard Lightman, *Victorian Popularizers of Science: Designing Nature for New Audiences* (Chicago: University of Chicago Press, 2007), ix.

³³ Kingsley, *Glaucus*, 44–6.

³⁴ Francis O'Gorman, "'More Interesting than all the books, save one': Charles Kingsley's Construction of Natural History", in Juliet John and Alice Jenkins (eds), *Rethinking Victorian Culture* (Basingstoke: Macmillan, 2000), 156 (147–61).

questing, exploration and discovery. It is in this vein of defining masculinity through a raw physicality that rock pooling—and science at the seaside more generally—was proposed as a means of rejuvenating the male body, providing Gosse, Kingsley, or any other prospective natural historian with a vigour which city life would sap from them.

Kingsley's naturalist-knight may have celebrated the masculine prowess of seaside science, but there is no doubt that, as an activity, much of its popularity stemmed from its take-up by women. Collecting marine specimens was an improving and genteel activity in which women were encouraged to participate. When Reverend George Tugwell poked fun at the craze for marine biology in a September 1856 article for 'Fraser's Magazine', he pictured it as a feminine phenomenon, mocking women's pretension to be scientific: 'our lady friend carries home a jar of marine pickles, invests in a Gosse and a Kingsley, and before morning is on the high-road to a state of confirmed "thalassian" (v. Gosse) monomania'.³⁵ The symptoms included a predilection for zoological nomenclature; a dressing table covered in pudding basins and confectioners' jars, all holding marine samplings; and expensive dresses ruined by seaweed and saltwater. Tugwell, a keen naturalist, was a curate at Ilfracombe during this time and was about to publish 'A Manual of the Sea-Anemones Commonly Found on the English Coast'; three months prior to the article being published, he had met with George Henry Lewes and George Eliot during their visit, even accompanying them on some of their outings along the Ilfracombe shore and giving them three anemones from his collection.³⁶

Eliot, who recorded her recollections of her trip to Ilfracombe in her journal, was fully immersed in the scientific expeditions undertaken with Lewes. In a letter, she enthusiastically describes the clutter created by their fieldwork:

You would laugh to see our room decked with yellow pie-dishes, a footpan, glass jars and phials, all full of zoophytes or molluscs or annelids—and still more to see the eager interest with which we rush to our 'preserves' in the morning to see if there has been any mortality among them in the night.³⁷

Lewes's work, which was initially published as papers in 'Blackwood's Edinburgh Magazine' before appearing in 'Sea-Side Studies', records the same sense of excitement, obsession, even disorientation, at the phantasmagoric world of polypes and molluscs when seen through the microscope:

The typical forms *took possession of me*. They were ever present in my waking thoughts; they filled my dreams with fantastic images; they came in troops as I lay awake during meditative morning hours; they teased me as I turned restlessly from side to side at night; they made all things converge towards them.³⁸

The visit to Ilfracombe was an enabling point in both their careers. In addition to helping Lewes research and write up 'Sea-Side Studies', George Eliot commenced writing fiction immediately after the trip. The incorporation of natural history and scientific tropes in her novels is renowned, as is her commitment to a realism founded on detailed observation of the seemingly unimportant minutiae of the material world. There is also a telling coda to their stay; another female tourist, the twenty-six year old Eliza Brightwen,

³⁵ [George Tugwell], 'Science by the Sea Side', Fraser's Magazine, 54 (September 1856), 254 (253–60).

³⁶ See Kathryn Hughes, George Eliot: The Last Victorian (London: Cooper Square Press, 2001), 173.

³⁷ George Eliot, The George Eliot Letters, ed. Gordon S. Haight, 9 vols (New Haven and London: Yale University Press, 1954–78), ii. 252.

³⁸ Lewes, Sea-Side Studies, 34.

arrived in Ilfracombe for a day trip to gather ferns on the very same day they departed: she would go on to become a renowned writer-naturalist in the 1890s.³⁹

[insert image here - . [John Leech], 'Common Objects at the Seaside—Generally Found upon the Rocks at Low Water', *Punch*, 35 (21 August 1858), 76]

While George Eliot's success story undermines Tugwell's gentle satire of women's engagement with natural history, he was not the only one to mock the feminine preoccupation with the seashore. A caricature from 'Punch' similarly shows a group of female marine enthusiasts, all with bums in air. Entitled 'Common Objects at the Seaside—Generally Found upon the Rocks at Low Water', the title alludes to the extremely successful set of popular science handbooks that were beginning to be published by Rev. J. G. Wood: 'Common Objects of the Sea Shore' (1857), 'The Common Objects of the Country' (1858), and 'Common Objects of the Microscope' (1861). All but one of the collectors in the engraving are female; their rather unsuitable crinolines (another of Punch's favourite targets) imbue them with the appearance of the anemones they are trying so fervently to collect. As Jonathan Smith notes, 'Their search for "common objects at the seaside" converts them into objects of an implicitly male gaze.'⁴⁰

The impact of the works of Gosse, Kingsley, Chanter, and Lewes, among numerous others, owed much to the revolution in printing and publishing that produced cheaper books and periodicals for an ever-larger readership. In recent years, numerous scholars have demonstrated the importance of Victorian print media in shaping public perceptions of scientific debates.⁴¹ Sales figures for popular science books were high and formed a notable part of popular publishing. Wood's 'Common Objects of the Sea Shore' sold 15,000 copies in its first year and 14,000 in its second. 'Glaucus' went into four editions in the first four years after its publication, while Gosse's 'A Naturalist's Rambles on the Devonshire Coast' enjoyed a print run of 1,500 copies and earned him the handsome sum of £70.⁴² Gosse continued to educate the public on the ever-changing world of the seashore, publishing works full of practical advice on marine collection. 'A Year at the Shore' (1865) was a collection of articles initially published in 'Good Words'; despite its temporal focus, it was based on the littoral life of Devon, as was 'Land and Sea' (1865), another volume published for the SPCK.

The locatedness of Gosse's natural history writing sits paradoxically alongside the geographical distribution achieved due to advances in book circulation and distribution. Thanks to all of the various publications on marine biology, the North Devon coast had certainly found its metier. In the decades after their books' publication, Gosse and Kingsley's books continue to be invariably mentioned in articles promoting the Devon coastline as ideal for those interested in naturalist expeditions. In 'London Society' of 1867, Ilfracombe was portrayed as still obsessed with natural history:

³⁹ Eliza Brightwen, *Eliza Brightwen, Naturalist & Philanthropist; An Autobiography*, ed. W.H.Chesson, introd. Edmund Gosse (New York: American Tract Society, 1909), 55. Other notable publications by women in the field include Anne Pratt, *Chapters on the Common Things of the Sea-Side* (London: SPCK, 1850); and Margaret Gatty, *Parables from Nature* (London: Bell and Daldy, 1855–71) and *British Sea-Weeds* (London: Bell and Daldy, 1863).

⁴⁰ Jonathan Smith, *Charles Darwin and Victorian Visual Culture* (Cambridge: Cambridge University Press, 2006), 72.

⁴¹ See Lightman, *Victorian Popularizers of Nature*; James A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000); Geoffrey Cantor, Gowan Dawson, Graeme Gooday, Richard Noakes, Sally Shuttleworth, and Jonathan R. Topham (eds), *Science in the Nineteenth-Century Periodical: Reading the Magazine of Nature* (Cambridge: Cambridge University Press, 2004); and Aileen Fyfe, *Science and Salvation: Evangelical Popular Science Publishing in Victorian Britain* (Chicago: University of Chicago Press, 2004).

⁴² Lightman, *Victorian Popularizers of Science*, 75; Fyfe, 'Natural History and the Victorian Tourist', 388, 398; Edmund Gosse, *The Life of Philip Henry Gosse* F. R. S., 245.

I must here remark that it is not very much use in coming to Ilfracombe unless you have some little taste for natural history. Socially it is everything here. You are hardly fit to live unless you know everything about anemones. Nearly every house, I suppose, has got its aquarium. You are at any moment liable to remarks about zoophytes like the madrepora and polype....Let me strongly advise my friends to bring down with them a set of natural history books if they would fully enjoy this marvellous coast and what is still more important, 'be in the fashion'.⁴³

The particular appeal of Ilfracombe (and the role that guidebooks played in shaping its reputation and encouraging natural history tourism) was similarly described in the 'North Devon Journal' in 1871:

Like pebble-hunting at Hastings, Ilfracombe has also its speciality of amusement—natural history; everyone hunts for anemones, sea shells, and sea weeds, and everyone has got an aquarium. If you wish to stand well with Ilfracombe society you must, if not already in love with its marvellous beauties, go in for natural history. Bring your books by Gosse,—'Sea and Land', 'A Year at the Sea Shore', your Catlow and Woodward; your 'Common objects' and 'Common Shells', and, above all, Kingsley's 'Glaucus', and you will find work and use for all.⁴⁴

In addition to these specialist works, general guidebooks for tourists were part of the increase in printed matter for sale, and could also advertise the pleasures of natural history. Fyfe has noted that the first John Murray handbooks produced were those for 'London' and 'Devon' in 1851.⁴⁵ Tellingly, in her examination of the revisions made for the 1856 edition of Murray's 'Devon' handbook, Fyfe points out how Gosse's reputation was exploited to promote Ilfracombe as a resort; it was noted, 'It is a favourite haunt of those wonderful and beautiful forms of life so recently brought to our notice by men such as Gosse'.⁴⁶ These lines were still present in the eighth edition of 1872, but disappeared by the eleventh edition of 1895; their removal testifies to the much more commercial character of late Victorian seaside culture, which replaced the earlier romance of natural history.

2. THE AQUARIUM: 'OH! I DO LIKE TO BE BESIDE THE SEASIDE'

Railways and steamships were able to take many more tourists to the coast; thanks to Gosse, though, those enamoured of their experience were able to recreate their own seashore space through the latest fashionable accoutrement for the home: the marine aquarium. The coast would no longer be a peripheral or remote space, but was now mobile and reproducible, part of the domestic interior. The impetus to reproduce the beauty of nature within the Victorian home was already evident in the Wardian case, which had become popular in the 1840s and 1850s as a decorative artefact. It allowed exotic ferns and other plants to thrive within an unhealthy urban atmosphere by enclosing them within the controlled temperature of an airtight glass container. The marine vivarium satisfied a similar drive to observe, domesticate, and conserve nature.

Gosse cannot take credit for inventing the aquarium, but rather for developing and popularizing it. The question of who can claim primacy is complicated by a number of contemporaneous developments; however, the rock pools of North and South Devon figure significantly in its development. Rebecca Stott has argued that Anna Thynne, wife of Reverend Lord John Thynne, Sub-Dean of Westminster Abbey,

⁴³ 'Ilfracombe', *London Society: An Illustrated Magazine of Light and Amusing Literature for Hours of Relaxation*, 12 (July 1867), 28.

⁴⁴ 'At Ilfracombe', *North Devon Journal*, 2 November 1871, 6.

⁴⁵ Fyfe, 'Natural History and the Victorian Tourist of science', 390.

⁴⁶ Quoted in *Ibid.*, 390.

should receive more recognition.⁴⁷ An enthusiast for geology and marine biology, while in Torquay in 1846 Thynne collected some madrepores and sponges from the seashore; she wanted to study them further and transported them to Ashburnham House, which was part of Westminster Abbey. At her London home, she kept them in glass cases and discovered that, by transferring some of the water from one receptacle to another in front of an open window, the water could be aerated and the madrepores kept alive. Later, in 1847, she had sea plants brought from Torquay to aid the tanks and was able to maintain her specimens for another two years.

Although Thynne did not publish her work until much later, her discovery was another example of the important contribution of women to Victorian popular science. It was Gosse and another scientist, Robert Warington, who were working at the same time on the problem of how to keep sea organisms alive for long periods in tanks and jars, who succeeded in popularizing the aquarium.⁴⁸ Gosse's key contribution was to refine and commercialize the seawater model such that it became the latest decorative craze of the 1850s.⁴⁹ Natascha Adamowsky has pointed out that, prior to 1852, 'aquariums were mostly cylindrical glass containers with a few fish or invertebrates inside. After this date, they came to be viewed as the living space for a marine community and an idealised miniature landscape'.⁵⁰ Gosse's perfected version of the aquarium emerges directly out of his work on the littoral zone of North Devon, as well as from his commitment to a natural history based on investigating and collecting living specimens. His description of how he had managed to sustain a living seawater collection was published at the end of *A Naturalist's Rambles on the Devonshire Coast*.

In a triumph of his overall approach to natural history, Gosse discovered that marine life could only survive as part of an ecosystem. On their own in a tank, starfish and anemones were doomed due to the diminution in oxygen levels; however, when paired with living vegetation, the oxygen produced counterbalanced what was used by the marine life therein. In 1850, when Gosse was first engaged in the study of microscopic Rotifera, he noticed that by allowing aquatic weeds to grow in the glass vases in which he kept the Rotifera, they were able to survive and multiply. Gosse renewed his experiments while at Torquay and Ilfracombe. Motivated by his desire to sustain the many specimens he collected, he devised an extremely effective formula for artificial seawater that could be used for refreshing the tank if it was located a long way from the coast. For Gosse, the vivarium offered an embodiment of his belief that the most 'interesting parts, by far, of published natural history, are those minute, but most graphic particulars, which have been gathered by an attentive watching of individual animals'.⁵¹

In 1852, he advised on the building of around a dozen freshwater and marine aquaria for public exhibition at the Zoological Gardens at Regent's Park: he stocked them with around 200 specimens of marine animals and plants he had brought up from Ilfracombe two months previously.⁵² The attraction opened on 22 May 1853, immediately after the release of *A Naturalist's Rambles on the Devonshire Coast*. The *Illustrated London News* declared that visitors would no longer have to journey to the sea to discover the exquisite biodiversity of the English coast:

⁴⁷ See Rebecca Stott, *Theatres of Glass: The Woman Who Brought the Sea to the City* (London: Short Books, 2003).

⁴⁸ See Natascha Adamowsky, *The Mysterious Science of the Sea, 1775–1943* (2015; Abingdon: Routledge, 2016), on the relative claims of each.

⁴⁹ On the development of the aquarium, see 'Aquarium History', available at <http://parlouraquariums.org.uk/HomePages/historyHome.html>, accessed 2 February 2017.

⁵⁰ Adamowsky, *The Mysterious Science of the Sea, 1775–1943*, 115.

⁵¹ Philip Gosse, *The Aquarium: An Unveiling of the Wonders of the Deep Sea* (London: John van Voorst, 1854), v.

⁵² Edmund Gosse, *The Life of Philip Henry Gosse F. R. S.*, 244.

But, in this new undertaking of the Zoological Society, we have not only an illustration of the colour and form of these animals, which no pencil can approach, but a means of observing their habits and economy which far surpasses any opportunity which has been within the reach even of the authors to whom we have referred; and the student may now, without the expense of a journey to the sea, without the use of the dredge, or any other exertion than that of a visit to Regent's Park, find himself, in a museum of living nature, where he will find, from time to time, all the rarest as well as the most common of the inhabitants of the British seas...⁵³

[insert image here - 'The Aquatic Vivarium at the Zoological Gardens, Regent's Park', Illustrated London News, (28 May 1853), 420]

This living-picture exhibition of the seashore did not entail the difficulties and physical travails of rock pool rambling; the specimens were guaranteed to be present, and there was little travel required, and the large plate-glass tanks offered a more transparent viewpoint than most tidal pools. As Figure ?? demonstrates, whereas anemones when seen at low tide were a closed mass, in their underwater condition at the aquarium, observers could see them unfurled in all their beauty. Crowds thronged to this new attraction. On Whit Monday of 1853, 22,000 people visited the exhibition, exceeding the numbers seen at the Zoological Gardens during the height of the Great Exhibition of 1851.⁵⁴ Next to open in Britain was the Derby Museum in Liverpool in 1857. Never to be outdone, P. T. Barnum created the first American aquarium in 1856 in New York as part of his Barnum's American Museum. Other large public aquaria subsequently opened at the Crystal Palace (1871), Brighton (1872), and in a number of European cities.

The excitement caused by Gosse's perfection of the marine aquarium made them the latest craze. Gosse himself did much to inspire the fashion as *A Naturalist's Rambles on the Devonshire Coast* led to *The Aquarium: The Unveiling of the Wonders of the Deep Sea* (1854), in which he elaborated in more detail its theory and practice. Tellingly, until the volume went to press, it was entitled 'The Mimic Sea'; the title testifies to the impetus not only to artificially reproduce the littoral world, but also to deconstruct the boundary between land and sea. Whereas coastal landscapes are always changing thanks to tidal ebb and flow, within the vivarium's controlled environment a mimic miniature seashore could be brought into the home for conservation and the edification of all. Henry Butler made a similar point in *The Family Aquarium; Or, Aqua-Vivarium* (1858), proclaiming its scientific and artistic virtues as a replica, its provision of observational epiphanies in the same vein as the microscope and telescope:

That extraordinary combination of science and art may be called the crowning glory of the spirit of discovery characteristic of the nineteenth century. It opens to our inquisitive gaze the hidden chambers of the deep....It presents us with a miniature facsimile of the fascinating reality in its exquisite colours, and replete with its inexplicable revelations. It exhibits, in other words, LIFE BELOW THE BILLOWS in all its surprising shapes, and amid all its amazing phenomena.⁵⁵

A number of other books and journal articles provided instruction on how to install one's own home aquarium. Gosse's book illustrated a design for a fountain aquarium (see Figure ??); there were various other designs in Edwin Lankester's *The Aquavivarium* (1856), while Shirley Hibberd's 1857 edition of his *Rustic Adornments for Homes of Taste, and Recreations for Town Folk* pictured one with a cast-iron decorated base. Aquaria came in all varieties for all classes; the 'coast' was now everywhere. The *Literary*

⁵³ 'The Aquatic Vivarium at the Zoological Gardens, Regent's Park', Illustrated London News, 28 May 1853, 420.

⁵⁴ Ibid.

⁵⁵ Henry D. Butler, *The Family Aquarium; Or, Aqua-Vivarium* (New York: Dick and Fitzgerald, 1857), 11.

Gazette was just one journal to poke fun at their ubiquity but, in so doing, makes clear that it was its very accessibility that led to its appeal:

It was almost as if we went to bed one night innocent of anything but... having seen some glass tanks at the Zoological Gardens, and rose to find every naturalist's shop, half the fishing tackle houses, and all the filtered water and ginger-pop establishments, displaying elegant assortments of living, swimming fishes, gracefully meandering amid groves of water plants, every little nondescript shop up a by-courte feasting the eyes of admiring urchins with dim-looking bottles, in which 'tittlebats' and minnows and 'water-efts' sprawled and wrangled, while more than half the centre drawing-room windows in the more fashionable parts of the town appeared furnished with an ornamental chest of plate glass, with a shingly, rocky, weedy bottom, and numerous silvery fishes, and other marine animals of strange shapes...⁵⁶

[insert image here - Philip Henry Gosse, 'Fountain Aquarium', in *The Aquarium: An Unveiling of the Wonders of the Deep Sea* (London: John van Voorst, 1854), 254.]

Aquaria were like many other popular exhibitions of the period, such as panoramas, lantern slides, and stereoscopes, in offering an experience of a country, landscape, or region where the viewer did not have to leave the comfort of their own home or city. Everyone could be beside the seaside. Unsurprisingly, part of the success of the domestic aquarium was its appeal to women, and *Punch* could not resist picturing 'The Bursting of Old Mrs Twaddle's Aqua-Vivarium', in which a genteel drawing room was turned into a seascape with Mrs Twaddle endeavouring to pick up her favourite eel with her coal tongs.⁵⁷ Kingsley wrote approvingly that 'if Mr. Gosse's presages be correct, a few years more will see every clever lady with her "aquarium," and live sea-anemones and algae will supplant "crochet" and Berlin wool'.⁵⁸ The refined feminine accomplishments—polite but artificial—should be supplanted by the healthier concern with natural history.

At least one visitor to Ilfracombe set up an aquarium as a living souvenir of time spent in North Devon; the Anglo-Irish novelist, Anna Maria Hall (who usually published under Mrs S. C. Hall), visited Ilfracombe and Torquay in the autumn of 1855. She was accompanied by her husband, Samuel Carter Hall, editor of the *Art Journal* and a prominent journalist: the couple are another example of the area's ability to attract well-known literary figures. Writing in the *Art Journal* in 1856, Anna Maria Hall describes her trials and tribulations in maintaining her seawater vivarium. While in Ilfracombe, they stayed with the daughter of a Mr Heale, who had become as 'familiar with "Madrepores" and "Sabellas" and "Actinae" of all kinds, as the generality of pretty village maidens are with primroses and buttercups'.⁵⁹ She found that even the small children of Torquay and Ilfracombe had been caught up in the new fashion and 'come to the sea-side visitor with a bunch of "zoophytes," as they used to do with a young bird or a bouquet'.⁶⁰ One small boy reportedly brought her a worm in triumph, describing it as a sea serpent.

Anna Maria and Samuel Carter Hall also spent their time in Devon gathering ferns as much as actinae, filling their lodgings with all kinds of marine specimens. She even met Gosse when he was leading his seashore seminar and subsequently relied on both his books and personal advice when putting together

⁵⁶ 'Book Review', *Literary Gazette*, 21 August 1858, 236.

⁵⁷ 'Terrific Accident. Bursting of Old Mrs Twaddle's Aqua-Vivarium', *Punch* (19 December 1857), 250.

⁵⁸ [Charles Kingsley], 'A Popular History of British Zoophytes or Corallines', *North British Review*, 22 (November 1854), 1.

⁵⁹ Mrs S. C. Hall, 'A New Pleasure', *Art Journal*, 17 (May 1856), (145–7).

⁶⁰ *Ibid.*, 147.

her aquarium. Anna Maria Hall's touching account reveals the decorative, contemplative, and theological meanings that were got out of her many hours watching life inside the tank:

During the past winter, those 'blossoms of the sea' have afforded me a great deal of enjoyment. Every bit of weed and rock—every zoophyte—has its little history. I have beguiled some lonely midnight moments by placing my candle, so as to reproduce different effects of light and shade on my mimic ocean; and those dim links between vegetable and animal life have carried me back, without an effort, to the delicious scenes from whence they came.

How patiently have we watched the receding tide, to enable us to explore the mysteries of some tide pool, difficult of access, but richly repaying our exertions by the abundance and variety of its inhabitants!...

It is impossible to admire these beautiful creatures, and the simple labours by which they exist, without thinking of HIM who, insignificant as they may appear, works for them and in them. Surely, if HE cares for them—which cannot, except by the contentment they exhibit, acknowledge HIS bounty—how much more will HE care for us.⁶¹

The many hours Anna Maria Hall spent studying and arranging the specimens—observing the dignified life and simple labour of the creatures—is a counterpoint to the oft-satirized feminine fascination with the secret life of the intertidal zone. As Adamowsky notes, the aquarium offered 'a theatre of exotic forms that were perpetually changing, a continuum of the strangest metamorphoses and paradoxical symbioses'.⁶² Hall's 'mimic ocean', taken from Ilfracombe and Torquay, was more than just a commemoration of a pleasant holiday and an evocation of the blessed hierarchy of nature; it ebbed and flowed in her body through her emotions like a tide.

To sum up, seaside science emerged at a unique moment; it was a convergence of the popularity of natural history, particularly among the genteel, with the rise of coastal Devon as a tourist resort for those self-same visitors. Gosse's achievements were not endlessly reproducible across different locales; his volume, *Tenby: A Sea-Side Holiday* (1856), which attempted to repeat the success of his Devon work, sold very well but did not have the same influence. Indeed, so popular was the seaside science inspired by Gosse and others that, on coming to Tenby, he found that amateur naturalists had got there before him and removed a great volume of species; he bemoaned the fact that probably only one in six anemones they captured actually made it into an aquarium: 'if the visitors were gainers to the same extent that the rocks are losers, there would be less cause for regret'.⁶³ It was the same for Devon; Gosse was soon to protest that the coastline of all the fashionable watering places on the south and west coast was being stripped:

Since the opening of sea-science to the million, such has been the invasion of the shore by crinoline and collecting jars, that you may search all the likely and promising rocks within reach of Torquay, which a few years ago were like gardens with full-blossomed anemones and antheas, and come home with an empty jar and aching heart, all being now swept as clean as the palm of your hand!⁶⁴

It was not solely overenthusiastic amateurs that were to blame for pleasure hunting, though; the popularity of natural history had a commercial element (of which the growth in scientific publishing was but one element), with a cadre of professional collectors and small tradesmen emerging, who would collect as many as ten dozen anemones in a single tide.

⁶¹ Ibid.

⁶² Adamowsky, *The Mysterious Science of the Sea, 1775–1943*.

⁶³ Edmund Gosse, *The Life of Philip Henry Gosse F. R. S.*, 264.

⁶⁴ Philip Henry Gosse, *Land and Sea* (London: James Nisbet, 1865), 251.

Tugwell was equally splenetic towards those who were infected by the new-found desire to be thought 'scientific', those who were more concerned with fashion than nature; he declaimed against them as 'swarming on our coasts like blow-flies in summer time—infesting our *soirees* and *conversazioni* in the London season'.⁶⁵ The geographical remoteness of the North Devon coast, which led to its initial popularity among a certain cultural set, had lost its cachet now that it had become more touristy. The ventures of Gosse, Tugwell, Kingsley, and others became the victim of their own success; promoting hands-on engagement with the life of the seashore may have recreated innumerable miniature seascapes through domestic aquaria, but it was unsustainable to the marine ecosystems from which the specimens came. Gosse's and Kingsley's natural theology encouraged wonder towards the subjective life of non-human entities; they stressed the value, beauty and sentience of ordinary seashore life. At the same time, however, their ecological appreciation was often riven with contradictions that stemmed from a hierarchical view of nature and the drive to popularize natural history. Thus, the pleasure hunts of marine biology were founded on the particular ecology of the Devon coast; yet the fashion for seaside science also produced the aquarium—where you could take the shore back home with you and recreate it according to your taste. This reduction of nature to a decorative artefact undermined the locatedness that made the seashore a space of social freedom and scientific curiosity. Coastal landscapes are always changing thanks to tidal ebb and flow. But, as Victorian natural historians came to realize, they were also subject to human cultivation and the growth of the tourist industry with serious ecological consequences.

⁶⁵ [Tugwell], 'Science by the Sea Side', 255.