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Coralline Geohistory in James Montgomery's *Pelican Island*

'The first branch of natural science to become genuinely historical', Stephen Toulmin and June Goodfield wrote in *The Discovery of Time*, 'was geology.' In the early nineteenth century, between the eras of Cuvier and Darwin, biology arose to accompany geology, and 'the intellectual claims of the modern, extended time-scale were finally established by the resultant interweaving of geological considerations with evolutionary ones.'[1]

Another doyen of the history of geology, Martin Rudwick, reminds us of two key features of that discovery—or two misunderstandings of it, to be precise. First: that 'religious and scientific practices and knowledge *interacted*' during the interweaving Toulmin and Goodfield describe. 'Rather than being the enemy of progress in the sciences of the earth,' Christianity in fact 'fostered the extension of historicity to the previously uncharted vastnesses of pre-human time', as a product and a result of its own fascination with Biblical history, Biblical origins, and Biblical accounts of the creation.[2] Second: that 'it was...the human *imagination* that needed to be stretched, even among savants, before talk of vast amounts of time could begin to seem anything more than vacuous and scientifically irresponsible hand-waving.' (Rudwick, 124–5.) This was a matter of what he calls 'human constructions: not unconstrained by the natural evidence available at a given period, but certainly using that evidence in a representation that has many other inputs besides the fossil bones and

1 Stephen Toulmin and June Goodfield, *The Discovery of Time* (London: Hutchinson, 1965), 141, 143.

2 Martin J. S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005), 6, 643; my italics.

shells themselves.'[1] Religious people and imaginative people played their roles in the discovery of time, and it is the work of one particular religious imaginist I want to discuss here: the sub- or proto-evolutionary epic, *Pelican Island*, published by the direct contemporary of Wordsworth, James Montgomery, in 1827. (A poem 'worth ten *Excursions*', in Ralph Waldo Emerson's view.)[2] Above all, *Pelican Island* takes its origin in *coral*: a zoological interweaver whose biological activity has a posthumous geological result.

Without rehearsing the debate between the 'Vulcanists' (for whom volcanic forces were the chief engine of geological change) and the 'Neptunists' (for whom changes in sea level performed the same role), it is clear that the sea played a massive role in the confluence of geology and biology just described. But the sea in the late eighteenth century was an element that empirical observation could hardly penetrate at all. Objects could be dropped into it and hauled back up again; a person could dive a few fathoms with his eyes open; creatures of all sorts came up in fishermen's nets; but there was no way the sea could systematically be explored beneath its surface: so the imagination had a peculiarly rich field once the greatest ocean in the world was opened up to exploration in the mid-eighteenth century.

Two individuals—one writing at the beginning of the period, the other writing near its end—give us a sense of the obscurity of Pacific Neptunism in the first half of the nineteenth century. François Péron was every inch a product of revolutionary Napoleonism: a self-made (indeed, *soi-disant*) polymath from the provinces who talked his way onto the luckless Baudin expedition to Australia in 1802 and, by a series of accidents and desertions, became in effect its chief scientist. John Williams, hero and martyr of the London Missionary Society, was every inch Péron's antithesis: the product of the British religious revival that had emerged in response to the Enlightenment whose principles the Frenchman served, and stolidly, almost painfully, devout, right up to his murder at the hands of indigenes on a beach at Eromanga in 1839. Thirty years and an immense ideological gulf

1 Martin J. S. Rudwick, *Scenes from Deep Time: Early Pictorial Representations of the Prehistoric World* (Chicago: University of Chicago Press, 1992), 223.

2 Ralph Waldo Emerson, *Journals, 1820–1872*, Vol. 2 (Boston: Houghton Mifflin, 1909), 235.

divided these two travellers in the Pacific, but they possessed essentially the same imaginative restrictions on their capacity to burst the limits of time.

As part of his account of the Baudin expedition, Péron included a volume of 'dissertations on various subjects', including one 'On Some Phenomena of the Zoology of the Southern Regions, which can be Applied to the Physical History of the Earth and of the Human Species'. 'One of the finest results of modern geological research, and also one of the most uncontestable,' he asserted, 'is the certainty that the level of the sea was once much higher than it is now.' The evidence for this conclusion was twofold: petrified seashells found on elevated pieces of ground, and 'Zoophytes observed at great heights above the present level of the sea; madreporic islands and archipelagoes.' Volcanos are the only things that make land rise, Péron was sure; but they could not possibly have raised all this coralline rock above the sea — and, besides, they always left evidence of their activity, and none was to be seen in the antipodes. Thus in his 'General Results' Péron concluded: 'We discovered living zoophytes sowing the seas with fresh dangers, multiplying reefs, increasing the size of islands and archipelagoes, cluttering roadsteads and ports and raising up new calcareous mountains everywhere.'[1]

For Williams, 'modern geological research' would have counted mostly as what he called 'prying researches after knowledge'. 'The great object for which all knowledge should be sought, and for which it ought to be employed,' he wrote in his discussion of coral formations,

> is to illustrate the wisdom or goodness of the great and beneficent Creator. And if we come to the study of natural phenomena, with minds unchilled by scepticism or infidelity, we shall be led to sublime religious contemplations; and whether we examine the little coral insect of the ocean, or gaze upon the gigantic beast of the forest ... we shall be led to exclaim: 'How manifold, O God, are thy works! in wisdom thou hast made them all.'[2]

1 François Péron, *Voyage of Discovery to the Southern Lands*, 2nd edn. (1824), Vol. 3, trans. Christine Cornell (Adelaide: Friends of the State Library of South Australia, 2007), 34, 47.

2 John Williams, *A Narrative of Missionary Enterprises in the South Sea Islands*

In a sense, Williams was nearer to the mark than Péron, who thought that coral reefs were built 'from the floor of the ocean right up to its surface' (Péron, 41). Coral, in his view, needed to find a suitable spot, a suitable platform, and having found it, 'innumerable myriads of these wonderful little animals work with incredible diligence until they reach the surface of the water, above which they cannot build.' (Williams, 8.) Their diligence was worthy of the Victorian seal of approval, but coral could not have built the islands, in Williams' view: they simply did not have the time. According to current scientific estimates of growth, 'eighteen thousand years would be required to produce the island visited by Captain Beechy, thirty thousand for the rocks of Rurutu, and fifty to sixty thousand for those of Mangaia; and only that portion of them which appears above water!' This 'amazing length of time', since it was inconsistent with Biblical history, must be inconsistent with nature; and so, 'After all... that I have seen, and thought, and read upon the subject, my impression is, that the islands remain much in the same state as the deluge left them, and that every subsequent alteration has been partial in its character, and exceedingly limited in its extent.' (Williams, 9–10.)

So it was that Péron managed to exaggerate coral activity in the Pacific region, and Williams managed to underestimate it. The first spoke about the 'prodigious antiquity' of coral activity, but could account for coral islands only in terms of prodigious dynamism; the second spoke about 'incredible diligence', but strictly curtailed the amount of antiquity he would afford it. But both were striving to account, imaginatively as well as rationally, for the manifestations they witnessed in the Pacific: in particular, coral rock above the surface of the water.

There was something about innumerable myriads of wonderful little animals working with incredible diligence until they reached the surface of the sea that English writers would not willingly let die. Thus in 1828 Granville Penn sought to explain the geological world in a set of conversations two children are imagined to have with their—very well informed—mother. 'I think I remember

(London: John Snow, 1840), 7.

seeing it remarked in some book of voyages,' the daughter of the house observes, 'that Otaheité, and all the islands of the South Seas, have been raised from the sea by insects; now, I cannot help thinking this, if true, to be very extraordinary.' In her explanation her mother cites Cook, Forster, and Flinders, and points out, *inter alia*, that coral atolls are built 'with their backs to the sea, as if the coral animalcules were aware of the properties of the arch.' Such a thing, she added, 'cannot be explained otherwise than by the operation of intelligence and design.'[1] A year later Andrew Ure, reconciling the whole field of study 'at once to modern science and sacred history', theorized that 'the numerous volcanic chimnies which ... rise through the vast Pacific, are remnants of the general convulsion which raged at the deluge, ending in the submersion of some primeval continent, corresponding probably in area to the surface of that ocean.'[2] Again: it is easy to smile at this; but 'volcanic chimnies' is by no means the worst expression to use of those tectonic vents that are the sources of all the non-continental islands of the Pacific, high and low.

Andrew Ure imagined a disappearing Pacific continent. Two years later John MacCullough imagined a rising one. By common consent, he wrote, it was understood that coral atolls and islets were 'crowding the whole of the sea, under a rapid increase'. Was it not likely, therefore, that they were 'destined to become the seats of vegetation, and the habitations of man, and perhaps, at length, to form a continent in the Pacific Ocean'? Like Penn's, MacCullough's vision was one of intelligent design. As islands rose, the seawater trapped in their atolls would surely become diluted by rain, until it ceased to be salt at all, thus opening the way for animal life. Was this not a case of 'foresight and contrivance'?[3] Even as late as 1838, Gideon Mantell was indulging himself, Jules Verne-style: 'From the depths of the ocean they

1 Granville Penn, *Conversations on Geology* (London: Samuel Maunder, 1828), 147, 152, 157.

2 Andrew Ure, *A New System of Geology, in which the Great Revolutions of the Earth and Animated Nature, Are Reconciled at Once to Modern Science and Sacred History* (London: Longman, Rees, Orme, Brown, and Green, 1829), 467.

3 John MacCullough, *A System of Geology, with a Theory of the Earth, and an Explanation of its Connexion, with the Sacred Records* (London: Longman, Rees, Orme, Brown, and Green, 1831), 338, 341–2.

elevate those immense reefs that may hereafter form a communication between the inhabitants of the temperate zones.'[1] Twenty-five years later, Louis Agassiz still clung to the idea of a purposeful theodicy. Like coal, coral humiliated our sense of time:

> Leaving aside ... all historical chronology, how far back can we trace our own geological period, and the Species belonging to it? By what means can we determine its duration? Within what limits, by what standard, may it be measured? Shall hundreds, or thousands, or hundreds of thousands, or millions of years be the unit from which we start?[2]

Agassiz was prepared to give corals the time John Williams denied them. But the ubiquity and stability of coral species only made a pious conclusion more inevitable. 'These little beings' had a primary role to play in Creation: 'to make a masonry solid, compact, time-defying, such a masonry as was needed by the great Architect, who meant that these smallest creatures of His hand should help to build His islands and His continents.' (Agassiz, 200.) This was an imaginative pattern that many found simply too attractive, and too harmonious, to deny.

But Agassiz had begun to burst the limits of time, and speculate in terms of millions of years. That was the most important lesson Charles Lyell, James Dana, and Charles Darwin drew from coral. 'When we admit the increase of coral limestone to be slow,' Lyell pointed out, 'we are merely speaking with relation to periods of human observation'. 'Natural chronometers', with their roots in deep time, would be needed to grasp the prodigious antiquity at which Péron had only waved his hand.[3] Dana estimated coral growth at a thousand years per five feet; it was a scale of this temporal magnitude that led him to conclude: 'In this direction ... we find the grandest teaching of coral formations.'[4] Darwin treated the antiquity and

1 Gideon Mantell, *The Wonders of Geology* (London: Rolfe and Fletcher, 1838), 472.

2 Louis Agassiz, *Methods of Study of Natural History* (Boston: Ticknor and Fields, 1863), 151.

3 Charles Lyell, *Principles of Geology*, Vol. 2 (London: John Murray, 1832), 287, 288.

4 James D. Dana, *Corals and Coral Islands* (London: Sampson, Low, Marston,

the rate of growth of coral reefs with the peculiar Olympian grave insouciance that marks his entire project. For him such reefs, 'young' or 'old' (whatever those words might mean), belonged only to 'the present geological æra'. Accordingly, coralline growth is *never* slow, 'when referred either to the standard of the average oscillations of level in the earth's crust, or to the more precise but less important one of a cycle of years.'[1]

How much of this context the philanthropist, newspaper editor, and man Gideon Mantell (491) described as 'one of the most amiable and elegant of our modern poets', James Montgomery, knew in detail is hard to say. (Lyell, Darwin, Dana, and Agassiz, of course, he could not have known when *Pelican Island* was published in 1827.) He read explorers' accounts from the Pacific, and his biographers recorded a conversation that suggests he was well abreast of the 'construction' of coralline geohistory in his era. 'Seeing that coral islands are still constantly in progress of formation and enlargement,' he told John Holland, 'a time might arrive when these would coalesce, and a new continent appear where now only spreads a vast expanse of ocean with its insular spots'. Montgomery's indestructible philanthropy — and his imaginative instinct — envisaged this new world in evangelical terms: 'a continent peopled with human beings blessed with the gospel, basking beneath the meridian blaze of a sun more glorious than ours, and reflecting back to the moon, looking down in loveliness on the scene, a light thirteen degrees broader and brighter than that which the earth at present imparts.'[2]

Around 1818 Montgomery read Matthew Flinders' *Voyage to Terra Australis*, four years after its publication, and was struck by the circumnavigator's account of Kangaroo Island, off present-day South Australia. Flinders' visit to Kangaroo Island was clearly a memorable episode for him. Its isolation is reminiscent in certain respects

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Low and Searle, 1872), 253, 318.

1 Charles Darwin, *The Structure and Distribution of Coral Reefs* (London: Smith, Elder, 1842), 79.

2 John Holland and James Everett, *Memoirs of the Life and Writings of James Montgomery*, 6 vols. (London: Longman, Brown, Green, and Longmans, 1855), 4:249.

of Darwin's encounter with the Galapagos thirty years later. Like Galapagos, Kangaroo Island presented few *species*, but immense numbers of *individuals*: in particular of kangaroos and seals. Another animal present in huge numbers was the pelican, on islets in Nepean Bay:

> Flocks of old birds were sitting upon the beaches of the lagoon, and it appeared that the islands were their breeding places; not only so, but from the number of skeletons and bones there scattered, it should seem that they had for ages been selected for the closing scene of their existence. Certainly none more likely to be free from disturbance of every kind could have been chosen, than these islets in a hidden lagoon of an uninhabited island, situate upon an unknown coast near the antipodes of Europe; nor can anything be more consonant to the feelings, if pelicans have any, than quietly to resign their breath, whilst surrounded by their progeny, and in the same spot where they first drew it. Alas, for the pelicans! Their golden age is past; but it has much exceeded in duration that of man.[1]

In Flinders' account we can clearly see someone trying to burst the limits of time, by contrasting—and by those means comparing—the history of a pelican rookery with the history of civilization.

But there is no reef-building coral on Kangaroo Island; it is located in temperate waters between the Great Australian Bight and Bass Strait, off Spencer Gulf. So Flinders cannot have been Montgomery's only inspiration. Basil Hall's account of his voyage to the far East was published in the year Montgomery read Flinders; and Montgomery read that, too, reprinting this passage from Hall's book alongside Flinders in his preface to *Pelican Island*:

> The examination of a coral reef during the different stages of the one tide, is particularly interesting. When the tide has left it for some time it becomes dry, and appears to be compact rock, exceedingly hard and ragged; but as the tide rises, and the waves begin to wash over it, the coral worms protrude themselves from holes which were before invisible. These animals are of a great

1 Matthew Flinders, *Voyage to Terra Australis*, 2 vols. (London: G. and W. Nichol, 1814), 1:183–4.

> variety of shapes and sizes, and in such prodigious numbers, that, in a short time, the whole surface of the rock appears to be alive and in motion.... When the coral is broken, about high water mark, it is solid hard stone, but if any part of it be detached at a spot where the tide reaches every day, it is found to be full of worms of different lengths and colours, some being as fine as a thread and several feet long, of a bright yellow, and sometimes of a blue colour: others resemble snails, and some are not unlike lobsters in shape, but soft, and not above two inches long.[1]

That this magic living stone might inspire a poet is reasonable enough; but what has Basil Hall's tropical reef to do with Matthew Flinders' temperate island? The answer, I take it, is that Flinders' pelicans were doing what coral does: *hatch new generations of themselves on the remains of the old.* For ages unknown to man the pelicans of South Australia had replicated themselves, like coral, and resigned their breath in the spot where they first drew it. Taken together, therefore, Flinders and Hall planted a seed in Montgomery's religiously imaginative mind.

But it took time for that seed to sprout. In March 1827 Montgomery told John Holland that the idea for the poem 'has been floating in my mind several years'—at least since 1818 when he came across Flinders' pelicans, 'unseen as they were unsung by man.' 'Impressed as I was with the subject,' he went on,

> I thought it would do very well for the foundation of a missionary speech, and serve to illustrate the manner in which the heathen on the adjacent islands had been born, grown up, and perished as ignorant of God, and of all that is good, as we were ignorant of them, and of their neighbours the pelicans. (Holland and Everett, 4:198)

Then, in September 1826, travelling home to Sheffield from Scarborough, he witnessed a flood at the Wharfedale village of Thorp Arch, and had a moment of inspiration:

> only a few more prominent points of ground were seen, like

1 Basil Hall, *Account of a Voyage of Discovery to the West Coast of Corea, and the Great Loo-Choo Island* (London: John Murray, 1818), 107–8.

> green islands amidst the lake. By some involuntary association of ideas, I was powerfully reminded of the Pelican Island. In a moment the radical thought of which I had been so long in quest rushed into my mind; and I saw the whole plan of my poem from beginning to end. I immediately began the subject in blank verse; and by the time we reached Ferrybridge, I had composed a number of lines, which I wrote down with my pencil in the inn there.... (Holland and Everett, 4:199)

The equation is evident: summits of hills in a flooded plain (even in far-off Yorkshire) suggest coral islands in a vast ocean. The resulting poem was eventually published in 1827, and was more optimistic than the original idea for a missionary speech. In *Pelican Island* we see the coral reef become one of those primeval Pacific continents the geohistorians had dreamt of; but this time man is left at the end of the poem, instinctively aware that a beneficent deity is supervising his existence, and bowing, like an antipodal Adam, to his creator.

Pelican Island did not meet with universal approval in the scientific community. 'It is not...within the sphere of science to criticise the poet', Dana suggested; but,

> more error in the same compass could scarcely be found than in the part of Montgomery's 'Pelican Island' relating to coral formations. The poetry of this excellent author is good, but the facts nearly all errors—if literature allows of such an incongruity.

'The poet oversteps his license, and besides degrades his subject,' Dana bluntly concluded (19), 'when downright false to nature.'

But there are more inputs to the construction of geohistory than purely scientific ones---or purely religious ones, come to that. 'There is no authentic history of the world from the Creation to the Deluge, besides that which is found in the first chapters of Genesis', Montgomery had written in his preface to *The World Before the Flood* in 1815.[1] But his later imaginative construction prefigured the geohistorical interweavings of its era in a more ambivalent way. *Pelican Island* is told by one of the ultimate omniscient narrators in English literature: a radically disembodied roaming point of vision that starts

1 James Montgomery, *The World Before the Flood* (London: Longman, Hurst, Rees, Orme, and Brown, 1815), vii.

the poem saying, 'Methought I lived through ages, and beheld / Their generations pass so swiftly by me, / That years were moments in their flight, and hours / The scenes of crowded centuries reveal'd; / While Time, Life, Death the world's great actors, wrought / New and amazing changes:—these I sing.'[1] The poem's first canto essentially rehearses Genesis, moving from 'The sun, the stars, / The moon ... / The planets seeking rest and finding none' (7), through a pair of Vulcanist and Neptunist catastrophes (a 'war of mountains' and a 'wild whirl of foaming surges'), via a rainbow and a dove to a post-diluvian world apparently without life. The first to announce itself is the nautilus, followed by the flying fish, the dolphin, and the whale (13–14). 'In the free element beneath me', the narrator says in Canto Two,

> swam,
> Flounder'd, and dived, in play, in chase, in battle,
> Fishes of every colour, form, and kind,
> (Strange forms, resplendent colours, kinds unnumber'd,)
> Which language cannot paint, and mariner
> Hath never seen; from dread Leviathan
> To insect-millions peopling every wave;
> And nameless tribes, half-plant, half-animal,
> Rooted and slumbering through a dream of life.
> The livelier inmates to the surface sprang,
> To taste the freshness of heaven's breath, and feel
> That light is pleasant, and the sunbeam warm.
> Most in the middle region sought their prey,
> Safety, or pastime; solitary some,
> And some in pairs affectionately join'd;
> Others in shoals immense, like floating islands,
> Led by mysterious instinct through that waste
> And trackless region, though on every side
> Assaulted by voracious enemies,
> —Whales, sharks, and monsters, arm'd in front or jaw,
> With swords, saws, spiral horns, or hooked fangs.
> While ravening Death of slaughter ne'er grew weary,

1 James Montgomery, *Pelican Island and Other Poems*, 2nd edn. (London: Longman, Hurst, Rees, Orme, and Brown, 1828), 1.

> Life multiplied the immortal meal as fast.
> War, reckless, universal war, prevail'd;
> All were devourers, all in turn devour'd;
> Yet every unit in the uncounted sum
> Of victims had its share of bliss, its pang,
> And but a pang, of dissolution; each
> Was happy till its moment came, and then
> Its first, last suffering, unforeseen, unfear'd,
> Closed, with one struggle, pain and life for ever. (17-19)

Here is a Darwinian intimation of the survival of the fittest and of the indefeasible adaptation to that struggle. It is brutal, but not cruel: the pangs here are only those of dissolution, unforeseen and unfeared; and death is only a stoical unravelling of pain and life. But it cannot help blending the language of affect with the language of apathy: fish (or the livelier ones among them, anyway) appreciate fresh air and sunshine; individuals are driven by instinct by also by affection; prey species are 'voracious' but those predated upon enjoy their 'share of bliss'. The discussion is as anthropomorphic in some respects as it is scientifically neutral in others, but its summary statement is of a marine environment bleakly unredeemed by any sense of purpose:

> They roam'd, they fed, they slept, they died, and left
> Race after race, to roam feed, sleep, then die,
> And leave their like through countless generations;
> —Incessant change of actors, none of scene,
> Through all that boundless theatre of strife! (20)

But a boundless theatre of strife is not the last word on the world; the scene does change, however slowly. In 'thrice a thousand years'—half the age Archbishop Ussher ascribed to the Earth—Montgomery's narrator witnesses 'ocean's bed, as from the hand / Of its Creator, hollow'd and prepared / For his unfathomable counsels there,/To work slow miracles of power divine, / From century to century' (23). These slow miracles are worked by coral, and they are the corollary of the 'empty', 'purposeless' marine realm Montgomery had just described. This time the deaths of trillions of individuals leave behind them not the 'universal war' of the survival of the fittest, but a monument in stone:

> Enlongated like worms, they writhed and shrunk
> Their tortuous bodies to grotesque dimensions;
> Compress'd like wedges, radiated like stars,
> Branching like sea-weed, whirl'd in dazzling rings;
> Subtle and variable as flickering flames,
> Sight could not trace their evanescent changes,
> Nor comprehend their motions, till minute
> And curious observation caught the clew
> To this live labyrinth,—where every one,
> By instinct taught, perform'd its little task;
> —To build its dwelling and its sepulchre. (26)

'Millions of millions thus, from age to age,' Montgomery goes on,

> With simplest skill, and toil unweariable,
> No moment and no movement unimproved,
> Laid line on line, on terrace terrace spread,
> To swell the heightening, brightening gradual mound,
> By marvellous structure climbing tow'rds the day.
> Each wrought alone, yet all together wrought,
> Unconscious, not unworthy, instruments,
> By which a hand invisible was rearing
> A new creation in the secret deep.
> Omnipotence wrought in them, with them, by them;
> Hence what Omnipotence alone could do
> Worms did. I saw the living pile ascend,
> The mausoleum of its architects,
> Stilly dying upwards as their labours closed:
> Slime the material, but the slime was turn'd
> To adamant, by their petrific touch;
> Frail were their frames, ephemeral their lives,
> Their masonry imperishable. All
> Life's needful functions, food, exertion, rest,
> By nice economy of Providence
> Were overruled to carry on the process,
> Which out of water brought forth solid rock. (27–8)

Here the Biblical and the proto-Darwinian visions interweave at will. Darwin's faith in instinct and stupidity—in the capacity of 'toil

unweariable' among countless individuals to wear out the rock of mortality and keep the species alive by mutation, so that in actual truth the individual and the variety are indivisible—magically elides with the Biblical language of Omnipotence, Providence, and miraculous transfiguration ('Which out of water brought forth solid rock'). The coral reef becomes an objective correlative for human existence, where simple skill and toil are put to higher purposes, economies, and processes, and where ephemeral lives leave imperishable masonry behind them. The Darwinian and the Biblical theodicies reveal a common gene here: *of course* it is the lowliest of the low, in countless numbers, which have the greatest effect in the end, rather than the charismatic personalities of the animal kingdom. *Of course* the meek shall inherit the earth, in just the same way as Darwin watched humble earthworms bury a slab of granite in his garden at Down House. If they could do that in twenty years, what could they not achieve, given time? What valleys might they not fill, or mountains bring low? For both Darwin and the Bible, such things were inevitable, whether they were the will of Yahweh or of evolution.

But Montgomery would not rest satisfied with an analogy as complacent and anthropocentric as that between coral reef and human community. 'Compared with this amazing edifice,/Raised by the weakest creatures in existence,' he asks, 'What are the works of intellectual man?'

> Towers, temples, palaces, and sepulchres;
> Ideal images in sculptured forms, or in domes expanded,
> Fancies through every maze of beauty shown;
> Pride, gratitude, affection tum'd to marble,
> In honour of the living or the dead;
> What are they?—fine-wrought miniatures of art,
> Too exquisite to bear the weight of dew,
> Which every mom lets fall in pearls upon them,
> Till all their pomp sinks down in mouldering relics,
> Yet in their ruin lovelier than their prime!
> —Dust in the balance, atoms in the gale,
> Compared with these achievements of the deep,
> Were all the monuments of olden time,

In days when there were giants on the earth… (30–31)

Compared to them, 'Great Babylon was like a wreath of sand,/Left by one tide and cancell'd by the next', and Egypt's 'pyramids would be mere pinnacles,/Her giant statues, wrought from rocks of granite,/ But puny ornaments for such a pile/As this stupendous mound of catacombs/Fill'd with dry mummies of the builder-worms.' (31–32.) The perspective is enamoured with science and with providence; but it is mostly enamoured with *time*, and with what time *does*—and no work of literature, not even Shakespeare's plays, is as intent on what time does as the Bible. In the Old Testament time is fate, the medium of destiny, the spinner of cycles of crime and punishment, rise and fall. All that Darwin did, in one perspective, was exchange divine omnipotence for blind force.

In 1841 an essay of Montgomery's written some years earlier was published in the minute book of the Sheffield and Attercliffe Auxiliary of the Tract Society. The source may sound painfully provincial, but there is nothing parochial about its author's moral imagination:

> An earthquake may suddenly engulf the pyramids of Ghizza, and leave the sand of the desert where they stood as blank as the tide would have left it on the sea-shore. A hammer in the hand of an idiot may break in pieces the Apollo Belvidere, or the Venus de Medici, which are scarcely less worshipped as miracles of art in our day, than they were by idolaters of old as the representatives of deities.

'Looking abroad over the whole world after the lapse of nearly six thousand years,' Montgomery concluded, 'what have we of the past but the words in which its history is recorded? What besides a few mouldering a brittle ruins which time in insensibly touching down to dust?'[1] It was a Biblical perspective in the hands of Montgomery the missionary; it was a secular one in the hands of Péron the anthropologist; it was an imaginative perspective the vision of either. 'Thus, while man', Péron wrote (3:47), '—who proclaims himself king of the natural world—laboriously constructs on the earth's surface those

1 Samuel Ellis, *Life, Times, and Character of James Montgomery* (London: Jackson, Walford, and Hodder, 1864), 50, 51.

frail buildings which the effect of time must soon bring down, feeble little worms (whose existence he was but lately ignorant of and still disdains) create in the depth of the ocean more and more of these prodigious monuments, whose strength defies the ages and is such that even the imagination declines to conceive of....'

It was James Hutton who said, 'time is not made to flow in vain; nor does there ever appear the exertion superfluous to power, or the manifestation of design, not calculated in wisdom to effect some general end.' (Quoted in Toulmin and Goodfield, 156.) It is, if one may say so, a sort of Whiggish interpretation of geohistory, that the nineteenth century began to replace with a sometimes scarcely renovated version something far older: a cyclical vision of contending forces, neither achieving final victory over the other. 'Whatever destroying tendencies, then, exist on earth,' William Knight wrote, 'these renovating powers compensate for them.... No marks of a degradation acting through a prolonged series of ages are exposed to our observation, without being met by constant renewal. *The one arises out of the other*.'[1] For Agassiz, too (176), 'destruction and construction go hand in hand, and the materials broken or worn away from one part of the Reef help to build it up elsewhere.' This was a theodicy Darwin himself (at least in his early days) was prepared to walk towards, in his infinitely methodical but also visionary way:

> These coral islands stand, and are victorious: for here another power, as antagonist to the former, takes part in the contest. The organic forces separate the atoms of carbonate of lime one by one from the foaming breakers, and unite them into a symmetrical structure. Let the hurricane tear up its thousand huge fragments; yet what will this tell against the accumulated labour of myriads of architects at work night and day, month after month? Thus do we see the soft and gelatinous body of a polypus ... conquering the great mechanical power of the waves of an ocean, which neither the art of man, nor the inanimate works of nature could successfully resist.

1 William Knight, *Facts and Observations towards Forming a New Theory of the Earth* (London: Longman, Rees, Orme, Brown, and Green, 1818), 258; my italics.

James Montgomery could not see atoms of calcium carbonate being woven and unwoven by coral polyps and the action of the waves. But he could see the Pacific in a flooded Yorkshire valley—and come to similar conclusions.