Charles Darwin's impressions of New Zealand and Australia, and insights into his illness and his developing ideas on evolution

John A Hayman

ABSTRACT

- Charles Darwin visited New Zealand in December 1835, and Australia from January until March 1836, on the return portion of his voyage around the world in HMS *Beagle*.
- Despite the shortness of these visits, he retained an interest in these countries throughout his life, maintaining correspondence and receiving many biological specimens.
- His experiences in these places influenced his thinking on evolution, particularly on the evolution of man.
- Aspects of his health recorded during this part of the voyage support a new hypothesis for the diagnosis of the illness that Darwin endured for most of his life.

MJA 2009; 191: 660–663

Charles Darwin was born 200 years ago on 12 February 1809. On 31 December 1831, at the age of 22, he sailed on HMS *Beagle* as the expedition's naturalist and as gentleman companion to the captain, Robert FitzRoy (later the second Governor of New Zealand [1843–1845]).[1] The voyage, originally planned to take 3 years, lasted for 5 years. It would take Darwin around the world and allow him to observe many different animal species and geological features, observations that led to the development of his ideas on evolution and the mechanism that drives evolution — natural selection.

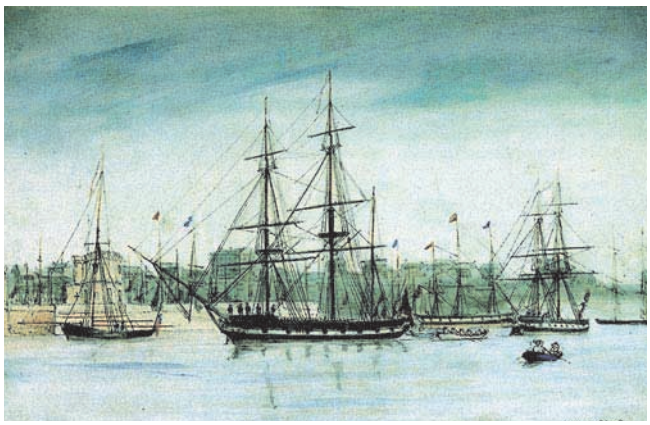
Throughout the 5-year voyage, Darwin was greatly troubled by seasickness. If anything, this sickness became worse as the voyage continued, and was present even when the *Beagle* was in port. The ship reached New Zealand in December 1835, 4 years after the voyage commenced.[2] From the Bay of Islands in New Zealand (27 December), he wrote to his sister Caroline:

> There is no more Geology, but plenty of sea-sickness; hitherto the pleasures & pains have balanced each other; of the latter there is yet an abundance…[3]

This was not Darwin's first experience of illness. He had had what was described as a "weak stomach" as a student in Edinburgh, and symptoms of sore lips (atopic dermatitis) appeared during his Cambridge days.[4] At times he was abnormally "knocked up",[5] and he had palpitations and chest pain before sailing on the *Beagle*.[4] During the voyage, while in South America, he had headaches and episodes of weakness and faintness.[2] However, in the periods when he was not ill, he was extremely fit and could outlast other members of the *Beagle* crew.

Darwin's documentation of his time in New Zealand and Australia demonstrates his superb ability to observe and record, and gives us an insight into his then current ideas. His illness is frequently mentioned.

1 HMS *Beagle* in Sydney



HMS Beagle *at anchor in Port Jackson, painted by Owen Stanley in 1841 during the ship's third voyage (1837–1843).* ◆

New Zealand

Darwin was not attracted to New Zealand. He wrote:

> 30th [December 1835] I believe we were all glad to leave New Zealand; it is not a pleasant place; amongst the natives there is absent that charming simplicity which is found at Tahiti; & of the English the greater part are the very refuse of Society. Neither is the country itself attractive. — I look back but to one bright spot & that is Waimate with its Christian inhabitants.[2] [Waimate is documented as being NZ's first European-style farm.[6]]

Despite this negative impression of New Zealand, Darwin remained interested in the country. At the time of his visit, an epidemic of influenza among the Maori gave him cause to consider the then scientific mystery of contagion.[7] Epidemics aside, Maori were decreasing in number and Darwin was concerned that this was contrary to the Malthus doctrine that populations should increase in times of plenty.[8] In December 1843, Darwin wrote to Ernst Dieffenbach (a German physician and naturalist working in New Zealand who later translated Darwin's account of the voyages of HMS *Adventure* and HMS *Beagle*[9] into German, *Naturwissenschaftlichen Reisen*):

> I have lately been much interested in reading your chapters on the slow decrease in numbers … of these poor people. The case appears to me very curious, especially as the decrease has commenced or continued since the introduction of the potato — the relation between the amount of population & of food is hence inverted. It would have been a case for the great Malthus to have reflected on.[10]

Darwin also observed the decline (at that time) of Australian Aboriginals, and commented:

> The varieties of man seem to act on each other in the same way as different species of animals — the stronger always extirpating the weaker.[9]

Australia

Darwin's impressions of Sydney (Port Jackson) were more positive, if a little parochial, than his impressions of New Zealand:

> 12th [January 1836] At last we anchored within Sydney Cove; we found the little basin, containing many large ships & surrounded by Warehouses [Box 1]. In the evening I walked through the town & returned full of admiration at the whole scene. — It is a most magnificent testimony to the power of the British nation: here, in a less promising country, scores of years have effected many times more than centuries in South America. — My first feeling was to congratulate myself that I was born an Englishman.[2]

He also admired, albeit with considerable condescension, Australia's Indigenous population and compared them favourably to the Fuegians (the indigenous inhabitants of Tierra del Fuego).

Darwin was always eager to leave his ship and explore on shore.

> In the morning of the 16th I set out on my excursion [to Bathurst]; the first stage took us through Paramatta, a small country town, but second to Sydney in importance … The road appeared much frequented by all sorts of carriages. — I met two Stage Coaches. — In all these respects there was a most close resemblance to England; *perhaps the number of Ale-houses was here in excess* [my emphasis].[2]
>
> At Sunset by good fortune a party of a score of the Aboriginal Blacks passed by, each carrying in their accustomed manner a bundle of spears & other weapons [Box 2]. — By giving a leading young man a shilling they were easily detained & they threw their spears for my amusement. — They were all partly clothed & several could speak a little English; their countenances were good-humoured & pleasant & they appeared far from such utterly degraded beings as usually represented. — In their own arts they are admirable; a cap being fixed at thirty yards distance, they transfixed it with the spear delivered by the throwing stick, with the rapidity of an arrow from the bow of a practised Archer; in tracking animals & men they show most wonderful sagacity & I heard many of their remarks, which manifested considerable acuteness. — They will not however cultivate the ground, or even take the trouble of keeping flocks of sheep which have been offered them; or build houses & remain stationary. — Never the less, they appear to me to stand some few degrees higher in civilization, or more correctly a few lower in barbarism, than the Fuegians.[2]

During his stay in Australia, Darwin never saw a kangaroo, but he did see several platypuses and kangaroo rats [long-nosed potoroos, *Potorous tridactylus*]. He wrote on 19 January 1836:

> In the dusk of the evening I took a stroll along a chain of ponds, which in this dry country represent the course of a river, & had the good fortune to see several of the famous Platypus or Ornithorhyncus paradoxicus. They were diving & playing about the surface of the water; but showed very little of their bodies, so that they might easily have been mistaken for many water rats …[2]
>
> A little time before this, I had been lying on a sunny bank & was reflecting on the strange character of the Animals of this country as compared with the rest of the World. An unbeliever in everything beyond his own reason, might exclaim "Surely two distinct Creators must have been [at] work; their object however has been the same & certainly the end in each case is complete".[2]

2 Australian Aboriginals

"Australian natives and weapons", from: Journal of researches *by Charles Darwin* (redrawn from expedition drawings).[11] *Reproduced with permission from John van Wyhe, editor.* The complete work of Charles Darwin online. ◆

Darwin then observed an antlion larva (family Myrmeleontidae), with its conical pit, entrap an unwary fly and compared the larva with its European equivalent. He wrote:

> Now what would the Disbeliever say to this? Would any two workmen ever hit on so beautiful, so simple & yet so artificial a contrivance? It cannot be thought so. — The one hand has surely worked throughout the universe.[2]

Darwin clearly had not developed his ideas of evolution at this stage and his fundamental religious beliefs, although questioned, remained intact.

Despite the respite ashore, Darwin was still unwell. The 3-year voyage was now in its fifth year, and from Port Jackson, Robert FitzRoy wrote, on 26 January 1836, to the Naval Hydrographer, Captain Francis Beaufort, the officer who had commissioned the *Beagle* voyage:

> My messmate Mr. Darwin is so much the worse for a long voyage that I am most anxious to hasten as much as possible. Others are ailing and much require that rest which can only be obtained at home.[12]

However, during the periods when Darwin was not sick, he was capable of strenuous physical activity. His ride to Bathurst took place in January, at the height of the Australian summer. He returned to Sydney in 6 days, averaging 45 km a day on horseback in temperatures of more than 40°C. This journey was not without cost, and Darwin was ill in bed for a day, and spent another day recovering at Wentworth Falls on the return journey.

In February 1836, the *Beagle* anchored in Hobart. Darwin climbed Mt Wellington (height, 1271 m) in a day, after failing in a similar attempt on the previous day. With his local guide, he records:

> It cost us five & a half hours of hard climbing before we reached the summit … After staying some hours on the summit, we found a better way to descend, but did not reach the Beagle till eight o'clock, after a severe day's work.[2]

From Hobart, HMS *Beagle* crossed the Great Australian Bight and made landfall at King George Sound. Darwin's seasickness continued. He noted on 6 March 1836:

> In the evening came to an anchor in the mouth of the inner harbor of King Georges Sound. Our passage has been a tolerable one; & what is surprising, we had not a single encounter with a gale of wind. — Yet to me, from the long Westerly swell, the time has passed with no little misery.[2]

Darwin was unimpressed with this part of Western Australia.

> We staid there eight days & I do not remember since leaving England having passed a more dull, uninteresting time … Every where we found the soil sandy & very poor; it either supported a coarse vegetation of thin low brushwood & wiry grass, or a forest of stunted trees … The general bright green color of the brushwood & other plants viewed from a distance seems to bespeak fertility; a single walk will however quite dispel such an illusion; & if he thinks like me, he will never wish to walk again in so uninviting a country.[2]

Darwin also thought little of Australian society:

> The whole population, poor and rich, are bent on acquiring wealth; the subject of wool & sheep grazing amongst the higher orders is of preponderant interest. The very low ebb of literature is strongly marked by the emptiness of the booksellers' shops; for they are inferior even to those in the smaller country towns of England.[2]

Despite these impressions, Darwin maintained an interest in Australia, as he did in New Zealand. His servant and assistant on board ship, Syms Covington, later migrated to New South Wales and maintained regular correspondence with Darwin. He sent Darwin examples of Australian barnacles. The midshipman, Philip King, later joined his father, Captain Philip Parker King (son of Governor Philip Gidley King), in Australia and sent Darwin useful information about sheep breeding. Two of the crew of the *Beagle* on Darwin's voyage (the second voyage of the *Beagle*) took part in the *Beagle*'s third voyage (1837–1843) under the command of Captain J C Wickham, the First Officer on Darwin's voyage. They discovered a large body of sheltered water in northern Australia, which they named "Port Darwin" after their previous shipmate. Darwin would be proud of the city that is now, indirectly, named after him.

Darwin's illness

Darwin's negative impressions of New Zealand and Australia may have been influenced by his frequent illness, and he was certainly longing to return to England. In crossing the Great Australian Bight, he was once more overcome by seasickness. It is important to emphasise that Darwin's illness at sea was not normal seasickness; it was present throughout the 5-year voyage, even when the *Beagle* was in port, and, if anything, became worse as the time passed. It was not a "red herring", as has been proposed;[13] rather it was an integral part of Darwin's illness, an illness that troubled him severely for most of his life.

Nor was seasickness the cause of his lifelong illness, as some of Darwin's colleagues thought. As described above, Darwin's illness was present before he sailed on the *Beagle*, when he was ashore in South America, and during his excursion from Sydney to Bathurst, and it worsened after he returned to England.

I have proposed that Darwin's illness was caused by cyclic (cyclical) vomiting syndrome (CVS),[14] a little known but well defined disorder linked to abnormalities of mitochondrial DNA.[15] Although generally regarded as a childhood disease, CVS frequently persists into adult life and may appear for the first time in adulthood.[16] It is correctly termed a syndrome, as people with CVS vary in their symptomatology, depending, presumably, on the exact nature of the mtDNA abnormality and the proportion of affected mitochondria.[17] Collectively, patients with this disorder have the same range of rather bizarre symptoms experienced by Darwin. Many experience motion sickness and are limited in their ability to travel.

CVS is characterised by periods without symptoms. Darwin travelled on horseback for 400 miles (650 km) in Argentina[6] and, in South America, he crossed the Andes twice.[6] In Australia, as mentioned earlier, he travelled more than 270 km in 6 days on horseback, with high temperatures and bushfires, and in Tasmania he climbed Mt Wellington.

His illness at this time of his life was typical of CVS — episodes of illness are interposed with periods of completely normal health. Later in life, episodes or "cycles" may become more frequent and even become confluent, with illness lasting for weeks or months. Severe motion sickness is frequently a feature of the condition and may act as a trigger, bringing on a full cycle of nausea, retching, vomiting, headache and abdominal pain. Exhaustion, both physical and mental, can bring on an episode, and it was probably physical exhaustion from horseriding in the heat that caused him to be confined to bed for a day during his trip to Bathurst. In Box 3,

3 Comparison of Darwin's main symptoms with those of patients with cyclic (cyclical) vomiting syndrome (CVS)

Darwin's symptoms	Symptoms of CVS patients*
Nausea, vomiting, retching	Symptom recorded
Abdominal pain	Symptom recorded
Initially episodic	Symptom recorded
Triggered by excitement, stress	Symptom recorded
Relieved by exposure to water	Symptom recorded
Headache, visual disturbance	Symptom recorded
Weakness, trembling, lethargy	Symptom recorded
"Eczema", recurrent boils	Symptom recorded
Motion sickness	Symptom recorded
Dental caries	Symptom recorded
Skin pigmentation	Symptom not found†
Backache ("lumbago")	More enquiry needed
Mild dyslexia	More enquiry needed

*Patients with CVS differ markedly in their symptomatology; some have only episodic nausea and vomiting, essential criteria for the diagnosis.

†Patients with CVS now receive fluid and electrolyte replacement during cyclic episodes. Elevated adrenocorticotropic hormone and melanocyte-stimulating hormone levels have been recorded in one patient before intravenous therapy.[18] ◆

the most prominent of Darwin's many symptoms are compared with those of patients with CVS.

Many diagnoses have been proposed to account for Darwin's symptoms and illness — arsenic poisoning (arsenic was used as a treatment for eczema), brucellosis, Chagas disease, and lactose intolerance.[19] Some have suggested psychogenic diagnoses, such as hypochondria or neurasthenia.[19] I believe that the origins of Darwin's illness lay in his mitochondria, not in his mind. Like his mother and his maternal uncle, and probably his wife (all belonging to the Wedgwood family, famous for Wedgwood pottery), I believe Darwin suffered from impaired mitochondrial function due to abnormal DNA in these organelles, DNA inherited from his Wedgwood forebears.[14]

Charles Darwin did not know about genes, or DNA, or mitochondria and mtDNA. We can be sure, though, that he would have delighted in this knowledge and been pleased that it supported his theory of evolution. He would have rejoiced that this knowledge may now explain his own puzzling illness. Darwin worried that his children, who were often sick, had inherited his condition.[20] He would also have been pleased to know that he could not have passed his defective mitochondria on to his children.

Acknowledgements

The quotations from Charles Darwin's *Beagle* diary are reproduced with permission from John van Wyhe, editor. The complete work of Charles Darwin online <http://darwin-online.org.uk/>.

Competing interests

None identified.

Author details

John A Hayman, MB BS, MD, FRCPA, Associate Professor
Department of Anatomy and Developmental Biology, Monash University, Melbourne, VIC.
Correspondence: hayman@johnhayman.net

References

1 Desmond A, Moore J. Darwin. London: Penguin Books, 1991.
2 Rookmaaker K, editor. Darwin's Beagle diary (1831–1836). English Heritage 88202366. The complete work of Charles Darwin online. http://darwin-online.org.uk/content/frameset?itemID=EHBeagleDiary&viewtype=text&pageseq=1 (accessed Oct 2009).
3 Darwin CR. Letter 289 — Darwin, C. R. to Darwin, C. S., 27 Dec 1835. Correspondence 1: 471. In: Burkhardt F, Smith S, editors. The correspondence of Charles Darwin. Vol 1. Cambridge: Cambridge University Press, 1985.
4 Barlow N. The autobiography of Charles Darwin 1809–1882, with original omissions restored. London: Collins, 1958.
5 Darwin CR. Letter 73 — Darwin, C. R. to Fox, W. D. [15 Oct 1829]. Correspondence 1: 93. In: Burkhardt F, Smith S, editors. The correspondence of Charles Darwin. Vol 1. Cambridge: Cambridge University Press, 1985.
6 Darwin C. Voyage of the Beagle. Penguin Classics. London: Penguin Books, 1989.
7 Gulick A. Charles Darwin, the man. *The Scientific Monthly* 1922; 14: 132-143.
8 Malthus T. An essay on the principle of population. London: Johnson, 1798.
9 Darwin CR. Voyages of the Adventure and Beagle. Vol III. Narrative of the surveying voyages of His Majesty's ships Adventure and Beagle between the years 1826 and 1836, describing their examination of the southern shores of South America, and the Beagle's circumnavigation of the globe. Journal and remarks. 1832-1836. London: Henry Colburn, 1839. The complete work of Charles Darwin online. http://darwin-online.org.uk/ (accessed Oct 2009).
10 Darwin CR. Letter 725 — Darwin C. R. to Dieffenbach, Ernst, 16 Dec 1843. Correspondence 2: 423. In: Burkhardt F, Smith S, editors. The correspondence of Charles Darwin. Vol 2, 1837–1843. Cambridge: Cambridge University Press, 1987. The complete work of Charles Darwin online. http://darwin-online.org.uk/ (accessed Oct 2009).
11 Darwin CR. Journal of researches into the natural history and geology of the countries visited during the voyage of H.M.S. Beagle round the world. Under the command of Capt. Fitz Roy, R.N. With a biographical introduction [by GT Bettany]. 7th ed. London: Ward Lock (Minerva Library No. 1), 1890.
12 Darwin F. FitzRoy and Darwin, 1831–1836. *Nature* 1912; 88: 547-548.
13 Campbell AK, Matthews SB. Darwin's illness revealed. *Postgrad Med J* 2005; 81: 248-251.
14 Hayman J. Darwin's illness revisited. *BMJ* 2009; 339. In press.
15 Boles RG, Adams K, Li BU. Maternal inheritance in cyclic vomiting syndrome. *Am J Med Genet A* 2005; 133A: 71-77.
16 Fleisher DR, Gornowicz B, Adams K, et al. Cyclic vomiting syndrome in 41 adults: the illness, the patients, and problems of management. *BMC Med* 2005; 3: 20.
17 Salpietro, CD, Briuglia S, Merlino MV, et al. A mitochondrial DNA mutation (A3243G mtDNA) in a family with cyclic vomiting. *Eur J Pediatr* 2003; 162: 727-728.
18 Nakazato Y, Tamura N, Shimazu K. An adult case of cyclic vomiting syndrome successfully responding to valproic acid. *J Neurol* 2008; 255: 934-935.
19 Colp R Jr. Darwin's illness. Florida: University Press of Florida, 2008.
20 Darwin CR. Letter 1489 — Darwin, C. R. to Fox, W. D., 24 [Oct 1852]. Correspondence 5: 99. In: Burkhardt F, Smith S, editors. The correspondence of Charles Darwin. Vol 5: 1851–1855. Cambridge: Cambridge University Press, 1990.

(Received 19 Aug 2009, accepted 6 Oct 2009) ❑