DARWIN’S ILLNESS: A FINAL DIAGNOSIS

by

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We have re-examined many of the abundant publications on the illness that afflicted Charles Darwin during most of his life, including some of the 416 health-related letters in his correspondence, as well as his autobiographical writings. We have concluded that he suffered from Crohn’s disease, located mainly in his upper small intestine. This explains his upper abdominal pain, his flatulence and vomiting, as well as his articular and neurological symptoms, his ‘extreme fatigue’, low fever and especially the chronic, relapsing course of his illness that evolved in bouts, did not affect his life expectancy and decreased with old age, and also the time of life at which it started. It apparently does not explain, however, many of his cutaneous symptoms. We do not support other diagnoses such as Chagas’ disease, lactose intolerance or the many psychiatric conditions that have been postulated.

Keywords: Darwin; illness; Crohn’s disease; Chagas; lactose intolerance

INTRODUCTION

The illness that afflicted Charles Darwin for more than 40 years was a cause of considerable suffering for him (only his wife Emma knew ‘the full amount of suffering he endured’1), and has remained something of a puzzle for physicians since its very beginning (Dr Holland ‘never saw such a case’;2 Dr Gully ‘seems puzzled by my case’;3 Dr Jenner and Dr Brinton found ‘no organic mischief’;4 and his friends thought it was all due to hypochondria, a diagnosis later upheld by Keith and by Hubble5). Since his death in 1882, many pages have been written on the subject, and a large number of mostly conflicting diagnoses have been put forward.6 We shall briefly discuss the more important ones at the end of the article, but first we shall present evidence that strongly suggests that Darwin’s disease was, in fact, Crohn’s disease.

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Crohn’s disease is a chronic, relapsing illness that begins usually between 20 and 40 years of age, does not alter life expectancy and affects people who have some genetic predisposition and live under good hygienic conditions. Darwin’s disease started when he was about 30 years old and lasted until his death at the age of 73 years. Its course was chronic, with relatively short partial remissions and bouts of exacerbation. The sanitary conditions at ‘the Mount’—the Darwin home in Shrewsbury—and later at Edinburgh, Cambridge and on the Beagle, may be presumed good, and certainly better than those prevailing in London at the time, or in the countries that the Beagle visited.

Crohn’s disease is thought to start with an inductive phase, in which bacterial infection of the gastrointestinal tract leads to breakdown of the epithelial barrier, although this may not be always apparent because of the long time that usually elapses between this phase and the appearance of clinical signs of the disease. This is supported by finding intracellular bacterial RNA in the intestine of 80% of patients with the disease. This is then followed by an overreaction of the immune system, which leads to the appearance of symptoms that depend on a number of factors, among them the location of lesions. Darwin suffered a severe gastrointestinal infection that probably affected only his upper gastrointestinal tract, as judged by his being treated with calomel, a purgative, which is evidence that he had no colitis. This infection started on 19 September 1834 and had him confined to bed, in Valparaiso, until the end of October 1834. He attributed it to having drunk some ‘chichi’ (chicha, a lightly fermented grape juice) in a gold mine, owned by a certain Mr Nixon, close to Rancagua, in central Chile. This episode, largely ignored, was probably the beginning, the inductive phase of Crohn’s disease. On his return to England, after about two years, he started with some ill-defined symptoms (‘I was occasionally unwell’) that increased in severity, until in September 1839 the illness that would afflict him for the rest of his life was already evident. An old acquaintance described Darwin at this time as ‘obviously very ill & looking like a shadow’. The digestive symptoms that Darwin experienced more frequently were ‘extreme spasmodic daily and nightly flatulence’, that was increased by spice and salad, by excessive work, long conversations, public presentations, and anything that flurried him. This was the main cause of the many bad nights he experienced. The other major ailments were abdominal distress, with upper abdominal pain that varied greatly in intensity from slight to excruciating, as observed by Dr Lane, and, especially, vomiting, whose frequency varied greatly: ‘incessant vomiting’, ‘vomiting every week’, ‘suffered from almost incessant vomiting for nine months’, ‘Hurrah! I have been 52 hours without vomiting’, and so on. These vomits occurred two to three hours after eating, and food was not present in them. His appetite was usually good, he was ‘not thin’, and ‘evacuation was regular & good’. By comparison, Crohn’s disease located in the upper small intestine shows intermittent nausea and vomiting, and pain in the upper abdomen that may become very intense, just as in Darwin’s illness. Darwin himself located the origin of ‘the air’, that is flatulence, ‘some where… lower down than the stomach’. These symptoms increase after eating, as a consequence of luminal obstruction, but are lessened by a scant meal, as that prescribed by Dr Bence Jones, or by soft foods such as ‘plain pudding’ (in fact, about one-half of Emma Darwin’s cookbook was dedicated to puddings). This location does not result in diarrhoea, as seen when the ileum or colon are affected, but rather a tendency to constipation, which Darwin had in his later years, when he ordered enemas. Crohn’s disease, in about 8% of
patients, also causes aphthous ulcerations in the mouth,\textsuperscript{21} which Darwin also described in his sketch to Dr Chapman as ‘tongue crimson and ulcerated’.\textsuperscript{18}

Another range of symptoms that have been mostly neglected are those related to abnormal sensations (paraesthesias): Darwin complained of ‘pins and needles keeping him from working on his book’ (\textit{The descent of man}), of ‘dreadful numbness’ in his finger ends,\textsuperscript{22} and of his ‘hands burning as if dipped in hell-fire’. All this may correspond to peripheral neuropathy of sensitive fibres (‘yes-yes-exactly-tut-tut, neuralgic’, said Dr Robert Darwin, Charles’ father and a highly competent physician).\textsuperscript{22} This peripheral neuropathy is common in Crohn’s disease and is usually attributed to vitamin B\textsubscript{12} deficiency, either as a result of defective absorption or, more frequently, bacterial overgrowth syndrome.\textsuperscript{11,23} This may have also caused some degree of anaemia that was possibly responsible for the episode in which Darwin was described as ‘yellow, sickly, very quiet’ in contrast to his usually ruddy complexion.\textsuperscript{24} Although Crohn’s disease may cause jaundice because of compression of the common bile duct, sclerosing cholangitis or biliary calculi, the evolution of Darwin’s illness is not compatible with these pathologies. Vitamin deficiency also produces reddening of the tongue, as occurred with Darwin.\textsuperscript{18}

During his life Darwin showed a variety of cutaneous symptoms. During his early, pre-\textit{Beagle} years he may have had facial eczema.\textsuperscript{25} Later on, during his chronic illness, he suffered from several cutaneous alterations. In the 1840s and 1850s he had boils that frequently coincided with an aggravation of the digestive symptoms, as well as eczema, on occasions induced by stress and accompanied by swelling of the face. During much of 1863 he suffered daily ‘attacks’ of ‘abominable yet blessed’ facial eczema that peeled his skin and ‘energized’ him. Such attacks apparently began in 1859 and disappeared soon after 1863. His friend Hooker also reports that, in the early 1840s, after conversations with Darwin in which there was some intellectual conflict, the latter showed ‘violent eczema in the head during which he was hardly recognisable’. This lasted for a few hours and was not followed by desquamation. It is known that eczema is aggravated by stress, either resulting from external causes or because of the process of coping with chronic disease, both of which were present in Darwin’s life. He also spoke of ‘rash’, ‘erythema’ and ‘eruptions’, the meaning of which is not clear. Although erythema nodosum is seen in 25\% of patients with Crohn’s disease, it consists of reddening of the skin and nodules that do not suppurate or ulcerate, usually located in the legs, and is followed by desquamation. Erythema nodosum, just as in Darwin’s ‘boils’, follows the course of Crohn’s disease; however, its signs do not coincide with those presented by Darwin.

Other overlooked symptoms of Darwin’s illness are the articular ones. He complained on eight different occasions of ‘rheumatism’, probably arthralgias, without indicating its location. He also spoke of lumbago, which at one time became constant, and of stiffness of the spine (‘my back feeling locked & rigid’).\textsuperscript{18} No apparent cause for these symptoms has been put forward; however, articular complaints such as non-deforming migratory arthritis of large joints or, in the spine, sacroiliitis or ankylosing spondylitis, are common in Crohn’s disease.\textsuperscript{21} Darwin also suffered from ‘involuntary twitching of muscles’, a sign of motor nerve hyperexcitability, which is observed during hyperventilation and also after copious vomiting, both conditions leading to alkalosis, by loss of CO\textsubscript{2} or of H\textsuperscript{+}, respectively. Hyperventilation was never described in him, but vomiting was frequent, and these nerve signs, as well as swimming head, treading on air, fatigue sensation and seeing black spots, all of which Darwin had, are associated with it.

Another prominent feature of Darwin’s illness was ‘extreme fatigue’ and ‘most days great prostration of strength’,\textsuperscript{18} which largely contributed to turning him from an exceptionally
vigorous young man into an invalid at the age of 33 years. These symptoms are also seen in Crohn’s disease,\(^\text{11}\) as well as non-specifically in most immune diseases of a general character.

Darwin often complained of shivering, associated initially with palpitations that were present even in the days that preceded the sailing of the *Beagle*, and have been attributed to the effects of coffee, strong tea, smoking or snuff,\(^\text{6}\) and, later on, associated with his digestive distress. According to Emma Darwin, it corresponded to fever,\(^\text{26}\) also seen frequently, to a moderate degree, in Crohn’s disease. Incidentally, the clinical thermometer was introduced into clinical medicine only near the end of the nineteenth century.\(^\text{27}\)

The beneficial, although transient, effect of cold baths, when at the hydropathic establishments at Malvern (‘I consider the sickness as absolutely cured’), Moor Park or Ilkley House, may be also interpreted in the light of Crohn’s disease, because cold enhances cortisol secretion, which depresses the immune system and inflammation, and ameliorates the symptoms of the disease, also transitorily.\(^\text{12}\)

**Psychological factors**

Darwin’s illness was frequently aggravated by psychological triggers, especially by stressful situations such as speaking in public, criticisms, and arguments concerning his work, although many times his worsening had no apparent cause. According to Walter C. Alvarez, in sensitive persons (such as Darwin, and also in those who suffer from Crohn’s disease\(^\text{28}\)), ‘the meddling of the brain in the functions of organs like the heart and stomach is excessive’,\(^\text{29}\) or, in Darwin’s own words: ‘I find the noodle [used in the sense of head or brain] & the stomach are antagonistic powers’.\(^\text{30}\)

These psychological influences have suggested to many that they were the ‘cause’ of Darwin’s disease and not just a non-causal, modulatory influence as is frequent in Crohn’s disease.

Among these psychological factors, it has been repeatedly suggested that the real cause of Darwin’s disease was the conflict that his evolutionary ideas produced in him, as he was well aware of the resistance they would find. He felt, when in 1844 he first presented them to J. D. Hooker, it was ‘like confessing a murder’.\(^\text{31}\) We believe, however, that although his evolutionary ideas and the conflicts derived from them did influence his disease, a causal relationship is unwarranted, because he had no special troubles when writing the first volume of his ‘big book’ on the transmutation of species,\(^\text{32}\) and, conversely, during the eight years it took him to write his work on barnacles, a non-conflicting subject, ‘two years of this time were lost by illness’.\(^\text{33}\) The same may be said of his work on corals, which he spent about 3\(\frac{1}{2}\) years in writing, but included in this time is 23 months that he lost because of illness or visits.\(^\text{34}\) In addition, his illness became aggravated many times without any apparent cause.\(^\text{35}\)

The lack of apparent organic causes has, up to now, been the main basis for suggesting a psychiatric cause for Darwin’s disease. However, this may not be so because Darwin once vomited clots of blood,\(^\text{36}\) thus indicating an organic cause. In addition, the lesions of Crohn’s disease were beyond the reach of the diagnostic tools available at the time. Besides, the psychiatric conditions suggested as causal—for example hypochondria, neurosis, depression, panic or anxiety disorders, as well as some psychoanalytical interpretations—do not correspond to the symptoms present in Darwin’s disease: he showed no panic attacks (on only one occasion did he suffer from panic, during a nightmare), nor persistent anxiety, and his condition was far from imaginary, as testified by many of the most distinguished physicians of his time. In addition, Charles Darwin’s personality, described as charming, affectionate,
cheerful, gentle, sweet, kind-hearted, patient, generous and playful, who loved social life and enjoyed a good joke, seems incompatible with neurosis or depression.

Darwin occasionally suffered from episodes of headache that, judging from the one he had during the two days and two nights that preceded his marriage, were of a tensional nature.

Another feature of Crohn’s disease is the decrease in symptoms with age, possibly correlated with the involution of intestinal granulomas. This also occurred with Darwin, who felt considerably better, although not well (‘I cannot forget my discomfort for an hour’) during his last years.

OTHER DIAGNOSES

Another diagnosis that has enjoyed popularity is that of Chagas’ disease. This is based on the fact that Darwin was bitten by a vinchuca—not a Benchuca as in Darwin’s diary—(Triatoma infestans, the vector of Trypanosoma cruzi, the causative agent of the disease), near Mendoza, Argentina, on 25 March 1835. This hypothesis can, however, be easily discarded because not all vinchuvas carry T. cruzi; Darwin did not show the acute symptoms of the disease; the chronic phase of Chagas’ disease appears 10–20 years after the infection (in Darwin’s case the latency was 4 years) and is manifested by myocarditis with dilation, heart failure or alteration in the rhythm; by megaesophagus, with difficulty in swallowing; or by megacolon with severe constipation and asymmetric bulging of the abdomen. Chagas’ disease also decreases life expectancy by about nine years. None of these symptoms were present in Darwin.

Recently, the suggestion has been made that Darwin’s illness was due to lactose intolerance. This is of interest because it points to an organic gastrointestinal cause, and it may have contributed in a minor way to Darwin’s symptoms, as there is a strong (83.3%) association between active Crohn’s disease and lactose intolerance, in which the former generates or accentuates the latter. We think, however, that the main features of lactose intolerance, namely stools or diarrhoea, pain in the lower abdomen, abdominal bloating, borborygmi or gases (namely anal ‘wind’), do not correspond to the symptoms present in Darwin, whose stools were ‘regular & good’, he felt pain in the upper, not lower, abdomen, and did not report borborygmi or gases. In addition, Darwin was a keen observer of nature and himself, and he associated his symptoms with spice and salad, anything that flurried him, and so on, but not with dairy products. In fact, he was convinced that plain (milk-containing) pudding lessened his sickness.

CONCLUSION

In summary, virtually all of the symptoms of Darwin’s ‘mysterious illness’ may be explained by Crohn’s disease, with the possible exception of some of the numerous skin alterations (eczema, rash, erythema and boils) that he suffered, part of which seem to have been present before the Beagle voyage. It is also known that eczema is increased by stress, which Darwin suffered abundantly, and that in inflammatory bowel disease the response to stressors is enhanced. In retrospect, it is of interest that the most accurate diagnosis made during Darwin’s life was that by Dr Edward Lane, who said he suffered from ‘dyspepsia of an aggravated character’, which, at the time, was the closest he could get to Crohn’s disease. It is also noteworthy that T. H. Huxley FRS should say, in relation to the origin of Darwin’s disease, that the ‘anomalous but severe disorder, which laid him up for several weeks at
Valparaiso, in 1834, however, seems to have left its mark on his constitution’.\(^4^9\) It is also paradoxical that Charles Darwin (CD) suffered from Crohn’s disease (CD), and that the Chilean contribution to his illness has been, in a minor way, balanced by a Chilean diagnosis.

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**NOTES**

2. C. Darwin, letter to W. D. Fox, 6 February 1849.
4. C. Darwin, letter to J. D. Hooker, 26 March 1864.
14. C. Darwin, letter to Catherine Darwin, 8 November 1834.
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25 C. Darwin, letter to W. D. Fox, 4 July 1829.
30 C. Darwin, letter to Caroline Darwin, May 1838.
31 C. Darwin, letter to J. D. Hooker, 11 January 1844.
34 C. Darwin, letter to Emma Darwin, May 1842.
39 C. Darwin, letter to J. D. Hooker, 15 June 1881.
42 Colp, op. cit. (note 16).