Excerpt from

Feeling for Stones

Chapter Six
Darwin's Face

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I have in front of me a postcard from the nineteenth century. It is the yellowing portrait of an old man whose white head and shoulders are framed in a dark oval background. His eyes are ancient and deeply shadowed, sinking beneath the deep lines of his brow. His expression is sad, thoughtful and steady, a formal pose soaked in fatigue. It is a portrait of Charles Darwin who died in 1882. His signature is at the bottom of the card, with a wavy brown water stain running through it. It is one of those bits of ephemera that come into our lives casually and can just as easily disappear. In 1849, Darwin's favourite daughter, Anne, was ill with scarlet fever, as were her two sisters. While her sisters recovered quickly, Anne failed to thrive so her father took her to Malvern to be treated by Dr. Gully, whose water cure had once done Darwin considerable good. Tragically, Anne, aged nine, not only did not improve, but got worse, developing intense fever and vomiting. '*Oh my own'* wrote Darwin to his wife, *' it is very bitter indeed'*. A few days later their daughter died. On the death certificate, Dr. Gully cautiously gave the cause as *'bilious fever with typhoid characteristics,'* unwilling to admit that typhoid, a water-borne disease, might be to blame.[1]

The sadness of Darwin's face, forces me to ask why, one hundred years after the take-off of the industrial revolution – that marvellous invention of an intelligent and creative society – was there so little practical understanding in England of the causes of disease? Why was it that each remedy was often little more than a educated stab in the dark? Why did Darwin's much-loved daughter die of a disease that is relatively easy to control? Why was Darwin as bewildered as any other parent of his day? He was a man whose knowledge of biology and the natural world was so detailed and insightful that it continues to haunt our lives, yet he did not know enough to keep his daughter alive.

The puzzle is even more perplexing when we realise how many of the elements that compose our Western germ theory of disease were available in London by 1720. The first piece of the puzzle appeared in 1616 when William Harvey described the circulation of blood in a lecture at St. Bartholomew's Hospital in Smithfield. By 1660, Dr. Thomas Sydenham

was teaching his pupils to observe closely the symptoms of illness because '*Nature, in the production of disease, is uniform and consistent.'* Each collection of symptoms, he argued, was the signature of a different disease. In the 1670s, Antony van Leeuwenhoek, a draper in the Netherlands, built his own microscopes, using them to look inside a droplet of water. There he discovered numerous small *animacules* which he described in letters to the Royal Society in London. *'I now saw very plainly that these were little eels, or worms, laying all huddled up together and wriggling … This was for me, among all the marvels that I have discovered in nature, the most marvellous of them all …'* During the same years, two early members of the Royal Society – John Graunt, a haberdasher, and William Petty, a natural philosopher – laid the foundations for demography and epidemiology when they began discovering patterns of disease in the London records of mortality. Finally, by 1717, Lady Mary Wortley Montague, wife of the British Consul in Constantinople, had written to a friend describing how Turkish peasant women performed inoculations against smallpox in annual parties among friends.[2]

All this information was collected and heard in the Royal Society in London where it might have been understood as a unified problem around the table one evening over dinner. Yet no record of such insight survives. Instead, there was no systemic understanding of the causes of disease until 1879 when Robert Koch in Germany published his paper on the bacterial origins of infectious disease.[3] In 1850, no one could treat Anne Darwin because no one really understood why she was ill. There was no conceptual framework that helped people to understand the workings of disease in the same way that Isaac Newton's framework had simplified the workings of the mechanical world.

So was better health one of the foundations of industrialisation in England, as it is today in all developing countries? Or did English inventiveness exist despite the predations of disease? It seems that both conclusions are true. Higher life expectation in England did not precede economic development to the same extent seen in the late twentieth century, but it did not stagnate either; it simply rose in a more modest way. However, unlike the 20th century, better health was not the result of direct human intervention. Rather, it was the unforeseen consequence of unpredictable natural histories and petty human choices about what to drink, what to wear and how to use the land.

Take for example, access to clean water, one of the prerequisites of healthy societies. Between 1400 and 1800 the English rarely drank water, preferring instead to drink beer and later, tea. In the mid-sixteenth century, John Aylmer compared the drinking habits of continental Europeans to those of the English: *"They [continental Europeans] drink*

commonly water: and thou [the English] good ale and beer." At that time, beer was cleaner than water, especially when made with hops, because it had antiseptic properties that protected people against intestinal disease. Tea had similar antiseptic virtues. Health in the British Isles also began to improve with the arrival of cotton and especially cotton underclothes. Cotton was more easily washed than traditional woollen clothing, making it harder for disease-bearing lice and fleas to survive.[4] Finally, as the marshes were drained and converted to agricultural use, English malaria began to die out with the last case being reported in 1911.[5]

When English life expectation rose after 1790, it was not because of medical knowledge. Instead, it was the accidental consequence of changing ecologies around human habits and the production of food. At different times in our history, this ecology has worked for us or against us, often without our knowing it was working at all. It is an ecology of small differences, seemingly insignificant variations from one place to another, one culture to another, one era to another. In the English case, these variations had surprisingly large effects, as they helped to establish a modest life expectation of 37 years in 1750 which was considerably higher than life expectation in France at the same time – a mere 27 years.[6] However, this improvement in health was an accident of ecology, not the conquest of disease.

So where was the intellectual frontier in the two hundred years between Leewenhoeck's *animacules* and Robert Koch's bacteria of the 1870s? Why were Koch's insights so late to arrive? One answer may be that many natural philosophers of the 18th and early 19th century were struggling to understand the nature of life itself. As Roy Porter put it *'investigators … probed the gap between the living and the inanimate.'* They wanted to explain the whole of the living world with Newton's stunning mechanical insights.[7] This was not a purely scientific investigation, but one that tested each individual's Christian beliefs, turning their scholarly enquiries into deeply personal questions of faith.[8] Just as importantly, by looking for explanations in mechanical philosophy, the scholars of the day were radically misled because disease is not a mechanical process. It is a biological one that interacts with every living and non-living thing it encounters, a dynamic complexity of multiple simultaneous events.

For hundreds, even thousands of years, men and women have used science and superstition interchangeably to comprehend the workings of disease in their everyday lives. In 550, a disease called the 'Yellow Plague' appeared in Wales and was described at that time as a *"loathly monster." "It appeared to men as a column of watery cloud, having one end trailing along the ground, and on the other above, proceeding in the air … Whatever living*

creatures it touched with its pestiferous blast, either immediately died, or sickened for death."[9] To describe an epidemic disease as a horrifying living thing, roaming the land and killing everything it touched, was only to recognise a vivid, devastating fact of life. This was not metaphor; epidemic disease was palpably monstrous and mysterious, dreadfully alive, but impossible to trap and control.[10]

In 1972, some fourteen hundred years after the 'loathly monster' of Wales and one hundred years after the germ theory of disease, a collection of essays by J.D. Chambers was published posthumously by his colleagues. Chambers was a demographer and was particularly puzzled by the arrival and disappearance of various diseases which affected the rate at which people died in society. *'The disappearance of the plague,'* he wrote *'is one of the greatest puzzles of epidemiological history.'* It was not a puzzle he was able to solve. Instead he concluded that the rate of death in society depended on *"… random biological causes …"*[11] Disease and death were autonomous forces, shaped by the mutations and adaptations that help all microbes to evolve and survive. As William McNeill put it, *"We will never escape the limits of the ecosystem. We are caught in the food chain whether we like it or not."* [12] Germ theory alone cannot handle this complexity because disease is not just an enemy germ; it is an ecology of relationships often beyond our control.

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[1] Janet Brown, *Charles Darwin: Voyaging.* Pimlico Edition, London, 1996, p. 498-501. This story is taken from Janet Brown's excellent work. Typhoid fever is usually caused by *salmonella typhi*, and is often water-borne.
[2] Daniel Boorstin, *The Discoverers: A History of Man's Search to Know His World and Himself.* Vintage Books, 1985, p.m329-330. Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present.* Fontana Press, 1999, p. 275,281.
[3] Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present.* Fontana Press, 1999, p. 436ff.
[4] Alan Macfarlane, *The Savage Wars of Peace: England, Japan and the Malthusian Trap.* Blackwell Publishers, 1997, p. 127, 131-2, and p. 241-2. See all of chapter 7: "Drink: Milk, Water, Beer and Tea," as well as chapter 13: "Textiles, Clothing and Footwear." The whole of this marvellous book looks at the cultural habits of pre-industrial Japan and pre-industrial Britain in order to identify their impact on health in both societies.
[5] The incidence of malaria in England, for example, declined with the increase of drainage. See G. Melvyn Howe, *People, Environment, Disease and Death: A Medical Geography of Britain throughout the Ages.* University of Wales press, 1997, p. 41-42.
[6]Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present.* Fontana Press, 1999, p. 281.
[7] Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present.* Fontana Press, 1999, p. 253.
[8] Charles Darwin, for example, was aware of how profoundly his work challenged existing beliefs, and was worried about the effect of his own thinking on his wife, whose faith in Christian beliefs was particularly strong. Janet Brown, *Charles Darwin: Voyaging.* Pimlico Edition, London, 1996, see p. 396-399 and 438-439.
[9] G. Melvyn Howe, *People, Environment, Disease and Death: A medical geography of Britain throughout the Ages.* University of Wales Press, 1997, p. 82-83.
[10] Peregrine Horden argues convincingly that when the saints of medieval Europe did battle with dragons they were confronting the imaginative embodiment of malaria. *"The dragon makes its home in fields or standing water of some kind. It prevents access to the pure spring. Its insides or its exhalations are lethal. … It can cause widespread depopulation. … The dragon-slayer is the figure who renders safe a whole route or area, who demarcates the waste and the habitable, contains the environmental hazard and, it can be added, given the dragon's noxious breath, makes the area salubrious."* Peregrine Horden, "Disease, dragons and saints: the management of epidemics in the Dark Ages," in *Epidemics and Ideas: Essays on the historical perception of pestilence,* edited by Terence Ranger and Paul Slack, Past and Present Publications, Cambridge University Press, 1995, p. 61.
[11] J.D. Chambers, *Population, Economy, and Society in Pre-Industrial England.* Oxford University Press, London, 1972, pages 103-4, 82, 86-7. *"We are now brought face to face with the irrevocable fact which historians have been loath to recognise, the fact of the autonomous death rate …"*
[12] This quotation comes from Laurie Garrett's book, *The Coming Plague.* Penguin Books, p. 5-6.