

## **Observation and the amateur geologist: the success of ‘self-culture’ in Thomas Hainsworth’s exploration of the Mersey-Don Coalfield, Tasmania**

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Tasmania’s 170-year-old coal-mining industry has never been rich. Thin seams, low quality and often poor access have ensured that local coal struggled to compete with that imported from mainland Australia, particularly from Newcastle. There have been only two significant Tasmanian coalfields: the Lower Permian beds of the Mersey River and Don River area; and the Triassic beds of the Fingal-Mount Nicholas field. The Cornwall Coal Company, based in the Fingal Valley, is now Tasmania’s sole supplier of coal for general and industrial purposes.

The older Mersey-Don coalfield suffered because shafts were sunk before a geological survey was undertaken.<sup>1</sup> Little reliable guidance was to be had, anyway, during the infancy of Australian geology, when even its ‘experts’ contradicted each other. The Mersey-Don’s faulted geological structure, unskilled management, physical isolation (until 1885 there was no railway to Launceston, which prevented the Mersey-Don from trying to compete with Newcastle coal for the local market) and insufficient capital all counted against the field. Had its small companies pooled their resources they might have survived: instead, weaker companies perished.<sup>2</sup>

Still, it is doubtful that even with better management the field could have prospered. Although the Mersey-Don coal was for decades thought to be the best discovered in Tasmania, it contained too much sulphur for iron-making, and it corroded metal fire-bars, preventing its use on railways.<sup>3</sup> In addition, its ash content was too high to enable it to replace New South Wales coal in the bunkering trade or the export trade.<sup>4</sup>

Establishing this coalfield’s character took more than half a century. In 1861, while examining the Mersey-Don, Tasmanian government geologist Charles Gould recognised that there were at least two coal ‘horizons’ in Tasmania.<sup>5</sup> Robert Mather [R.M.] Johnston identified three horizons in his *A Systematic Account of the Geology of Tasmania* in 1888.<sup>6</sup> Such experts, though, benefited from the site-specific knowledge of coal miners. One of these was Thomas Hainsworth, the senior student of the Mersey-Don coalfield. This amateur geologist’s part in establishing Tasmania’s second coal horizon and a picture of the Mersey-Don field vindicated his lifelong habits of careful observation and voracious study: the ethic of self-culture or self-improvement.

### **Self-culture: the Scottish quarryman and the Yorkshire pit boy**

Scottish journalist Hugh Miller’s geological arguments were discredited long ago.<sup>7</sup> For two decades, however, his works, characterised by a personal, autobiographical style accessible to the layman, sold like popular novels. Although essentially a popular description of geological formations, his first text, *The Old Red Sandstone* (1841)

contains two significant themes: that the rocks bear the mark of creation, fossils being evidence of God's architecture; and that there is much for workingmen, no matter how constrained by society, to enjoy and benefit from in humble employment. Miller's opening chapter is emphatic about the latter:

My advice to young working-men, desirous of bettering their circumstances, and adding to the amount of their enjoyment, is a very simple one. Do not seek happiness in what is misnamed pleasure; seek it rather in what is termed study. Keep your consciences clear, your curiosity fresh, and embrace every opportunity of cultivating your minds ... Learn to make a right use of your eyes: the commonest things are worth looking at — even stones and weeds, and the most familiar animals. Read good books, not forgetting the best of all: there is more true philosophy in the Bible than in every work of every sceptic that ever wrote; and we would all be miserable creatures without it, and none more miserable than you.<sup>8</sup>

Miller exhorts the reader to direct his jealousy of the upper classes away from Chartism, a movement for universal male suffrage in mid-nineteenth-century Britain, to useful purpose. The flux of society, he writes, is from time to time bound to demote a member of the upper class, replacing him with a workingman,

always the more steady and intelligent among you, remember; if all your minds were cultivated, not merely intellectually, but morally also, you would find yourselves, as a body in the possession of a power which every charter in the world could not confer upon you, and which all the tyranny or injustice of the world could not withstand.<sup>9</sup>

Thus careful observation of nature in his workplace was an act of self-improvement and empowerment.

Miller goes on to recall how two decades earlier he had learned to find 'much happiness in very mean employments' as a boy labouring in a quarry.<sup>10</sup> The fossilised 'sculptures' revealed by his pick in the geological strata of the cliff filled him with wonder and intensified the observation which a boyhood curiosity had already awakened.

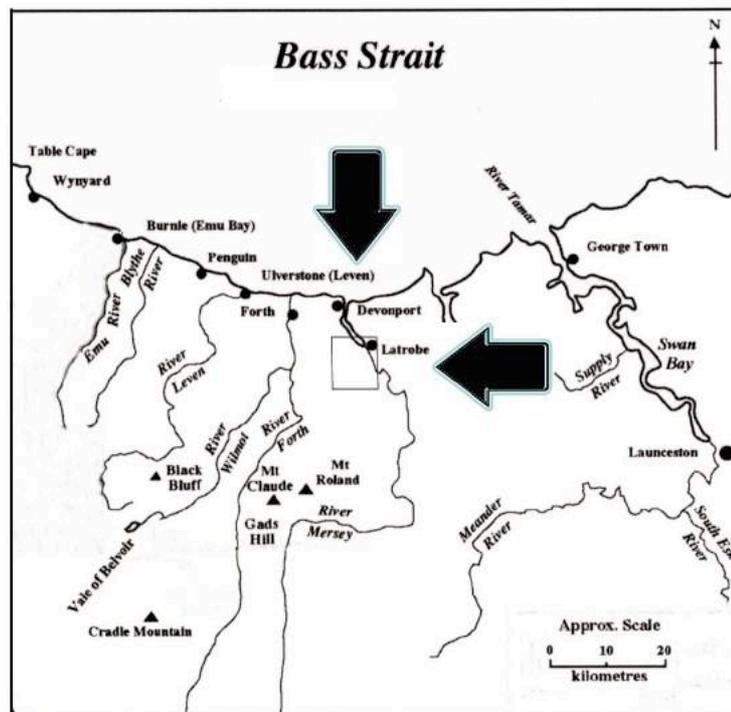
Reading Miller's texts probably introduced Thomas Hainsworth to the popular Victorian-era concept of self-culture. In 1841 when *The Old Red Sandstone* first appeared, nine-year-old Hainsworth was 'bumping his head and scarring his back' in the coal galleries of Birkenshaw, Yorkshire.<sup>11</sup> So began a life which was afterwards described as a 'practical lesson in the dignity of labour'.<sup>12</sup> His Yorkshire pit was less healthy ('a life which no insurance office would take') than the quarry, which bestowed the joy of geological discovery upon the boy labourer Miller. For six years Hainsworth had a heavy cough, and at 19 he was pronounced consumptive.<sup>13</sup> Born near-sighted and without a sense of smell, this mechanic's son also had poorer faculties to study with.<sup>14</sup> He taught himself to read by spelling out the words on shop signs and street posters, after which he may have benefited from the educational facilities provided for working men by mechanics' institutes.<sup>15</sup> Self-culture was ingrained in him to the extent that by

the age of 20, and with the aid only of infant and night school, Hainsworth delivered a lecture to his fellow pit workers. Even in his twenties he drew upon a large store of literary allusions, suggesting a very wide readership.<sup>16</sup> In 1853, before his 21<sup>st</sup> birthday, he married Mary Jane Batty (or Battye), who was then about 18 years old.<sup>17</sup> However, Hainsworth's geological blackboard — his equivalent of Miller's Cromarty red sandstone — would be the Mersey River coalfield, and his one-to-one mentor would be the Reverend William Branwhite (W.B.) Clarke, far from Britain in the antipodes. Clarke was also remote from Hainsworth, providing most of his mentoring by letter.

### The Mersey Coal Company

In 1851 a Launceston businessman, William Boswell (W.B.) Dean, effectively bought a north-west Tasmanian mining field for five shillings. That is what it cost him to be guided into the mouth of Botts Gorge, where the Don River cascaded between mossy boulders, and manferns sprouted with tropical vigour. Here palings splitters who supplied timber to the South Australian mines had discovered coal, the chief fuel of the early Industrial Revolution.<sup>18</sup>

**Figure 1:** North-western Tasmania, showing the position of the Mersey-Don coalfield (open box).



Source: Map courtesy Glyn Roberts.

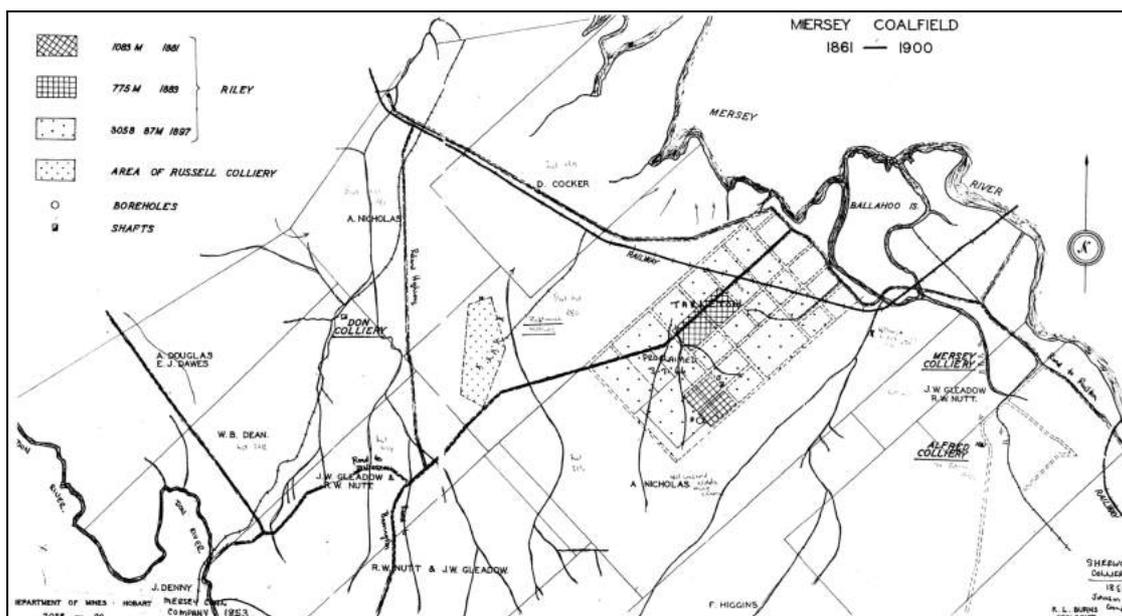
Dean's basement buy must have delighted him. The demand for coal had been escalating for a century. In 1750 Britain's annual output had been 7,000,000 tons, but now, a century later, it was 150,000,000.<sup>19</sup> Van Diemen's Land, as Tasmania was known until 1856, seemed set to join this highly lucrative trade. The abolition of convict transportation in 1853 freed its coalfields from the local dominance of the convict-powered Saltwater River operation near Port Arthur.<sup>20</sup> Dean entered into a contract to

supply the Adelaide Smelting Company with 20,000 tons of coal per year. William Goodwin, proprietor of Launceston's *Cornwall Chronicle* newspaper, heralded the north-western coal as a greater civilising force than any Victorian gold.<sup>21</sup>

The Denison colliery at Tarleton fared better than the Botts Gorge operation; and new ventures soon began at Johnson's (later the Alfred) Colliery at Frogmore; Dawson's (Sherwood) Colliery on Caroline Creek; and the Don Coal Company's works on W.B. Dean's land at the Mersey. Conversely, the Mersey Coal Company operated near the Don River, and it was under a three-year contract to the entrepreneurial merchant Henry Reed and this firm that the Hainsworths, along with other Yorkshire collier families, came to Van Diemen's Land as assisted immigrants in 1854, just in time for the coal 'bubble' to burst.<sup>22</sup>

The Mersey Coal Company, the north-west coast's first significant mining venture, was a product of Launceston's 'Dissenter' community, in which Independents or Congregationalists were prominent. Theirs was a personal faith. They held that the congregation governed itself, without the rituals of the Church of England and the 'tyranny of the bishops' or presbyteries.

**Figure 2:** *The Mersey-Don collieries. Map by K.L. Burns.*



Source: Tasmanian Department of Mines.

Hainsworth was also a Congregationalist, which says much about his character. His and Mary Jane's migration to Van Diemen's Land suggests enquiring minds, an independent nature and a tremendous leap of faith. On 20<sup>th</sup> October 1854 the *Merrington* anchored in sight of George Town, at the mouth of the Tamar River. Aboard with the Hainsworths were the wife and child of Zephaniah Williams, the Welsh Chartist exile who was another pioneer of the Mersey coalfield.<sup>23</sup> After the *Merrington's* 100 passengers were transferred to coastal steam packet the *Titania*, two slaughtered sheep, the first fresh meat the passengers had tasted in four months since leaving England, christened a new beginning.

**Photo 2:** *Sketch of the settlement at the mouth of the Mersey River in about 1860 by James MacArthur.*



Source: Queen Victoria Museum and Art Gallery, Launceston.

It is easy to imagine the new immigrants questioning their antipodean move as they steamed into the Mersey River. The sight of the cliffs of Mount Roland glowering over immense forests must have been intimidating. The next day, however, they were handed the keys to a furnished home at the Mersey, quite a boon considering that they had less than £1 to their name.<sup>24</sup> Hainsworth established a half-acre (0.2-hectare) potato crop protected from the native fauna, snared ‘kangaroos’ (Bennett’s wallabies) and ‘wallabies’ (pademelons) for food, cured the skins of pademelons and possums, and stuffed a ‘beautiful’ quoll. His cough soon disappeared and he enjoyed better health. His first report home to England in February 1855 was a virtual recruitment pamphlet:

We live as happily and as comfortable and much better circumstances than we were in England.

We have had a pay day and have cleared all expenses as regards furniture ...

If the coal turns out well, this will be one of the best places in the world for miners for ten or twelve years to come. There are bridges and pier heads to build, tramways to lay and pits to sink, so our three years will be taken up with jobbing.<sup>25</sup>

### **Early impressions of the Mersey coal**

*Would* the coal turn out well? Hainsworth’s long struggle to understand the field would be a greater journey than the one he had made across the oceans. Surgeon Joseph Milligan had been the first person with any grasp of science to test the Mersey-Don coal, reporting that it was ‘black bituminous shale, while soils the fingers, yields a sooty black streak, and in a common fire crackles and burns with a bright steady flame of no long continuance ...’<sup>26</sup>

Hainsworth knew at a glance that it differed from any coal he had seen before being unlike anything in England or even Australian coal from Newcastle or the Douglas River. There were no 'baits' or 'grain', as Yorkshire pit workers called the fibres along which the coal split. Unusually, this coal split against the direction of the seam.<sup>27</sup> It answered the mineralogical tests usually applied to brown coal. Scratching it with a steel point produced a brown streak, and it gave off a brown dust. This contradicted no less than the venerable Miller, who had written, 'Coal, though ground to an impalpable powder, retains its deep black color, and may be used as a black pigment'.<sup>28</sup> It looked like knotty wood. Then Hainsworth made a peculiar discovery: a lump of coal left in the sun for a few minutes exuded a strong odour. Burning it increased the smell, and this was a coal that seemed to ignite almost spontaneously. A shipment to Melbourne arrived in a highly heated state, exciting fears of fire on the vessel.<sup>29</sup>

Hainsworth concluded that the coal, on which about £20,000 had been spent, was lignite, a 'Jack-with-a-lantern' or 'evil spirit' which led colliers into 'sloughs and quagmires innumerable - especially with their creditors', and that eventually it would 'drown them in the Insolvency court, or at least give them a good dip, and only allow them to escape after a severe (white) washing!'<sup>30</sup> He was wrong about the lignite, if not the quagmires produced by the coal, and his audacity probably made him no friends among those he had imagined deceived and drowning.

### **Alfred Selwyn and Van Diemen's Land's single coal 'horizon'**

In 1855, when the Victorian government geologist Alfred Selwyn paid the Mersey coalfield a flying visit, three collieries were operating - the Mersey Coal Company, the Denison and Johnson's (later the Alfred), at Frogmore. In addition, yellow coal or dysodile, then thought to be valuable for gas-making, had been discovered further up the Mersey.<sup>31</sup> The Mersey Coal Company was building a wooden tramway from its mines to its wharf at Deans Point on the western bank of the Mersey, buoyed, no doubt, by the successful testing of its steaming coal by the local trader the *Titania*, whose master and engineer had pronounced it 'first-rate quality ... equal to the best Charleston or Newcastle coal ...'<sup>32</sup>

Like Milligan, Selwyn believed all known Van Diemen's Land coals to be of the same age.<sup>33</sup> His hardly well-considered report (he claimed to have not even been supplied with a map of the district)<sup>34</sup> dealt the Hainsworths a blow. His condemnation of the ground being worked, and his prediction that no coal would be found beneath the fossiliferous beds (that is, that the marine limestone formation was the floor of the coal beds), was correct for that particular shaft on the Mersey Coal Company ground, but not for the field in general. The Mersey Coal Company operation closed immediately, putting Hainsworth out of work, and probably out of home too, only 11 months into his three-year contract.<sup>35</sup>

Did Hainsworth now revise his glowing report of life in the new world? It was probably at this time that he and Mary Jane, as he later recalled, lived in a bark lean-to, with a hollow tree trunk for a bedroom.<sup>36</sup> Perhaps the pioneering spirit of this

ramshackle frontier settlement in the antipodes, with no house, no roads, almost no shops, no school, and, most significantly, no job, preserved their optimism, but they needed money. Three weeks in gold-happy Victoria failed to establish a new opening. Hainsworth also split palings for the booming Victorian timber trade on the site of present-day downtown Devonport, farmed at the Don River and managed the Don Coal Company.<sup>37</sup>

Eventually Hainsworth's dogged self-improvement brought him a permanent vocation. In 1858 he had a successful interview with Inspector of Schools Thomas Stephens, and so it was that a man who until now had hardly entered a schoolroom was appointed the pioneer schoolmaster at the Mersey River, with wife Mary Jane his assistant.<sup>38</sup> On the strength of these appointments, the couple conceived the second of the ten children they would struggle to feed. Hainsworth had probably spent more time in Yorkshire mechanics' institutes than schools, and in 1859 he was a founding member of the Devon Institute, north-western Tasmania's first agency dedicated to working class self-improvement. By presenting edifying lectures, operating a lending library and a reading room stocked with newspapers, it aimed to advance intellectual and moral welfare and help to develop local industries.<sup>39</sup>

Hainsworth's most important geological achievement of the late 1850s, however, was to prove Alfred Selwyn wrong about no coal existing beneath the fossiliferous beds. In 1857 he drove a bore through the marine fossiliferous deposits, which Selwyn had designated the 'floor' of the coal beds, striking coal at a depth of about 30 metres.<sup>40</sup>

### **Mesozoic or Palaeozoic strata?: WB Clarke and Frederick McCoy**

Long after all wrangling is finished about whose discovery precipitated or anticipated the Australian gold rushes, the Reverend W.B. Clarke will be remembered for his study of the New South Wales coalfields.<sup>41</sup> Clarke was a poor man who followed the example of his Cambridge mentor Professor Adam Sedgwick, by combining clerical duties with scientific research.<sup>42</sup> Ill-health and geological curiosity spurred him to leave England for New South Wales in 1839, when he was 40 years old.<sup>43</sup> Clarke was then in the vanguard of scientific thought, a Church of England minister unencumbered by Biblical literalism. As Darwin's earliest and most vocal champion in Australia, he saw no contradiction between the theory of evolution and belief in the guiding hand of God in human affairs.<sup>44</sup>

When Clarke arrived in Sydney he bore the knowledge of two decades of British and continental European field geology and, understandably, he interpreted Australian geological evidence in Australia according to his northern hemisphere experience.<sup>45</sup> Since at that time English coal measures were thought to date from the Oolitic (Jurassic) Period of the Mesozoic Era, Clarke assumed that New South Wales coal was also early Mesozoic. William Sharp Macleay, an amateur geologist who did not share Clarke's European bias, opposed this belief. Macleay claimed, correctly as it was eventually proven, that the coal beds of both England and New South Wales were Palaeozoic Era, a view to which Clarke was gradually converted.<sup>46</sup>

Two months after Hainsworth arrived in the colonies, the foundation professor of natural science at the University of Melbourne, Frederick McCoy, took up his post.<sup>47</sup> Mining historians have remembered McCoy, an authority on the Palaeozoic rocks and fossils of Great Britain,<sup>48</sup> for two blunders: his 1856 prediction that the Victorian gold deposits would not 'live down', fuelling Australian scepticism about geologists; and his 20-year disagreement with Clarke over the age of the New South Wales coalfields. Ironically, Clarke's earlier stance was now neatly reversed. Now McCoy, the recent immigrant, saw Oolitic (Mesozoic) fossils through European eyes; while Clarke, the seasoned Australian field geologist, knew that the fossil-encrusted beds were Palaeozoic.<sup>49</sup> The difference between them was that while McCoy recognised *Glossopteris* as a Mesozoic fossil, and based his judgment upon that, Clarke passed judgment only when *Glossopteris* and marine Palaeozoic fossils occurred together and pronounced the strata Palaeozoic.

### **From Miller's tutelage to Clarke's**

What chance had a novice geologist like Hainsworth of finding the truth in such high-powered debate? According to Hugh Miller, he had plenty of chances. The labourer in the quarry, for example, had many more opportunities than the educated geologist to reach an understanding of the strata he worked, since he saw the beds day after day. The key to success was observation.<sup>50</sup> Studying shop signs had taught Hainsworth to write, and he predicted the future status that observation in the workplace would bring him:

If he [the 'practical miner'] is an intelligent man and studies the position, structure, and characteristic fossil contents of the rocks he works in, he becomes a local geologist; and wherever rocks occur containing similar characteristic fossils his opinion is of importance ...<sup>51</sup>

Hainsworth had arrived in the colony as, by his own admission, a 'practical miner', but had been stimulated by the 'sublime facts of geology', taking a 'lively interest in anything that tends to illustrate the changes which have taken, and are taking place, in the earth's crust ...'.<sup>52</sup> He became the languishing coalfield's committed student. Hainsworth found further confirmation of coal existing beneath the marine fossiliferous beds at the Don River, where a cross-section of the geological layers was revealed: from top to bottom they ran fossiliferous shales, sandstone, black shale, coal. Hainsworth had never seen Oolitic coal, but this seemed to match the textbook description, and so at first he supported McCoy's belief that Australian coal beds were Oolitic in age. The fossils which 'being dead yet spoke' also suggested Oolitic. Professor McCoy attributed marine fossils, such as *Spirifera* and *Trochus*, to the Mesozoic Era. Hainsworth wrote later:

I had not sufficient experience to enable me to read the story which the fossils tell in the history of the earth's formation, but I had the temerity to attempt it with the aid of prints, and I thereby unwittingly exposed my ignorance.<sup>53</sup>

It was important to settle the matter, since he knew this was the key to the extent of the coalfield. The rare Oolitic seams were thin, and Hainsworth knew of only one really rich Oolitic coalfield having been found anywhere in the world - in Virginia.<sup>54</sup> A Carboniferous Period (Palaeozoic Era) coal seam, on the other hand, was usually one of a series gathered in the same locality. The amateur geologist deferred to the true scholar. In March 1859 he wrote to W.B. Clarke. Clarke's response that the coal was Carboniferous, not Oolitic, offered no explanation, leaving Hainsworth frustrated. 'I may be left to enjoy my communications alone,' he lamented, 'and still I plod on my way as I always have done alone and unsupported'.<sup>55</sup>

Unconvinced by Clarke's initial judgment, Hainsworth decided to subject a box of fossils from an unfinished shaft sunk at Coal Creek, near the Don River, to his scrutiny. Clarke's response to this shipment excited him, as if a light was being cast upon the unknown. In Hainsworth's fossil selection the geologist recognised specimens of *Theca*, *Eurydesma*, *Fenestella*, *Productus*, *Stenpora*, *Cyathoerisites* and *Bellerophon* - all characteristic Palaeozoic fossils that had become extinct before the Mesozoic age. He also found *Spirifer*, *Terebratula*, *Entommosina*, *Trochus*, *Turbo*, *Pleurotomania*, *Curelini* and *Myacites*, which continued after the close of the Palaeozoic age into the Mesozoic.<sup>56</sup> These, Clarke wrote, confirmed that the coal was Carboniferous. What then, Hainsworth puzzled, of McCoy's claim that fossil plants belonged exclusively to the Oolite?

In 1860, overlooking a shaft on W.B. Dean's land, Clarke pronounced the Mersey coal identical to the formation on the Hunter River in New South Wales, claiming that they were both Carboniferous. He was unmoved by Hainsworth's protest of the former field's peculiar lithological characteristics. 'Coal may and does differ in structure', the oracle explained, 'but the characteristic fossils of the associated beds are a certain guide'. 'Many of the hieroglyphics which I have pored over for a series of years, and have been unable to make out, were deciphered', Hainsworth noted in his 'Mersey' column in the *Launceston Examiner* newspaper.<sup>57</sup>

### **Charles Gould and the second Tasmanian coal 'horizon'**

Hainsworth was less satisfied with Tasmanian government geologist Charles Gould's inspection of the coal in 1861. Hainsworth told Gould and an amateur geologist, Thomas Stephens, of his discovery that coal underlay the marine limestone, and that this could be seen in exposed rock strata on Coal Creek. For confirmation, Gould then sank a shaft at the site of Hainsworth's 1857 borehole.<sup>58</sup>

This information led Gould to the conclusion that there were two Tasmanian coal horizons. By recognising that the Mersey coal was of a different age to the Fingal coal, he severed one of the pillars supporting McCoy's argument that the Newcastle and Jerusalem coals were both Oolitic. This anticipated Daintree's 1872 conclusion that both Palaeozoic and Mesozoic coals were present in eastern Tasmania.<sup>59</sup>

Yet Gould did not credit Hainsworth with any part in discovering the true nature of the Mersey coalfield, and his report singled out Zephaniah Williams instead of Hainsworth as his primary guide on the field (Mary Jane Hainsworth believed that

Gould had snubbed her husband out of jealousy of his knowledge).<sup>60</sup> Gould's treatment of him rankled with the 'practical miner', as did the way Gould had put him on the spot by demanding to see the fossiliferous Coal Creek strata. 'Now for the fossils! Not a hundred yards from here we are to have them', the professional geologist quipped as they reached the appointed site. Gould found *Spirifer* in marl about 35 metres from the outcrop, and also trilobites.<sup>61</sup>

The discovery of trilobite fossils in 1842 had been an important development in the process of converting W.B. Clarke to William Macleay's opinion. The Mersey was the only location in Tasmania where trilobites were found, other specimens later being unearthed in the beds of Caroline Creek, at the place (near today's Latrobe) known as Sherwood.<sup>62</sup> Etheridge described and named the latter as *Concephalities Stephensi*, after Thomas Stephens, who, as inspector of schools, was effectively Hainsworth's boss.<sup>63</sup> The presence of the *Glossopteris* fern fossil was another link between the Mersey strata and those of the New South Wales coalfields.<sup>64</sup>

By the time Gould's report appeared, the Mersey river schoolteacher has been transferred along the coast to Table Cape (now Wynyard), where he was again the pioneer government schoolmaster. A decade far from his coalfields would not diminish his lifelong fascination with them and, in fact, only widened his geological horizons. Through the winter of 1862 Hainsworth brooded over his treatment by Gould, enduring what would become for him a familiar quandary: the agony of possibly being misunderstood in print. He wanted to question the professional geologist about his Mersey-Don report, but feared that by doing so he risked opening himself to the charge of vanity, that is, it would appear that his ego had been injured by the lack of acknowledgment in Gould's report. His resolution to answer Gould's report caused him great anguish. Gould had judged that the coal contained too much sulphur to be useful as a household fuel, but that it was valuable for 'manufacturing and steam'.<sup>65</sup> Hainsworth questioned the latter, unsubstantiated claim, Gould's failure to predict clearly the position of the Mersey-Don coal in relation to the fossiliferous beds and the absence of a prediction about whether a second seam of coal might exist.<sup>66</sup> The boldness of a self-educated workingman in criticising a socially superior professional, the son of the famous ornithologist, John Gould, moreover, seems to have done Hainsworth a terrible injury which silenced his pen. 'My mind is unhinged', he wrote privately,

My memory is impaired and I am unable to fix the attention for many minutes ... I can compare my mind only to a lumber room.

There are a great many useful things in it but they have been stowed away unticketed. When I want a tag I have to turn over a hundred other things before I can ascertain its locality and then it is found to be under a lot of other things up in a far corner and when obtained it is so injured with pressure and mouldings from damp, that it is all but useless. I have arrived at a dead pass and I believe nothing will do but a thorough clear out.<sup>67</sup>

Gould later spent nearly a day with Hainsworth at Table Cape without confessing that he had wronged him. Hainsworth wrote that:

I have no doubt of his cleverness but I very much doubt whether he has the manliness to publicly acknowledge an error ... I fear he does not belong to the broad principled, disinterested class of scientific men who gravitate upwards ... He has no affinity to the Bucklands [William Buckland, British geologist and palaeontologist] and Millers who could stand forward and say they had been led to alter their opinions on points where they had openly committed themselves.<sup>68</sup>

Hainsworth's solace at this time was reading a volume of Hugh Miller essays which 'aroused' his soul and renewed his determination to 'commence afresh the important work of self culture. The more I read', he wrote,

the more I admire and wonder and feel humbled. Sometimes the latter feeling is so powerful that I despair of ever doing anything worth being remembered by my children. May God help me!<sup>69</sup>

### **A new geological 'blackboard'**

At Table Cape, local geology and minerals temporarily replaced Hainsworth's beloved Mersey-Don coal. He was free to explore the seaward cliffs and hilltops, in the manner of the young Hugh Miller, and in summer he also fished and prospected up country.<sup>70</sup> As well as acting as Table Cape correspondent to the *Launceston Examiner*, Hainsworth made a series of speculations about the effects of vegetation upon climate<sup>71</sup> and wrote accounts of journeys that represent almost a geologist's guide to the mid north-western coast.<sup>72</sup>

The 60-kilometre-long 'Created from Chaos' geological trail interprets features between the Mersey Bluff near Devonport and Table Cape near Wynyard in north-western Tasmania. This Rotary International initiative showcases 'Tasmania's oldest deformed rocks (750 million years) along a coast sculptured by recent ice-age effects'.<sup>73</sup> Among its features is the 25-metre-high cliff now known almost redundantly as Fossil Bluff, which was once much-loved by Wynyard picnickers for its marine fossil souvenirs. In the 1860s, Hainsworth, the new local schoolmaster, found those 19 geological strata perched over Bass Strait an even better 'blackboard' of fossils than Coal Creek near the Don River. Fossil Bluff's Tertiary Age beds were 'like the tiers of the wall of some old castle', which were capped by masses of 'trap rock', a display which Hainsworth regarded as the best natural section for the study of geology on the island.<sup>74</sup> (To see a good selection of what it once held might require tracking down the samples Hainsworth sent to the National Museum in Melbourne).<sup>75</sup>

The portly schoolteacher pretended to literally take the newspaper reader on his ample shoulders as he mounted the cliff to inspect its strata. The amusing image of him grappling with more than his science as he performed dizzying acrobatics on a ledge recalled, ironically, his friend, the much leaner James 'Philosopher' Smith, who reputedly mastered the great forests that barred his prospecting expeditions by walking for days on end high above them across a canopy of Tasmania's dreaded endemic 'horizontal' (*Anodopetalum biglandulosum*).<sup>76</sup> (This rainforest tree takes its common name and reputation from forming layer upon layer of matted vegetation as it spreads

horizontally in search of sunlight).<sup>77</sup> Like the 'horizontal', Hainsworth's rock ledge on Fossil Bluff featured slippery moss that might plunge him to disaster:

Our way for the next few yards is a ticklish one. I have performed the feat of creeping along that narrow shelf, which is not more than a foot wide in places, twice during the last seven years, and if I get safely along it now it will be seven years more before I again make the attempt. The greatest danger is from that wet slippery moss which covers part of the shelf. Well, here I am at the extreme point of the shelf, and now for the drop. It is only about ten feet ... It's all right - I am quite safe. Only a splash - water a foot deep, tide coming in. Come along quick; put your feet on my shoulders. There, that's well done. We are both safe and, with the newly-married girl, we can congratulate ourselves and say 'the worst is over!'<sup>78</sup>

Reporting on the country between Boat Harbour and the Detention River, Hainsworth recalled how Hugh Miller had compared the landscape of the micaceous hills of Scotland to 'a tempestuous sea, agitated by powerful winds and conflicting tides'. Happily for the schoolmaster, nature obliged him during this ride. 'The sea was lashed into a foam,' he wrote, 'and rain and hail, and thunder and lightning, were strangely mingled. The lightning half blinded us, and the rain and hail met us like so many showers of half-spent shot'.<sup>79</sup> His article 'Wynyard, and a Ride on a Truck' found calmer waters:

To-day [the sea] reminds me of the countenance of a wise mother, who looks round smilingly on her well-disciplined off-spring and her well regulated household. It seems to say, 'There now, our hurry and bustle are over; my house is in order, and my children are all quietly and joyfully performing their duty; so I will rest awhile and enjoy the bright sun, and the clear blue sky, and the fresh breeze.' Wise old mother!<sup>80</sup>

Hainsworth's original mentor Hugh Miller regarded regular or angular forms in nature as evidence of 'God's architecture', and used them to repudiate the theory of natural evolution. Hainsworth was pious but progressive. The unusual columnar basalt of Blackmans Point, Emu Bay, since destroyed for road metal, moved him to a celebration of nature's workmanship rather than God's:

Whether we get a floor resembling a tessellated pavement, or a wall resembling the colonnades of some ancient Grecian temple, or an irregular mass of floor and wall resembling the broken down ruins of one of those temples, this kind of rock has always called forth the wonder and admiration of the beholder.<sup>81</sup>

The Table Cape schoolmaster's efforts to educate his fellow working men also took other forms. A program of public lectures at Table Cape failed, but Hainsworth drew audiences with penny readings, that is, readings from popular texts such as Charles Dickens' *A Christmas Carol*, which it cost a penny to attend.<sup>82</sup> He sometimes indulged in impromptu lectures. On one occasion Hainsworth found a stranded cuttlefish in the mud of a creek bed, and explained its peculiarities to three companions

while dissecting it. One of his audience, a ‘rustic-looking bush farmer’, was ‘apparently nearly all eyes and ears’ as the schoolmaster recalled how he had previously caught a cuttlefish alive, and extracted a bottleful of ink from it

with which I wrote day and date of its capture on the margin of a leaf in one of my books. I described the use the animal made of its ink when in danger — how it squirted it out and darkened the surrounding water and blinded its enemies, and then escaped under the cloud it had made. I even ventured to point a moral, and showed how this fact might be used to illustrate the practice of some bipeds in throwing dust in their neighbours’ eyes, etc, etc. I never had a more attentive audience; ‘very select and intelligent’ ...

Hainsworth’s musings about his new intellectual prowess amongst his neighbours was rudely interrupted, however, by the ‘rustic-looking’ farmer’s cry of

‘Well, well! What my mother used to tell is as true as Gospel. She used to say — ‘Now, William lad, you always keep your eyes and your ears open, and then you may learn something from every man you meet, *even though he should be a born fool!*’<sup>83</sup>

### **Hargraves and the quest for gold in Tasmania**

Hainsworth continued to learn from W.B. Clarke, who in 1862 sent the former a copy of his book *Recent Geological Discoveries in Australasia*.<sup>84</sup> The relationship proved mutually beneficial six years later, when Clarke asked to be sent a ‘good’ collection of Table Cape fossils.<sup>85</sup>

Other ‘experts’ received shorter shrift. If Hainsworth was unconvinced of Gould’s ‘manliness’, he was scathing about the public subscription which brought Edward Hargraves, the disputed discoverer of gold in New South Wales, to Tasmania to test its gold discoveries in 1865. ‘I expect he will be as much decried on leaving’, Hainsworth divined correctly, ‘as he was praised on his arrival and the grand question - a goldfield or no goldfield - will be as far from being settled’.<sup>86</sup> Right again. Hargraves’ failure to ride 13 kilometres from the main thoroughfare to visit the Calder River diggings astonished north-westerners. He was scarcely more energetic at the Arthur River (the part then known as the ‘Hellyer’), only visiting the site after the eager prospector Skelton Buckley (S.B.) Emmett had cut a pack-track to it which allowed Hargraves to ride the whole way. Hargraves further blotted his copybook by expressing a desire to burn W.B. Clarke’s work on the Australian goldfields.<sup>87</sup> He declared that no goldfield existed between Launceston and the ‘Hellyer’.<sup>88</sup>

Yet, like his friend James Smith, Hainsworth was convinced Table Cape had a rich future as a mineral district. After Hainsworth and Robert Quiggin found a small piece of coal on the Inglis River above its junction with the Flowerdale River, Smith sent the prospector W.R. Bell to investigate.<sup>89</sup> Bell found coal near Lettes Plain, on the Inglis River above its junction with the Calder, but it was too far inland to be transported profitably.<sup>90</sup> The unsuccessful Preolenna coalfield would later be discovered at the head of this river system.

### **The final test of the Mersey coalfield**

In the 1860s European analysts began to worry that coal supply would not meet escalating demand.<sup>91</sup> In the colonies too, demand for coal for steam navigation and manufacturing likewise surged. Yet in 1864 a government commission concluded that Tasmania owned no economically viable coalfield.<sup>92</sup> The Mersey and Deloraine tramway, on which work began in 1863, would have tested this finding by enabling Mersey-Don coal to compete with that of Newcastle in the small Launceston market, but the line was never finished. In 1876 the completion of a railway 'triangle', linking Hobart, Launceston and Deloraine reinforced Newcastle's domination of the Tasmanian market.<sup>93</sup>

Since Clarke's and Gould's visits, little had been done to test the Mersey-Don coal reserves at depth, but the field continued to intrigue Hainsworth. In 1865, while passing Johnson's mine east of Tarleton, Thomas Stephens had found a sample of the fossil *Glossopteris Browniana* in a waste dump, which immediately linked the Mersey-Don coal measures to the West Maitland beds in New South Wales - plant fossils of the supposed Mesozoic Era were overlaid by strata with marine fossils of the Palaeozoic Era.<sup>94</sup> The finding of five seams of coal beneath the fossiliferous beds of West Maitland renewed Hainsworth's faith in Clarke's prediction that thicker seams may yet be found beneath those already known at the Mersey-Don.<sup>95</sup>

In 1870 Hainsworth was transferred back to the Mersey River to open his third school at the growing centre of Latrobe, about 10 kilometres from the river mouth. His beloved coalfield now lay at his doorstep again. He devoted much of his spare time to the search for *Glossopteris* fossils in order to place specimens of it in public collections. Within a few years, Hainsworth and J.W.A. Shirt succeeded in doing this and 'opened out the whole of the flora of the Mersey coal age'.<sup>96</sup>

Hainsworth also made perhaps his most interesting natural discovery. While searching for fossils in a bed of shale millions of years old, he found a living fly. There was nothing miraculous about it: the fly appeared to have burrowed through the shale and made a bed in fossilised *Glossopteris* leaves. *Launceston Examiner* newspaper editor Henry Button sought an explanation from the mining speculator Augustus Simson, an amateur naturalist, who concluded that the species of *mellifera* or *hymenoptera* submitted had crept into the tunnel of a larger insect to shelter or die at the approach of winter.<sup>97</sup>

By the 1880s the Mersey-Don coalfield still held considerable promise. Its total output was now about 60,000 tons of coal, 25,000 of which had been produced by the Don Coal Company alone. There was no better spruiker than a satisfied customer. In 1880 the owners of the steamer *ss Rosedale*, which traded between the north-west coast and Melbourne, claimed to be fuelling this vessel and its sister ships only with Mersey-Don coal. The local product, they reportedly stated, was 'far better [coal] than that obtained at Newcastle'.<sup>98</sup> Unfortunately, in August 1880 the *Rosedale* sank with all hands lost — including, presumably, those glowing advocates.<sup>99</sup>

Hainsworth, meanwhile, had arrived at his final verdict on the Mersey-Don coalfield. Although happy to see the matter put to rest by testing, he now believed it was impossible that coal would be found beneath the Silurian limestone - there were *no*

thicker coal beds at depth. He had satisfied himself that the Mersey-Don coal beds lay beneath marine beds of the Palaeozoic Era.<sup>100</sup>

**Photo 5:** *Corsets on, teeth out. Thomas and Mary Jane Hainsworth (left and right at front) in about 1890, with children (left to right at back) Mary, Martha, Selina and (centre at front) James Thornton Hainsworth*



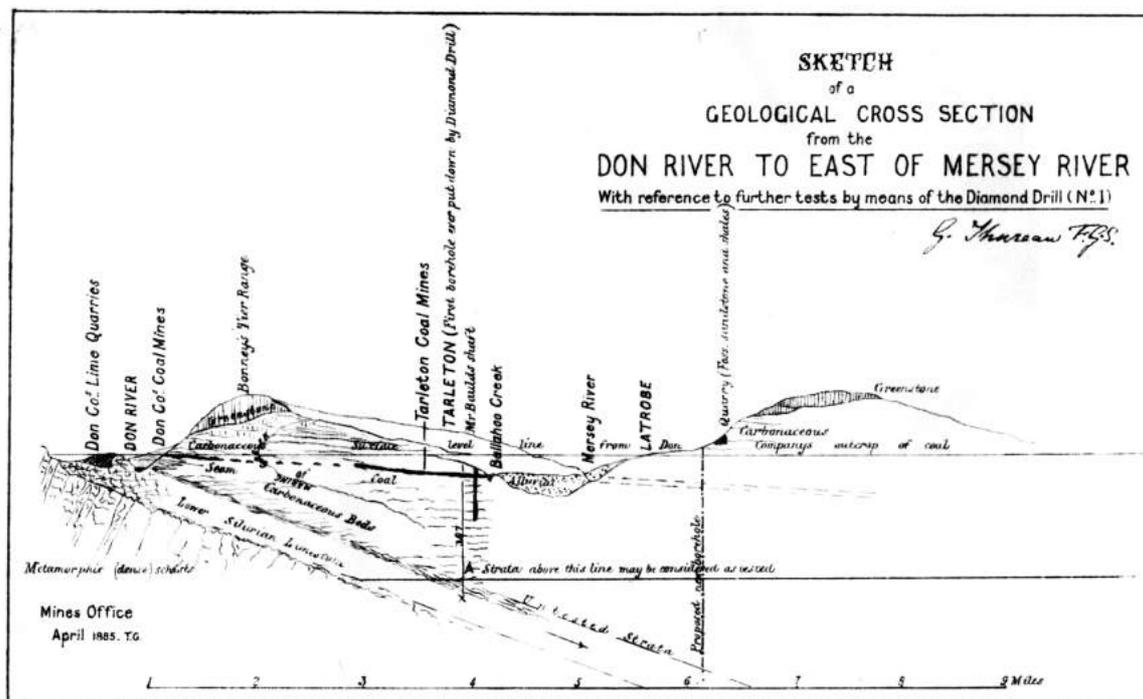
Source: Courtesy Merle Fitzmaurice.

Paying a flying visit to the field in 1883, Inspector of Mines Gustav Thureau would not commit himself to Hainsworth's single seam theory.<sup>101</sup> Testing of the field, Thureau claimed, was still inadequate. Aside from the odd borehole, the deepest workings were less than 25 metres deep. Thureau recommended diamond drill testing at five or six locations fixed by him to settle the issue.<sup>102</sup>

The 1884 diamond drilling at Tarleton, supervised by Hainsworth, vindicated the field's enduring student. Drilling was abandoned when the bit passed through conglomerate and at 387 feet (about 120 metres) cut the Silurian limestone without striking coal beds.<sup>103</sup> Although some criticised Hainsworth's stance and regarded the drill's withdrawal as premature, he remained steadfast, if that is the word for the unusual offer to pawn his wife's drawers in support of any initiative that proved him wrong.<sup>104</sup> He had, as he later pointed out, nothing to gain by this opinion (and some drawers to lose):

There were problems to be solved which had given me more or less thought for a period of 30 years; and besides the interest I felt as a student of geology, the discovery of a lower and better seam meant a fortune for myself, for my acquaintance with the rock formation of the Mersey basin would have enabled me to 'spot' the coal where it could have been worked with far greater economy than by sinking near the site of the borehole.<sup>105</sup>

**Figure 3:** Thureau's cross section of the Mersey-Don coalfield 1885, showing the 387-foot drill hole (left of centre) and his proposed deeper hole (right of centre), which was not drilled.



Source: Gustav Thureau, 'Supplementary Report on the Mersey Coal Deposits (1885)'.

When a company proposed to sink a new shaft through the limestone at Railton in search of coal, Hainsworth sealed his written prediction that it would prove fruitless in an envelope and gave it to *Launceston Examiner* proprietor Henry Button for safekeeping. This time capsule was opened only when the new venture had failed. Decades of daily study, lonely struggle with geological textbooks and supplication of experts were now vindicated.<sup>106</sup>

### A coalfield eclipsed

In the late 1870s and 1880s, the town of Latrobe, the largest in north-western Tasmania, aspired to regional domination. It wanted to be the colony's 'third centre', after Hobart and Launceston. Latrobe boomed commercially until the advent of big steamers gave the nearby deep-water Devonport docks an insurmountable advantage in the late 1880s.<sup>107</sup> It established Tasmania's first 'provincial' (that is, outside Hobart and Launceston) newspaper, the *Devon Herald* (1877-89). Between 1877 and 1885, when Latrobe's chamber of commerce was established, 177 'halls of public entertainment', churches, hotels, stores, businesses and residences were erected here.<sup>108</sup> Appropriately, Latrobe followed Hobart and Launceston by establishing a gas company and introducing reticulated gas street lighting in 1888.<sup>109</sup> Mining speculation, particularly at the Pieman River and upper Forth River (Five Mile Rise) goldfields and at Mount Claude, accompanied the launching of the Latrobe Building Society in the same year and inspired talk of establishing a Latrobe Stock Exchange.<sup>110</sup>

It is poignant that the adjacent Mersey-Don field coal played no part in Latrobe's rise, neither powering its gas lighting nor stimulating its mining investors. Although the coalfield's limitations were now apparent, however, it remained a small supplier to the domestic market for many years. Hainsworth was himself manager of the Russell colliery at Tarleton when he died from diabetes in 1896.<sup>111</sup>

The great irony about the field was that after all the debate about whether coal would be found beneath the Silurian limestone, it was the limestone, not the coal, which proved economically important. Limestone was mined on a small scale at the Don River from the 1850s. By 1903 the Dally brothers, lime-burners from the Tamar River who had also uncapped the Tasmania gold reef at what became Beaconsfield in 1877, operated a lime works at Dulverton near Latrobe.<sup>112</sup> From 1915 to 1947, Broken Hill Proprietary (BHP) Ltd operated a quarry near the Don River at what became known as Eugenana, shipping the limestone to its Newcastle smelter as a flux.<sup>113</sup> Quarrying led to the discovery of small cave which contained what became known as the Eugenana Beds, that is, a deposit of sandstone, carbonaceous sandstone and cave breccias with a spore content indicating Middle Devonian age.<sup>114</sup> The beds were given Geological Monument status. The area is now part of a State reserve. In 1926 Tasmanian Cement Pty Ltd was established on the Mersey limestone at Railton. This was the culmination of a search for sites with the resources and access to cheaply produce a superior form of cement known as Portland cement, the essential ingredients of which were limestone and clay (which contained silica and alumina). Coal was also needed for burning or clinkering the cement mixture.<sup>115</sup>

While Railton's proximity to the Mersey-Don coalfield probably helped win it the cement works, Cement Australia's operations on the same site today use coal from further afield. The Cornwall Coal Company, a subsidiary of Cement Australia, supplies nearly all the State's coal from mines in the Fingal Valley and in south-eastern Tasmania.

The Mersey-Don coalfield is now forgotten, but Sherwood Cottage, Thomas Hainsworth's home during the 1880s, remains as perhaps the only monument to the field's dedicated student. Renovations to the cottage a decade ago revealed old broken inkwells and fountain pens. Perhaps Hainsworth used some of these to scrawl his geological epistles to newspapers while 'stealing a couple of hours from sleep' in the dead of night, indulging the studious habit of a lifetime.<sup>116</sup>

### Acknowledgements

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### Endnotes

<sup>1</sup> Bernard Booth, *Ninety Years of the Tasmanian Coal Industry*, BA (Hons) thesis, University of Tasmania, 1962, p. 74.

<sup>2</sup> *Ibid.*, pp. 65-67.

<sup>3</sup> *Ibid.*, p. 95.

<sup>4</sup> *Ibid.*, p. 56.

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- <sup>5</sup> Charles Gould, *Mersey Coal Field*, Tasmanian Parliamentary Paper 135/1862, pp. 4, 5, 8.
- <sup>6</sup> Johnston classified Tasmania's Douglas River, Seymour, Mount Nicholas, Hamilton, New Town, Daren't, Richmond, Jerusalem (Colebrook), Jordan River and Southport coals as Mesozoic Era; the Adventure Bay (Bruny Island), Mount Cygnet, Harefield and Fingal Basin coals as Lower Coal Measures of the Carboniferous Period; and the Mersey-Don Basin as Lower Coal Measures of the Upper Carboniferous Period. For his discussion of the Mersey-Don coal, see R.M. Johnston, *Systematic Account of the Geology of Tasmania*, Government Printer, Hobart, 1888, pp.129-33.
- <sup>7</sup> For a modern review of Miller's writings, see, Michael Shortland (ed.), *Hugh Miller and the Controversies of Victorian Science*, Oxford UP, 1996.
- <sup>8</sup> Hugh Miller, *the Old Red Sandstone; or, New Walks in an Old Field*, Gould and Lincoln, Boston, 4th edn., 1857 (first published 1841), pp. 1-2.
- <sup>9</sup> *Ibid.*, p. 2.
- <sup>10</sup> *Ibid.*, pp. 3-4.
- <sup>11</sup> 'Obituary', *Launceston Examiner*, 17 January 1896, p. 5.
- <sup>12</sup> 'In Memoriam', *North-West Post*, 25 January 1896, p. 3.
- <sup>13</sup> Thomas Hainsworth, 'Emigration to Tasmania', *Launceston Examiner*, 4 December 1883, p. 3.
- <sup>14</sup> Thomas Hainsworth, undated letter to James Smith, NS234/3/25, Tasmanian Archive and Heritage Office [TAHO].
- <sup>15</sup> Joseph Hainsworth, quoted in 'A Self-Taught Teacher', undated newspaper clipping, probably from the *Burnie Advocate* or *Launceston Examiner*.
- <sup>16</sup> For example, his allusion to Tom Treddlehoyle in 'River Mersey', *Launceston Examiner*, 20 September 1859, p. 2.
- <sup>17</sup> Marriage application no. WOO5313A, Parish of Halifax, Yorkshire. Thanks to Merle Fitzmaurice.
- <sup>18</sup> See Joseph Milligan, 'Report on the Coal Said to Have Been Found at the Don River ...', *Papers and Proceedings of the Royal Society of Tasmania*, vol. 2, no. 1, 1851, p. 90; and James Fenton, *Bush Life in Tasmania Fifty Years Ago*, C.L. Richmond, Devonport, 1964 (originally published 1891), pp. 82-83.
- <sup>19</sup> Rosalind Williams, *Notes on the Underground: an Essay on Technology, Society, and the Imagination*, MIT Press, Cambridge, Massachusetts, 1990, p. 55.
- <sup>20</sup> Booth, *Ninety Years of the Tasmanian Coal Industry*, p. 27.
- <sup>21</sup> 'Coal of the Rivers Mersey and Don', *Cornwall Chronicle*, 19 March 1853, p. 219.
- <sup>22</sup> 'One of the Pioneers', 'Old Times in Devon', *North-West Post*, 28 January 1896, p. 3.
- <sup>23</sup> See David Martin Jones, 'Zephaniah Williams and the Welsh Diaspora', *Island*, no. 82, Autumn 2000, pp. 108-22, and G. Rude, 'Williams Zephania (1795-1874)', *Australian Dictionary of Biography*, vol. 2, Melbourne UP, 1967, pp. 601-02. Williams, transported for high treason in 1839 for his involvement in the Chartist movement, was pardoned in 1854 on condition that he did not return to England. Mersey residents presented him with a solid silver cup for his industry in opening up the coalfields.
- <sup>24</sup> Thomas Hainsworth, 'Emigration to Tasmania', *Launceston Examiner*, 4 December 1883, p. 3.
- <sup>25</sup> Hainsworth letter February 1855 quoted in 'A New Tasmanian of a Century Ago', *Burnie Advocate*, 30 June 1951. The cited letter was then in the possession of Mrs Emrys Baker of Brighton, Victoria.
- <sup>26</sup> Milligan, 'Report on the Coal', p. 93.
- <sup>27</sup> Hainsworth, 'Mersey Coal and Mr Gould', *Launceston Examiner*, 1 April 1862, p. 3.
- <sup>28</sup> Hainsworth, 'The Age of the Mersey Coal', *Launceston Examiner*, 21 September 1872, p. 4.
- <sup>29</sup> *Ibid.*
- <sup>30</sup> 'A Practical Miner' [pseudonym Hainsworth]. 'Coal', *Launceston Examiner*, 23 October 1858, p. 3.
- <sup>31</sup> Richard P. Crompton, 'The Mersey Collieries', *Launceston Examiner*, 26 April 1856, pp. 2-3.
- <sup>32</sup> 'Mersey River Coal', *Cornwall Chronicle*, 20 December 1854. In the following year, the master of the *City of Hobart* declared Mersey coal 'better than any other colonial coal, and equal to English', see Booth, *Ninety Years of the Tasmanian Coal Industry*, p. 54.
- <sup>33</sup> Carol A. Bacon and Maxwell R. Banks, 'A History of Discovery, Study and Exploration of Coal in Tasmania', *Papers and Proceedings of the Royal Society of Tasmania*, vol. 123, 1989, p. 146.
- <sup>34</sup> Thomas Stephens, 'The Mersey Coal Beds', *Launceston Examiner*, 22 May 1880, p. 3.
- <sup>35</sup> 'The Age of the Mersey Coal', *Launceston Examiner*, 21 September 1872, p. 4.
- <sup>36</sup> Thomas Hainsworth, 'Emigration to Tasmania', *Launceston Examiner*, 4 December 1883, p. 3.
- <sup>37</sup> 'Hainsworth obituary', *North West Post*, 18 January 1896, p. 3.
- <sup>38</sup> For Stephens, see Ann Moyal, *The Web of Science: The Scientific Correspondence of the Rev. WB Clarke, Australia's Pioneer Geologist*, Australian Scholarly Publishing, Melbourne, 2003, vol. II 1864-78, p. 785.
- <sup>39</sup> See, for example, Thomas Hainsworth, 'River Mersey', *Launceston Examiner*, 13 December 1859, p. 2; *ibid.*, 18 February 1860, p. 4; *ibid.*, 15 March 1860, p. 2; *ibid.*, 17 January 1861, p. 2.

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- <sup>40</sup> Hainsworth, 'Geology', *Launceston Examiner*, 8 May 1880, p. 3.
- <sup>41</sup> Elena Grainger, *The Remarkable Reverend Clarke: the Life and Times of the Father of Australian Geology*, Oxford University Press, Melbourne, 1982, p. 123. For Clarke generally, see also Ann Moyal, *The Web of Science*, vol. 1, pp. 3-65.
- <sup>42</sup> Grainger, *The Remarkable Reverend Clarke*, p. 32.
- <sup>43</sup> *Ibid.*, p. 54.
- <sup>44</sup> *Ibid.*, pp. 11-12.
- <sup>45</sup> *Ibid.*, p. 124.
- <sup>46</sup> *Ibid.*; For the 'coal debate', see also Ann Moyal, *The Web of Science*, vol. 1, pp. 31-44.
- <sup>47</sup> Malcolm Carkeek, 'No Stone Unturned: In Search of Sir Frederick McCoy FRS', *Victorian Historical Journal*, vol. 69, no. 1, June 1998, p. 38.
- <sup>48</sup> *Ibid.*, p. 25.
- <sup>49</sup> *Ibid.*, p. 37.
- <sup>50</sup> Miller, *The Old Red Sandstone*, pp. 13-14.
- <sup>51</sup> 'A Practical Miner' (Hainsworth), 'Coal', *Launceston Examiner*, 13 November 1858, pp. 2-3.
- <sup>52</sup> Hainsworth, 'Mersey Coal and Mr Gould', *Launceston Examiner*, 1 April 1862, p. 3.
- <sup>53</sup> 'The Mersey Coal', *Launceston Examiner*, 23 May 1872, p. 3.
- <sup>54</sup> *Ibid.*
- <sup>55</sup> Hainsworth to James Smith, 27 March 1859, no.65, NS234/3/1, TAHO. The British black coal measures were finally assigned to the Carboniferous named for the abundance of coal, and Clarke concluded that the coal in New South Wales was also Carboniferous. In fact the coal in the Sydney Basin that he was referring to is Permian (still within the Palaeozoic).
- <sup>56</sup> 'The Age of the Mersey Coal', *Launceston Examiner*, 21 September 1872, p. 4.
- <sup>57</sup> 'River Mersey', *Launceston Examiner*, 12 April 1860, p. 2.
- <sup>58</sup> Hainsworth, 'Geology', *Launceston Examiner*, 8 May 1880, p. 3.
- <sup>59</sup> Bacon and Banks, 'A History of Discovery', p. 146.
- <sup>60</sup> Hainsworth to James Smith, undated 1862 letter, NS234/3/25, TAHO.
- <sup>61</sup> 'Mersey Coal-fields', *Launceston Examiner*, 11 January 1862, p. 2.
- <sup>62</sup> Robert Etheridge (junior), 'A Description of the Remains of Trilobites from the Lower Silurian Rocks of the Mersey River District, Tasmania', *Papers and Proceedings of the Royal Society of Tasmania*, 1882, p. 151.
- <sup>63</sup> *Ibid.*, p. 153.
- <sup>64</sup> Thomas Stephens, 'The Mersey Coal Measures', *Launceston Examiner*, 24 July 1873, p. 4.
- <sup>65</sup> Charles Gould, 'Mersey Coal-Fields', *Launceston Examiner*, 11 January 1862, p. 2.
- <sup>66</sup> Hainsworth, 'Mersey Coal and Mr Gould', *Launceston Examiner*, 1 April 1862, p. 3.
- <sup>67</sup> Hainsworth to James Smith, 14 October 1862, no. 44, NS234/3/1, TAHO.
- <sup>68</sup> Hainsworth to James Smith, undated 1862 letter, NS234/3/25, TAHO.
- <sup>69</sup> Hainsworth to James Smith, 14 October 1862, no. 44, NS234/3/1, TAHO.
- <sup>70</sup> 'I have been an explorer of caves and ravines — a loiterer along seashores, a climber among rocks, a laborer in the quarry. My profession was a wandering one', see Miller, *The Old Red Sandstone*, p. 113.
- <sup>71</sup> Hainsworth, 'Stray Notes on Natural History', *Launceston Examiner*, 24 February 1866, p. 3; Hainsworth, 'The Drought in Victoria', *Launceston Examiner*, 24 March 1866, p. 3; and Hainsworth, 'Trees, Rain, and Watersprings', *Launceston Examiner*, 4 September 1869, p. 6.
- <sup>72</sup> See also Thomas Stephens, 'Remarks on the Geological Structure of Part of the North Coast of Tasmania, with Special Reference to the Tertiary Marine Beds Near Table Cape', *Papers and Proceedings of the Royal Society of Tasmania*, 1869, pp. 17-21, which examines Table Cape rocks and fossils presented to the Tasmanian Museum by Hainsworth; Etheridge, 'A Description of the Remains of Trilobites', pp. 150-63; and Maxwell R. Banks, 'Wynyard District — A Geologist's Paradise', unpublished paper held by the Devonport Maritime Museum.
- <sup>73</sup> Rotary International, 'Created from Chaos' brochure.
- <sup>74</sup> Hainsworth, 'Naturalists' Field Clubs', *Launceston Examiner*, 16 June 1880, p. 3.
- <sup>75</sup> Hainsworth, 'A Stroll on Table Cape Beach', *Launceston Examiner*, 5 September 1868, p. 2.
- <sup>76</sup> For Smith, see Nic Haygarth, *Baron Bischoff: Philosopher Smith and the Birth of Tasmanian Mining*, the author, Perth, Tasmania, 2004.
- <sup>77</sup> Nic Haygarth, 'A Walk on the Wilderness: the Legend of Horizontal Scrub', *Papers and Proceedings of the Tasmanian Historical Research Association*, vol. 51, no. 2, June 2004, pp. 106-111.
- <sup>78</sup> Hainsworth, 'A Stroll on Table Cape Beach', *Launceston Examiner*, 5 September 1868, p. 2.
- <sup>79</sup> 'Progress' (Hainsworth), 'Circular Head Road', *Launceston Examiner*, 13 June 1867, p. 2.
- <sup>80</sup> Hainsworth, 'Wynyard, and a Ride on a Truck', *Launceston Examiner*, 10 October 1868, pp. 2-3.

*Observation and the amateur geologist: the success of 'self-culture' in Thomas Hainsworth's exploration of the Mersey-Don Coalfield, Tasmania*

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- <sup>81</sup> Hainsworth, 'A Ride from Table Cape to Emu Bay', *Launceston Examiner*, 11 July 1868, p. 3.
- <sup>82</sup> For example, Hainsworth, 'Table Cape', *Launceston Examiner*, 20 April 1865, p. 3 and 12 November 1867, p. 3. Charles Dickens, *A Christmas Carol*, was first published by Chapman and Hall, London, in 1843.
- <sup>83</sup> Hainsworth, 'Naturalists' Field Clubs', *Launceston Examiner*, 16 June 1880, p. 3.
- <sup>84</sup> Hainsworth, 'Mr Wintle and Geology', *Launceston Examiner*, 1 June 1880, p. 3.
- <sup>85</sup> Hainsworth, 'Mount Hicks Road', *Launceston Examiner*, 2 January 1869, p. 2.
- <sup>86</sup> Hainsworth to James Smith, 20 February 1865, no. 66, NS234/3/1. TAHO.
- <sup>87</sup> 'Mr Hargraves's Gold-Prospecting Tour', *Launceston Examiner*, 13 May 1865, p. 5.
- <sup>88</sup> S.B. Emmett to Van Diemen's Land Company Court of Directors, 13 August 1865, VDL 1/6, TAHO.
- <sup>89</sup> For Bell, see Nic Haygarth, 'Richness and Prosperity: the Life of WR Bell, Tasmanian Mineral Prospector', *Papers and Proceedings of the Tasmanian Historical Research Association*, vol. 57, no. 3, December 2010, pp. 203-35.
- <sup>90</sup> Hainsworth to James Smith, 11 January 1877, no. 8, NS234/3/6; James Smith to Hainsworth 25 January 1877, NS234/2/3. TAHO.
- <sup>91</sup> Williams, *Notes on the Underground*, pp. 196-7.
- <sup>92</sup> Booth, *Ninety Years of the Tasmanian Coal Industry*, p. 96.
- <sup>93</sup> *Ibid.*, p. 75.
- <sup>94</sup> Thomas Stephens, 'The Mersey Coal Beds', *Launceston Examiner*, 22 May 1880, p. 3.
- <sup>95</sup> Hainsworth, 'The Age of the Mersey Coal', *Launceston Examiner*, 21 September 1872, p. 4.
- <sup>96</sup> Hainsworth to James Smith 17 September 1873, no. 269-70, NS234/3/2 TAHO; Hainsworth, 'The Mersey Coal', *Launceston Examiner*, 14 August 1880, p. 3.
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- <sup>99</sup> 'Mount Bischoff', *Launceston Examiner*, 28 August 1880, p. 1.
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