

# Coal hunting at Bexhill 1805–1811:

## HOW THE NEW SCIENCE OF STRATIGRAPHY WAS IGNORED

H. S. Torrens

*This paper describes the lengthy attempts made to find coal at Bexhill, East Sussex, between 1805 and 1811 in hope of reviving the Wealden iron industry. The chief promoter of this Sussex Mining Company, William James (1771–1837), was convinced true coal was easily available in Sussex. The London-based mineral surveyor John Farey (1766–1826), on the other hand, from 1806 correctly urged that it was impossible to find true coal here, on the stratigraphic grounds taught him in the field from 1801 by William Smith (1769–1839). Farey knew that the Sussex adventurers had first, confused pieces of lignite for seams of coal and second, were hunting many thousands of feet above the geological horizon at which Smith had demonstrated that the main deposits of English coal occurred. Farey supported his view by articles, some printed in agricultural journals, and a unique newspaper advertisement. His advice was ignored. The project failed, at a total cost of well over £30,000.*

### INTRODUCTION

The Income . . . would be immense . . . from the Value [these Coal Mines] will give to the Surface of the [Bexhill] Estate by the Establishment of an Harbour and of Furnaces, Foundries and other Manufactories which prevail in a Country abounding, as I conceive this does, with valuable Minerals. Then we may say to our political Enemy we also have a *Coast of Iron* (W. James, Report to the Duchess of Dorset, November 1805).

Until the 1760s, the Weald of Kent, Surrey and Sussex was the leading iron-making centre in Britain, based on locally mined iron ore and locally produced charcoal. Thereafter it lost out to competition from other areas, especially Scotland, which used coal and new technology. By 1800 Ashburnham was the sole surviving furnace here, and that closed in 1813.<sup>1</sup> It was natural, though, that local people should hope that the industry was not finally lost, but could be revived by finding in the Weald the fuel which had taken it elsewhere. Meanwhile coal had also been increasingly substituted for furze and underwood for domestic and industrial purposes, with imports to Sussex rising fourfold between 1780 and 1807.<sup>2</sup>

The first reports that 'coal' occurred in Sussex had been promoted in 1800 at Ashdown Park and Newick and 1801 at Heathfield and in St Leonards

Forest,<sup>3</sup> but Bexhill became the first, and only, Sussex location at which serious exploration was to be made. The Revolutionary and Napoleonic Wars made their greatest impact on the Sussex coast following the breakdown of the Peace of Amiens, as Napoleon amassed his army of invasion at Boulogne in 1804. The Government put in hand a major programme of defence, building Martello towers backed by barracks. The towers around Bexhill were still being built in 1808.<sup>4</sup> Four brickfields had also been established, probably firing the bricks in large open clamps which used a by-product of coal, town-ash.<sup>5</sup> Bexhill was in the midst of this activity, with a barracks for 3000 men built in 1804 north-west of the village, with brickfields a couple of miles to east and west at Bulverhythe and Cooden,<sup>6</sup> and twelve Martello towers sited between Bulverhythe (number 43) and Rock House Bank (number 54).<sup>7</sup> The manor of Bexhill had long been possessed by the Sackville family, and from the estate of the infant Duke of Dorset land for the barracks was compulsorily purchased and the land for the brickfield at Cooden was requisitioned.<sup>8</sup>

The main driving-source behind the Bexhill coal-hunt, William James, later noted that it was on 30 May 1805 that he had first 'perused letter from Mr Neale about the existence of Coals' on the Dorset estate.<sup>9</sup> Certainly on 17 August 1805, Josias Routledge, a copyholder of Bexhill manor, wrote to

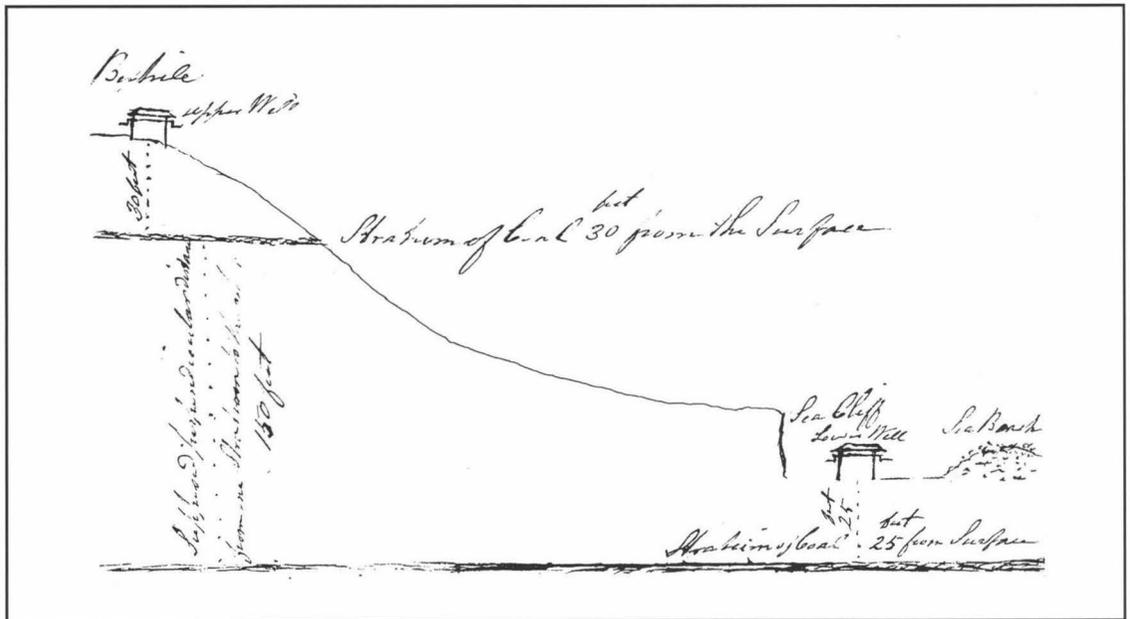


Fig. 1. Josias Routledge's sketch of the situations of coals at Bexhill, August 1805. That in the upper well was 30 feet below surface, that in the lower 25 feet, with the supposed perpendicular distance between them 150 feet (CKS U269 E173/2).

Thomas Neale or Neill, steward to the Duke's mother, the dowager Duchess of Dorset, with a sketch reproduced here as Figure 1, that:<sup>10</sup>

The Coal . . . found here, has been discovered by Wells, . . . sunk for the accommodation of the Troops stationed here, and . . . at the Sea Side, by Wells that have been sunk for the use of the Martello Towers building by the Sea . . . The Stratum in which the Coal lies is nearly similar in both Wells . . . The thickest stratum of Coal that was found in the upper Well was about the thickness of your hand and the piece now sent the thickest of any in the lower one . . . There were several strata of Coal about a foot apart from each other above these, of less thicknesses all laying in the same strata.<sup>11</sup>

Routledge had clearly been the first to comment on the supposed coals found in these excavations. His second surviving letter to Neale asked, if five or six were to subscribe £50 or £100 each in searching for coal (Routledge not hesitating to be among them), would the Duchess of Dorset join them? If they then found coal, the first profits would naturally go to repay the expenses incurred. But would the Duchess allow these same parties to have exclusive rights to work any coal found thereafter?<sup>12</sup> It seems to have been John Forster, the solicitor who handled the

settlement of the Duchess's Bexhill land transactions with the Government,<sup>13</sup> who involved the most important figure in the saga, William James, since Forster was then a partner with James in Staffordshire coal-working.<sup>14</sup>

#### WILLIAM JAMES (1771–1837)

James is best known, and achieved his place in the *DNB*, as a railway pioneer. But he was also a highly successful land-agent and surveyor of Wellsbourne, Warwickshire, and 14 Carey Street, London, and, until his bankruptcy in 1823, a major coal-owner of West Bromwich, Staffs.<sup>15</sup> In a sycophantic biography his daughter claimed that 'as a mineral surveyor his fame appears to have been universal' and that, 'as a geologist and mineralogist, Mr James can take rank with the first men this country has ever produced', from his many undertakings 'to demonstrate the existence of coal mines on the estates of [his] friends in those situations . . . contrary to the general opinion of all other miners', because of 'all the noblemen and gentlemen [who] placed great reliance upon his judgement in respect both to the value and management of mineral as well as landed property'.<sup>16</sup> More realistically, Robert Stephenson (1803–1859) who knew James well

through their railway projects, instead thought he was 'a ready, dashing writer, but no thinker at all on the practical part of the subject he had taken up . . . His fluency of conversation I never heard equalled, and so you would judge from his letters'.<sup>17</sup>

Some such letters survive of those he wrote to the geologist William Smith (1769–1839).<sup>18</sup> James had been one of the first people to receive copies, in 1799, of Smith's pioneering stratigraphic record of the 'Order of the Strata in the Vicinity of Bath'.<sup>19</sup> On 7 October 1800 James wrote to Smith 'there is not a doubt of your making a Fortune, if you will make proper exertions and not spend your time *Gratis* . . . No man has worked with more industry, or to less purpose than yourself. Beware of democratic principles'. His last known letter to Smith, dated 25 January 1805, noted further:

you have been long acquainted with the similarity of our Views and Labors . . . rest assured that however great may have been your labors, and extensive your Observations you have yet very much to learn, and I can . . . only believe that you have as yet a Glimmering Knowledge of . . . the Arrangement of Strata. I assure you that I have with great Attention and in most parts of this kingdom, considered the subject of your Pursuit and Study, and I have made very little Way towards a general arrangement.

How little, Smith's pupil, John Farey, was very soon to demonstrate to him.

Commissioned by the Duchess of Dorset, James started his 'mineralogical View of the Estate at Bexhill and its Neighbourhood' on 22 October 1805 and reported on the 27th that:

A Miner pretending to offer an Opinion in a New Country on viewing one Spot only, it is an airy Dream. With infinite Care and much Labour, I have completed my View, which extended over many Miles of Country, and the Result is, that I can deliberately state my thorough Conviction of the Existence of Strata of Coal in your Grace's Estate.<sup>20</sup>

His view had involved 'examining the range of Strata from Robertsbridge, Battle and to the east of Hastings', and:

the crops of Rocks along the Beach at Bexhill and collecting specimens of secondary strata indicative of Coal, and in viewing and investigating the Lie and Disposition of the Strata along the Beach from Hastings to Bexhill. In traversing the Ravines and Brook

Courses behind the Priory to Crowhurst Estate and thence to Bexhill. Attending Routledge about the researches made by him for Coal . . . and journeying along the Coast completing the Investigation of Specimens on the Beach as also examining for 9 miles to the extent of the Estate towards Pevensey. Examining the Interior of the Estate and the Ravines and Brook Courses and taking particulars of the Crop of the Rocks and Strata . . . and delivering my Sentiments on the existence of Coal and advising . . . how to form a Company to explore the Estate.

On 25 October James explored the wells already sunk and with Routledge traced the strata to Ashburnham and the ironstone working there and then to Battle. The next day was spent examining the country adjacent to Ashburnham, but he could 'not discover the Crop of any indicative Strata similar to the Ironstone found at Bexhill'.

On 10 November James sent his 16-page *Report on the Strata indicative of Coal at Bexhill in Sussex and its Neighbourhood* to Her Grace.<sup>21</sup> According to the Report, the 'Material Structure of this Island' was produced by 'three Great Causes'. First, 'the hand of the Creator at the Creation . . . in the Composition of those Saxa . . . considered by Miners *Primitive Rocks*, void of organic bodies as Granite, Schistus, Chalk [sic] &c'. Second, these were then disrupted 'at some subsequent period by *Volcanic Effects*, and the introduction of a new Genera of Saxa . . . and deposits of decomposed Primitive Strata'. Third, came 'the Creation of the Secondary Strata, formed of the minute parts of the decomposed primitive Rocks and an amalgamation of Animal, Vegetable and Marine Fossils . . ., such as Argillacious and Calcareous Gritstone, Greys, Penant Stone, secondary Schistus, Limestone and Chalk, Clays, Marls, Bines, Ironstone, Clunch, White Fluae, Peldron, Coal &c'. It was these last which James had 'researched'. He also discussed dip and the occurrence of faults or breaks which threw strata 'to Day', to appear on the surface. When this did not happen, as in Sussex, one was forced to 'discover the Existence of subterranean Minerals from the superficial Indications and God knows, at present our knowledge on that subject is so very limited that the wisest Man and most experienced Miner must confess *he is just beginning to learn*'.

James continued:

Bexhill is situated in a District of Secondary

Strata, which is terminated by the Chalk Hills . . . Coal being considered by Chemists and Miners to be an accumulation of Vegetable . . . Substances, . . . the strata indicative of Coal are those which contain Vegetable Fossils. The Strata next the surface at Bexhill, lying nearly horizontal . . ., [their] internal structure cannot be so accurately determined as tho' the Angle or Dip was greater, but those Strata, which I have traced . . . indicate most conclusively that Strata of Coal are deposited under this Estate.

These strata he identified in order downwards:

- 1 Argillaceous *Grit Stone* with an Ochery Appearance,
- 2 a *Steatite* called *White Fluae*
- 3 the *Cliff* or Argillaceous Schistus with Vegetable Impressions
- 4 two thin Bines of *Argillaceous Ironstone*
- 5 Argillaceous Strata in Rotchy Rock, called *Grey Fluae*
- 6 thin seams of inferior *Fire Clay*
- 7 *Batt* containing Vegetable Impressions
- 8 *Strong Clunch Rocks* with Lissums or Seams of Coal and Cannel . . . and Impressions of Vegetables
- 9 *Ironstone, Bines & Cliff*
- 10 seams of *Batt* with Vegetable Impressions.<sup>22</sup>

James also noted that 'on the beach and in the crop of the strata out at Sea, I found specimens of *Strong Clunch Rocks, Peldron* and a very valuable measure of Argillaceous Ironstone, more than six inches thick . . . On the Land Side below the Camp at Bexhill is a strong Spring highly impregnated with Iron, unquestionable percolating thro . . . Ironstone Strata'. 'These several Appearances' James thought were:

conclusive evidence of the Existence of Coal in this Estate, but whether that Coal is sufficiently thick to be recovered at a profit it is impossible for me to determine. At all events, I think the Indications are so strong, the situation so inviting, and this Mineral so valuable, that a fair prospect may be seen by Speculators to induce them to sink pits and prove the Country.

James had 'good reason to think that at about 60 yards on the Beach a Stratum of Coal will be met with below the Peldron rock, but where there is scarce any obliquity [dip] in the strata my Opinion on the subject is altogether hypothetical'.

James' *Report* also had sections on *Proof of Mines* and *Royalty and Prospect of Advantage*. In the first he suggests proving the area 'to the Depth of One

Hundred Yards at the Least', and that 'there are three situations which ought to be tried: at the Beach [Site 1, half a mile SE of the village], on the Downs [Site 2, at the NE corner of Bexhill Down], and near the west Martello tower [on the Dorset estate, and later numbered 51 — Site 3]'.<sup>23</sup> James recommended that Routledge and his friends form a partnership to treat with the Duchess for a grant of mines for 21 years. As to any royalty, 'in this case where no Coal is recovered within 300 miles Coastways [i.e. where none occurs nearer than that] and where all the Risk and Expences are to be defrayed by the Speculators, the Royalty ought to be low as an inducement'. James concluded 'it is impossible to conceive in any Situation prospects more flattering than what present themselves on the supposition that a good Coal shall be found at Bexhill. At a Royalty of 1/10[th on] the selling price, the Income arising from this Source would be immense . . ., with other royalties on clays, ironstone etc . . . most considerable'. In his touching finale, James was 'so thoroughly convinced of the Existence of the Coal, that I am ready to take any Share in the Company to be formed for the proof and Working thereof'. All the similarities which James had used throughout this *Report* to base his opinion upon were merely 'superficial indications'. This was the crucial point in James's methodology. He completely failed to use any knowledge of stratigraphic ordering which Smith had certainly passed onto him from 1799.

James' bill for the view and report was £95. As he anticipated substantial increases in surface land values, James was also retained to undertake valuations of the Stoneland and Bexhill estates and for these he was paid £200 in the year ending 25 March 1807 and £300 in each of the following three years.<sup>24</sup> James was still acting as land-steward of the Bexhill estate in December 1810.

#### AN ACT OF PARLIAMENT

At the end of November James was in London consulting the Duchess of Dorset, her husband Lord Charles Whitworth, and their solicitor John Forster, on how to proceed after such an enthusiastic report.<sup>25</sup> They agreed that an Act of Parliament should be obtained to enable mining leases to be granted. James and Forster drafted the Bill, which was examined by a House of Lords Committee. On 24 April 1806, 'Mr William James, Land agent' duly appeared before it and reported:

that to the best of his knowledge & belief there are under the said Manor & Lands valuable Mines, Veins, Layers & Strata of Freestone, Clay, Sand, Ironstone & other valuable Substances. That within the said Manor & Lands there are good situations for building Houses, Warehouses & Manufactories & for making Wharfs, Docks & Harbours. And that there are persons of respectability willing to treat for the working of the said Mines & for making the said Buildings [etc.] . . . And being examined, says, that he viewed the Lands about two months ago, & there was an idea there were Mines & that Coal & Ironstone might be found from the appearance of Lissums or Laminae of Shale in the Wells upon the Duke's Estate — that he has not examined beneath the Surface, that the Land has been viewed by no other person that he knows of — that he is not the least able to form any Estimate of the increases of the value of the Estate, but that they have had offers to treat for the payment of a given Royalty — offers for Leases of 40 or 50 years, & to pay them, a Royalty per Ton of a Tenth and Twelfth of the produce, & which he considers as very advantageous to the Estate.

Finally James certified the acreage of Bexhill manor was 1124, with an annual rent £430,<sup>26</sup> in a notably less enthusiastic report than the one he had earlier given to the Duchess. In the Commons the Bill was committed to John, 'Mad Jack', Fuller (c. 1756–1834)<sup>27</sup> and General Charles Lennox (1764–1819),<sup>28</sup> MPs for Sussex, for their consideration. On 19 May Fuller reported that they also found the allegations true, and the Bill was enacted unamended four days later. Significantly, the printed Act's reference to 'Valuable mines, Veins, Layers and Strata of Freestone, Clay, Sand, Ironstone, Minerals, and other valuable Substances' at Bexhill, now added Minerals to the list earlier given by James under oath.<sup>29</sup> He had clearly been less certain in his evidence before Parliament than in the euphoric *Report* prepared for the Duchess.

#### PARTNERS IN THE SUSSEX MINING COMPANY

Of the Sussex Mining Company, little is known. A report in 1809 noted that there were eleven partners but named only three. Nine can be identified and a

tenth (Bill) suggested. It is always possible that more than one share was held by one of the partners.<sup>30</sup>

1. John Bagnall (1759–1829), iron and coal master of West Bromwich.<sup>31</sup>
2. Samuel Bill (c. 1773–1847), coal and timber-merchant of West Bromwich, James's coal exploration manager in Sussex, may also have been a partner. He was James's agent at Pelsall Colliery, Walsall from 1813,<sup>32</sup> but he went bankrupt in 1821,<sup>33</sup> and died in 1847.<sup>34</sup>
3. Arabella Diana, Duchess of Dorset (1769–1825), left on her first husband's death in 1799, 'an accumulation of wealth as had scarcely ever been vested among us, in a female, and a widow'.<sup>35</sup>
4. Samuel Fereday (1758–1839), banker, coal-owner and ironmaster of Sedgley and Bilston, Staffs. who also went bankrupt, in both 1817 and 1821<sup>36</sup> and fled to Boulogne, France, where he died.<sup>37</sup>
5. John Forster (1752–1834), of Lewisham and Lincoln's Inn, London, the Duchess of Dorset's and the company's solicitor.<sup>38</sup>
6. William James, company treasurer and chief instigator, bankrupted 1823.
7. 'Mr Payton or Peyton', named in the 1809 report.
8. Josias Routledge (fl. 1791–1822), from 1791 of Bexhill and London, who in 1805 prompted the Dorset estate to call in William James. His address in 1822 was in Dieppe, France, which must be the result of his near or actual bankruptcy.<sup>39</sup>
9. Nicholas Vansittart (1766–1851), MP, then Secretary to the Treasury 1806–7 and later Chancellor of the Exchequer 1812–23,<sup>40</sup> and partner with James in the Balls Hill and Golden Hill collieries, near West Bromwich, Staffs.<sup>41</sup>
10. The Duchess' second husband Lord Charles Whitworth (1752–1825).<sup>42</sup>

Another, with knowledge of the Midland coal fields, who was also involved was Matthew Boulton (1728–1809) steam engineer and entrepreneur,<sup>43</sup> perhaps in connection with the supply of steam engines. An undated 'extract of a letter from Messrs Boulton and Watts, Birmingham' reads:<sup>44</sup>

Our Mr Boulton had not an opportunity of forming a conclusive opinion as to the existence of Coals at Bexhill but the cursory observations which he was enabled to make incline him strongly to think that there are Coal Measures at Bexhill, the stratification of the Grounds, both in the parts where the Trials have been made as well as in the adjoining Country, is very analogous to that of the

principal Coal Districts and as far as any Inference can be drawn from this analogy, there are very good grounds for concluding that coal will be found at Bexhill.

#### EXPLORATION FOR COAL STARTS

The Company did not wait for the passage of their Act but had already started their trial borings. Their first, euphoric, press report appeared on 2 June 1806:

A discovery was last week made near the sea coast, in this county, which will probably prove of great national importance: — A vein of exceedingly fine coal about four feet thick, and of considerable extent, was discovered and proved, on an estate the property of the Duke of DORSET, at Bexhill; and some hundreds of miners, with proper engines for raising the coals, we understand, are engaged for that purpose. By the above important discovery, the fine iron of the county may probably be again wrought with vast advantage to the public, as well as to individuals; divers manufactories may be successfully established, and the agricultural interests of the county, by the increased facility and reduced expence in burning lime, be materially assisted. Veines of coal have been discovered . . . in other parts of our county, where, had the research been pursued with as much spirit and perseverance as at Bexhill, the result would, probably, have been as successful.<sup>45</sup>

Further news followed on 23 June:

the persons engaged in the coal works on the estate of the Duke of Dorset, at Bexhill . . ., have met with so much encouragement through the whole progress of their laudable pursuit, that they have determined on sinking a shaft for raising the coal immediately, and the whole county must feel an interest in the success of their operations. We expect shortly to hear of miners being employed in a similar research, not many miles from this town [Lewes].<sup>46</sup>

This first site, in the close by the sea shore as shown in Figure 1, was near the present Ashdown Road (NGR TQ 754077).<sup>47</sup> Only the first 27 feet of strata here had so far been sunk, and all the strata below, to a total depth of 164 feet, had instead been bored.<sup>48</sup> At this depth, the borers penetrated Bed 32, a 'Strong Coal, 3 feet six to eight inches thick'; the 'vein of

coal' announced on 2 June 1806. Sinking shafts, large enough for two men to work in, was expensive, while boring, with thin iron rods which percussed and pulverized the strata, was much cheaper, but gave much less reliable data.<sup>49</sup>

The local paper also continued to announce how this trial was now stimulating others elsewhere in Sussex:

we are glad to find that the success which attended the research for coal at Bexhill, has enabled others to similar pursuits, in situations, perhaps, equally promising. At Rotherfield several men are actively employed in boring; at Maresfield, we understand, some good specimens have been obtained . . . [while those] of good coal have been drawn on the estate of John Newnham Esq., at Maresfield: and the men employed, we understand, are got down to a stratum of considerable promise.<sup>50</sup>

Samuel Bill, Bexhill exploration manager for James, was certainly involved in boring at Rotherfield,<sup>51</sup> and in December 1807 he also was offering advice to George Shiffner of Coombe Place in Hamsey, on a design of tramway to bring chalk from the pit at Offham Hill, near Lewes, to a wharf on the River Ouse. This was an alternative to that which William Jessop had proposed. This project had been put forward in 1807 by the local civil engineer Cater Rand, who will reappear in this story.<sup>52</sup>

#### JOHN FAREY ARRIVES

During July and August 1806 the geologist and polymath, John Farey, was busy drawing up a stratigraphic cross 'section of the earth from London to Brighton' for Sir Joseph Banks (1743–1820), President of the Royal Society, and making regular visits to Sussex.<sup>53</sup> His section, over five feet long, gave details of all the strata that Farey had recognized in the Weald working downwards from a 'marker' stratum, the Chalk of the North and South Downs. During his Sussex fieldwork Farey stayed with his brother Ben, steward to the Earl of Chichester at Stanmer. On 12 September he made an excursion to the Bexhill workings. Farey described this visit in an anonymous letter to the *Agricultural Magazine*, which he acknowledged as his, although James seems also to have been involved. It reported that William James was:

a miner of the first repute. These works have

proceeded with a degree of spirit and enterprize, which has placed all the eastern parts of the county on the tip-toe of expectation as to the vast benefits they are to receive, not only in the supply of coal for domestic use, but as the means of again opening their dormant iron furnaces. So little doubt of success is entertained that extensive stabling have been built of brick, in the most substantial manner, and horses [*recte* houses] for the superintendants and workmen in the intended mines, on a spot where formerly no buildings were standing. Two wells or shafts have been sunk, each about eighty feet deep, principally through sand or soft sand-stone rock, some of the layers of which are said to contain impressions of vegetables, like *Feras* [*recte* ferns], considered in most parts of England as a certain indication of coal veins being at no great distance. No other appearance of coal have yet, it seems, been met with in sinking the shafts, but the principal expectations are formed on the report of some experienced practical miners who bored in this place some months ago, and reported that their auger passed through a four feet vein of coals, at one hundred and sixty five feet deep. The water comes in so plentifully that the steam engine working in one of the pits, and a horse gin, with buckets in the other, to assist it, were barely able to keep down the water some days ago. A second steam-engine is about to be erected, . . . and no expence whatever will be spared, in exploring a treasure so valuable for this part of the county, as a four foot vein of coals, and doubtless the gaining of this, would secure other and thicker veins below it. We sincerely hope that no circumstance will occur to damp the ardour of the parties in this interesting search after an article of such general interest as fossil coal.<sup>54</sup>

From this it is clear that work had now been going on for some time at the second Bexhill sinking, at a site above the town on the edge of Bexhill Down (also shown in Fig. 1 — about NGR TQ 737 083),<sup>55</sup> whereas the first shaft was soon to be drowned out by sea water entering it.<sup>56</sup> That two expensive shafts, instead of exploratory borings, were now being sunk provides the best proof of how high hopes for the Sussex Mining Company had become. Farey had seemed enthusiastic in print. But to his friend (and correspondent of William James) William Smith on

29 September, he described, in much more guarded terms, his visit to these ‘quixoit[ic] coal works’ — implying that he already saw the Sussex scheme as impractical.<sup>57</sup> His letter continued

I was surprized to find various slight *vegetable impressions* some like *Fearn* in a soft red grit rock in Hastings Cliff E of the Town, & plenty of detached pieces of *bituminous wood*: they shewd me the same fearny leaves from their Coal Shaft at Bexhill as a certain sign of Coals, but said I ‘one swallow don’t make a summer’. They begin to sink at highwater mark & will never get down to the pretended 4 foot vein of Coals which they *bored thro’* at 165 feet, as I expect, for at 80 feet they employ a Steam-Engine & a horse-gin bucketing nearly all the time, & all below them is sandy or grit rock I expect.<sup>58</sup>

Farey first discussed the significance of William Smith’s work and how ‘our newly acquired knowledge of the stratification . . . has rendered the expectation vain of digging coals in all these parts [south of London] notwithstanding the confident assertions in your magazine [which had reprinted the reports of the previous June] to the contrary by certain speculators in Sussex’ in an article dated 16 February 1807 published in the *Monthly Magazine*.<sup>59</sup> Farey was now on record with his opinion that it was impossible to find any true coal at Bexhill.

Nevertheless, the local newspaper still reported in June 1807:

The success which has attended the operations of the miners, in search of coal at Bexhill, in this county . . . has been quite equal to the expectations of those most immediately concerned in the laudable undertaking, and that a lamb was in consequence roasted whole for an entertainment given one day last week.<sup>60</sup>

The next report, a month later, ominously made reference to materials *other than* coal having now been found, since:

The miners employed in search of coal, at Bexhill have lately met with a stratum of earth, which it has been discovered, contains a large portion of SALT of a very excellent quality . . . it is conceived, from specimens which have been produced, that it may be extracted, by a very simple process, to good advantage; but if not, a soil so highly impregnated with saline matter, must be found extremely valuable as a manure.<sup>61</sup>

Farey now felt forced to enter the debate in earnest. He published a new letter, 'On the finding of Coal' dated 9 August 1807, inspired by the report of additional 'Kenal Coal' being found between Heathfield and Waldron in Essex, in the *Agricultural Magazine*. Farey pointed out that these places were in fact in Sussex and noted 'the avidity with which some ignorant or interested persons circulate stories, respecting the finding of fossil coal, in situations where our present knowledge of the strata of the British island, utterly preclude the expectation'. He referred to his recent articles 'Coal' and 'Colliery' just being published in Abraham Rees's *New Cyclopaedia*,<sup>62</sup> and noted how this new, supposed coal discovery in Sussex, had yielded:

several pieces of bituminated wood . . . a few months ago, lodged in greyish white clay. A box full of these supposed pieces of coal were sent up to London to the proprietor of the wood, John Fuller Esq. one of the Members [of Parliament for Sussex] . . . who did me the honour to consult me thereon. I can confidently state, both from the inspection of these specimens, and from a practical examination of this very neighbourhood, which I made during a mineralogical tour last summer that nothing can be more dissimilar, than these bituminated woods, and indeed all the other fossils of Sussex, are to the coal and accompanying strata of Newcastle, and every part of England where regular fossil coal is dug. I could point out perhaps fifty places at least, where a white or pipe-clay stratum might be found; and in which, in all probability, detached pieces of this bituminated wood might, and, indeed, repeatedly for ages back, have been found in digging ditches, pits, wells &c in this stratum: as every curious person's cabinet will there testify: it is the more surprising, therefore, that the finding of such, should now be trumpeted forth as new and extraordinary discoveries. One of Mr Fuller's pieces of wood-coal, which he had the intention of presenting to the Mineralogical Cabinet of the Royal Institution, was about ten inches long, seven inches broad, and four inches thick; exhibiting the grain and fracture of a piece of wood, some parts of which appeared still in that state, while others of its lamina were so highly bituminized, as to seem like pitch. It appeared . . . to be a fragment of

a very large tree, and to have been entirely surrounded by the clay, some of which was adhering to it.<sup>63</sup>

Farey's *Cyclopaedia* article 'Colliery' also referred to the Sussex trials. It noted that he had brought:

specimens of a reddish soft sand-stone last summer from the foot of the cliff on the sea beach, about two miles east of Hastings in Sussex, from the vicinity of a cottage called the Grovers,<sup>64</sup> which contained so many detached pieces of bituminized wood, that were an augre-hole to be bored into it, and supplied with water, &c. something like the appearance of penetrating a coal vein, might be had in the borings; and it is this stratum dipping under Bexhill, situate about 6<sup>1</sup>/<sub>2</sub> miles to the westward, which . . . has been there mistaken in the borings for a seam of coal, but which the improved boring apparatus of Mr Ryan,<sup>65</sup> . . . would have detected, and saved, perhaps, a most unparalleled waste of money in the measures now pursuing.<sup>66</sup>

Farey's August 1807 article drew a powerful response from the Lewes schoolmaster, engineer and surveyor, Cater Rand (1749–1825). Rand had been a school and writing master, scientific lecturer, accountant and bookseller until his bankruptcy in 1784.<sup>67</sup> Thereafter he became active as patentee, land-surveyor and civil engineer all round Lewes.<sup>68</sup> Rand, who, as 'C. Rand Lewis Esq. Sussex', had been a confusing subscriber to one of the first works to bring aspects of British stratification to public attention in 1778,<sup>69</sup> had pronounced favourably on both the 'coal' found in the earliest 1800 discovery at Newick,<sup>70</sup> and on that first found on Fuller's land between Heathfield and Waldron in December 1801,<sup>71</sup> but which was only drawn to public attention between July 1807 and February 1811.<sup>72</sup> He was probably involved with our Bexhill speculators from the early days. Rand had ordered the last edition (1792) of Whitehurst's book for the Lewes Library Society in August 1803, with other books on 'Subterraneous Surveying' and the 'Analysis of Minerals' in 1805, but none of the books he had ordered for this Society by 1807 gave any details of the new stratigraphic results which Smith and Farey had by then worked out.<sup>73</sup>

Writing as 'Sussexensis', Rand had addressed the Editor of the *Agricultural Magazine*, but this reply to Farey appeared only in the *Sussex Weekly Advertiser*. He first accused Farey of 'lugging in what he does

not seem to understand . . . in a most illiberal, invidious and ungentlemanly stile'. Rand thought the hunt for coal in Sussex, that 'truly useful and valuable article', was 'laudable'. He was astonished that Farey could declare that Sussex contains none. He thought it contained an 'abundance of good coal . . . if sought for judiciously under the direction of an able Engineer'. Rand, confusing Rees's earlier edition of Chambers' *Cyclopaedia*, which was 'at his elbow but with not a single word to be found relative to the subject', with Rees's *New Cyclopaedia* (for which Farey was then busy writing), thought that 'a man who can deliberately . . . declare his knowledge of the whole fossilated strata of Sussex to an hitherto imperforated depth, and a surface of more than a THOUSAND SQUARE MILES from a hasty superficial survey of a solitary parish or two' must be a fool and a 'Sussex Pudding Head'. Rand's diatribe concluded that 'our best mineralogists' were in favour, since 'fine specimens of Coal have been drawn from Sussex' already, whatever the opinion of Farey, our 'Sussex mineralogical Tourist'. Rand thought 'the works now carrying on at Bexhill, with so much spirit in exploring a run of coal, has every flattering prospect of success from the appearance of the accompanying strata abounding in the usual vegetable impressions'. It is fascinating to see Rand's unfair criticism of Farey as a 'tourist' in 1807 mirrored by others, who instead criticized Farey's 'stage coach geology', in 1812 and 1813.<sup>74</sup> Rand gave final evidence of his total ignorance of Farey's new stratigraphic results by concluding that, since in the Newcastle coalfield they had had sometimes to reach twice the Sussex depth before good working seams were found, they should persevere at Bexhill.<sup>75</sup>

#### FAREY RENEWS HIS ATTACK

John Farey was absent from London from September to December 1807, and heard of Cater Rand's letter only on his return. He immediately set to work to reply, in a long letter which reprinted Rand's letter, made 47 detailed comments and summarized his reasoning against any true coal occurring in Sussex. It was a devastating reply and is a fascinating, as well as historic, document. The article is dated 4 January 1808 and appeared in the January 1808 issue of Dickson's *Agricultural Magazine*. In the hope of influencing local opinion, and redeeming his reputation among the original readers of Rand's letter, Farey also advertised in the newspaper which

had printed it, under the date of 13 January 1808.

This announced that Rand had greatly misrepresented him, because there were 'the most invincible arguments . . . against the probability of finding useful and real COAL, in any of the south eastern counties of England'. Farey intended to reprint Rand's letter with his answers in a forthcoming publication in 'hopes that his motives for wishing to avoid the discussion of a question of SCIENCE in a newspaper will be seen and approved, by all who are capable of understanding the subject'.<sup>76</sup>

Farey's article expressed amazement that Rand should be unaware 'that a great and scientific Dictionary [Rees's *New Cyclopaedia*] has been some years publishing' [since 1802]. When the old *Dictionary* which Rand cited was published, in 1786–88, 'little was known of the stratification of the British Islands, that could apply satisfactorily to . . . the probability of finding Coal in the South-eastern Counties'. But this old *Dictionary* had carefully separated Bovey Coal from common Staffordshire

**FOR THE LEWES AND BRIGHTHELMSTON JOURNAL.**

**SUSSEX COAL**

**M**R. FAREY, finding lately on his return from a journey, that some person under the signature of *SUSSEXIENSIS*, in this paper of the 5th and 12th of October last, has greatly misrepresented his observations in *DR. DICKSON'S AGRICULTURAL MAGAZINE* for August, particularly, by replying to remarks on a pretended COAL DISCOVERY in *ESSEX*, and representing the same to have been said of *SUSSEX*; and by making reference therein, to *CHAMBERS'S DICTIONARY*, edited by *DR. REES*, THIRTY YEARS AGO, instead of *DR. REES'S NEW CYCLOPEDIA*, NOW PUBLISHING, which was expressly quoted, and wherein (vol. viii. part 2.) it is presumed, that the most invincible arguments are to be found, against the probability of finding useful and real COAL, in any of the south eastern counties of England. He takes this method of informing all whom it may concern; that the *LETTER OF SUSSEXIENSIS*, has, at his request, been reprinted in the *AGRICULTURAL MAGAZINE*, to be next published (for January), and that thereto he has subjoined an ANSWER. Mr. F. presumes to hope, that his motives for wishing to avoid the discussion of a question of SCIENCE in a Newspaper, will be seen and approved, by all who are capable of understanding the subject.

12, Upper Crown-street, Westminster,  
13th January 1808.

Fig. 2. John Farey's announcement of January 1808 regarding Sussex Coal.

or Pit Coal, the two sorts that Rand had 'so laboured to confound'. Their distinction, Farey said, was the principal issue. 'Regular Coal occurred in *seams* or strata while the *Bituminated Wood* of the pipe clay stratum in Sussex and elsewhere is lodged in *casual and detached masses* only.' The 'stratification of the country' confirmed 'that the *South-eastern Counties of England* contain no Fossil Coal, likely to be of use as a substitute to that supplied by the mines from Somersetshire to Durham or counties to the west'.<sup>77</sup>

Farey emphasized the 'importance of the facts, and principles of *stratification*, discovered by William Smith and others, which are contained in Vol. 8 part 2 and have no where else been published', that is, in his own 1807 articles in the *Cyclopaedia*. He had traversed Sussex for 'several hundred miles, for verifying the observations, and perfecting myself in the theory taught me by Mr Smith, and that from materials and specimens thus collected, I have prepared a *Section* of its principal Strata, which has now been some months in the hands of the President of the Royal Society'. Farey recorded that 'to Mr Fuller, also, I stated in my report (on his consulting me as I have mentioned) the principles, somewhat at length, on which I recommended him not to listen to the delusive prospects held out to him, as had in so many instances been done to proprietors, not in Sussex only, but in every other county, where no Fossil Coal was likely to be found'.<sup>78</sup> Farey ended:

in all the numerous trials for Coals in the South-eastern Counties which have been related to me . . . scarcely one of them was deemed by the Coal-finder or the credulous populace, to be *conclusive* — either the [boring] rods broke, or were maliciously destroyed — the owner, a mean spirited person, grew tired, and would advance no more money — the miners were bribed by some rival Coal-owner — or, forsooth, some evil-minded person, by his words or writings, *checked* the Ardour of the undertakers.

Farey felt it was very important that assertions relating to the occurrence of *vegetable impressions* at Bexhill be confirmed, as:

in all the country surrounding Bexhill, [Farey had] found no vegetable forms, wood perhaps excepted; it is true, that when visiting the intended Coal-shaft there, on the 12th of September, 1806, I was shewn, and took specimens, of what the Superintendent of the

works with great confidence produced, as minute *vegetable impressions*, that were dug up at fifty feet below the surface, but on inspecting these afterwards, they were found to be only ramifications of a ferruginous substance . . . with no *form or characters of a vegetable*, or of any other organised remain.

Farey asked that, if any such have indeed been found, that they be forwarded to John Martin Cripps of Lewes for study. Cripps (1780–1853), Farey's local informant, was a knowledgeable mineralogist,<sup>79</sup> and another, local, man who had now sided against these Sussex Coal Adventurers.

Farey continued to advise against the Bexhill trial. In 1809 he noticed the 'error which has occasioned the useless expenditure of hundreds and sometimes of thousands of pounds, in numerous instances, as some in the vicinity of Boxhill [sic] in Sussex can testify, on recent experience'.<sup>80</sup>

#### FAREY'S ADVICE IS IGNORED

The Bexhill trials continued despite Farey's best efforts. At the meeting of the 'acting Partners of the Sussex Mining Co.' on 13 July 1809, Samuel Bill listed the strata recently bored at Cooden to a depth of 451 foot 5 inches.<sup>81</sup> These had now been bored through at a third site, the first which James had himself suggested, on the coast 'near the western Martello Tower' on the Dorset estate, later numbered 51.<sup>82</sup> The minutes of this meeting note how the Dorset estate had now been proved to the depth to which their Company had engaged and that one of the shareholders, John Forster, had now 'notified . . . Mr James his Determination not to incur individually any [further] expences in Boring'.<sup>83</sup> It was resolved that he and any other gentleman were at liberty to withdraw and that any that did would be 'indemnified from that date from all further Calls and Expences' and would receive a share of the value of the property of the Company from those partners who did continue the Works, at the end of 12 months, or sooner if the works were abandoned. Clearly there was now dissent amongst the ranks. It seems already to have been the public perception that the venture had failed: Mary Frewen writing from Northiam on 8 May 1809, to thank her brother for the cocoa nuts, wondered whether he was tempting her to have a hothouse, as 'if the Bexhill Colliery had success it might have been an additional inducement'.<sup>84</sup>

At a general meeting on 12 August 1809, the

value of the 'Stock' costed only up to July 1808, was estimated to be £11,399, leaving a balance against the Company of £5031 with a surplus of £6369. Stocks of timber, bricks and iron had all been included and the [steam] engines valued at nearly their original costs. The sinking of the shaft at the Down site (no. 2) and all the expenses of the establishment had also been estimated at cost price. The cost of coal for sinking and drawing water at the Down had been not less than £120 a week. Since that sinking 'most of the stock has been employed & consumed, the Engines have become deteriorated & th[at] work abandoned', but calls had now been made upon the Company to the amount of £700 per share, being £7700 on 11 shares. The total expenses at Bexhill to 8 July 1808 were noted as £30,754 . . . The August 1809 minutes concluded:

the view of the present Measures [still] Boring through [at a new fourth, but unlocated, site] being very promising, and the Expences on that account only amounting to £22 per week. Resolved that the Borings be continued and the Miners employed till next General meeting. Resolved that the Treasurer do make such calls as he may think necessary for paying Debts & prosecuting the works. Resolved that in Case at the boring a stratum of Coal be bored into, the operation do instantly cease, and a Special Meeting be called of all the Partners to attend the perforation.

Hope clearly still sprang eternal! This August 1809 meeting resolved to adjourn until 16 October 1809.

The last heard in any actual search for coal here is a receipt from William James, dated 25 March 1810, on account of the Sussex Mining Company. It reads 'received of Her Grace the Duchess of Dorset as Guardian to the Duke of Dorset, the sum of Two Hundred and Seventy two pounds on account of the Sussex Mining Co. as per account for [two years advanced] Rent returned to them on account of the abandonment of Works'.<sup>85</sup> The Dorset estate at least had abandoned its involvement.

But if these partners had done so, James was not yet so ready to give up. This remarkable notice (which shows the care with which newspaper notices should be taken as historical sources) appeared in the *Monthly Magazine* in 1811:

SUSSEX . . . The individuals who have engaged in the expensive mine works at Bexhill, will be amply rewarded for their enterprise, having sunk through a valuable mine of most

excellent coal 10<sup>1</sup>/<sub>2</sub> yards thick, on their estate, which mine is now at work. This will be of great public advantage, as the works are over the main fault, in a situation where, till now, the most experienced miners considered no mine of coal could exist; and it proves the extent of mine land to be greater by many hundred acres than it was before supposed to be.<sup>86</sup>

Notices referring to this same 'Sussex Coal Mine at Bexhill' appeared elsewhere.<sup>87</sup> The original source, the *Sussex Weekly Advertiser*, had instead additionally reported that it was 'some of those spirited individuals who [had] prosecuted the expensive mine works at Bexhill, and [who] afterwards proceeded into Staffordshire [i.e. James and his partners there, Bagnall, Fereday, Forster and Vansittart who] have been amply rewarded for their enterprise'.<sup>88</sup> They had there discovered new deposits of the famous 10 yard Coal, in the West Midlands, not in Sussex.<sup>89</sup> This was where many of the Sussex Mining Company's partners had come from, and whither they now returned.

But this same notice continued, to show how obtuse these speculators still remained in their Sussex aspirations, 'The above Company, we understand, intend to re-commence their works at Bexhill, in about a twelvemonth, by which time the Staffordshire mine, it is expected, will produce a very large income'. But, despite such terminal optimism, nothing more is heard of the Sussex Mining Company.

Farey made his last comment on the Bexhill trials in 1812, when he admitted 'his too confident and hasty expressions that no distinct small *vegetal impressions* like those of the Coal-measures were to be found in the British Series [of Strata] above the Lias and Red Marl'. He noted his call to produce to Cripps any such specimens from the 'disastrous scheme of sinking for Coals at Bexhill', had failed to produce a single response. Farey now thought these 'imperfect accounts of *Wood-Coal* or bituminated Wood in the Pipe Clay Stratum ([which is] below the Chalk and not above it as I now understand the clay of Purbeck [Dorset] to be)' were at a different and somewhat lower stratigraphical level [in Sussex]; but 'without much altering my opinion of the improbability of discovering even one *useful seam of Coal* at Bexhill, or any other part of Sussex'.<sup>90</sup> This shows the problems Farey still faced in correlating these Wealden strata, having been the first to

unravel their stratigraphic order in Sussex, and his ability to change his mind when new data became available.

James had 200 copies of a 'specification of estate at Bexhill', printed by Richard Taylor and Co. on 17 July 1812.<sup>91</sup> No copy of this survives but it must relate to the final sale of James's own estate at Bexhill, where he 'possessed a large house'.<sup>92</sup> The notice a month later of the sale of a freehold estate at Bexhill may relate to the same property, and to James' final departure from the town.<sup>93</sup>

#### POSTSCRIPT<sup>94</sup>

Local, as opposed to national, comment on these Sussex trials was very muted. In 1815 a *Hastings Guide* noted acidly, and rather inaccurately, that 'Bexhill . . . was once thought to have been fertile in Coals till some speculative gentlemen at a very considerable expense ascertained the contrary'.<sup>95</sup> W. D. Conybeare and William Phillips noted in 1822 how Smith's Ironsand Formation (the stratum to which these Wealden rocks were then assigned) 'much resembles, in some places, . . . the great coal formation. These circumstances have led to expensive but abortive attempts to prove [coal] from these beds near Bexhill, attended with so great an expense'.<sup>96</sup> Thomas Webster in 1826 pointed out that 'it was from the abundance of the iron, the beds of clay and shale with vegetable impressions and the fragments of charcoal in the sandstones, that the expectations had been formed of finding coal in this formation, before the difference between lignites and true coal was generally understood'.<sup>97</sup> This assessment highlights Farey's truly original contribution to the debate, as it was he who had first correctly concluded, by early 1807, that the complete *difference* between lignite and true coal, and their separate English stratigraphies, were indeed the crucial questions.<sup>98</sup>

William Fitton later tried to claim that it was he and his fellow workers at the Geological Society who had been the first to shed light on the stratigraphy of Sussex, from the 1820s onwards. He wrote in 1833 how

the assemblage [at Bexhill] is very nearly the same in mineral composition with that of the coal measures. . . differing from it only in geological place and the character of its fossils. It is not surprising therefore at a time when the geological relations of the groups in

England were less understood than at present, these carboniferous portions of the Wealden group should have excited hopes of discovering coal . . . the borings, which some years ago were conducted . . . at Bexhill, were much more excusable than has been supposed.<sup>99</sup>

This gentlemanly judgement ignores the ungentlemanly contribution of John Farey, who had argued on these very same, scientific, grounds for the abandonment of the Bexhill and other Sussex attempts, while they were in progress from early in 1807, well before the Society was founded in November 1807. The early members of the Geological Society were interested in disputing 'the nature of coal . . . , not where to find it',<sup>100</sup> so that when this later became a matter of interest to them, they happily rewrote history to advance their own, later, contributions. Rupke has rightly emphasized the lowly image of economic geology in this English school of geology at that time, when its 'economic aspect was . . . thought not to merit academic rank'.<sup>101</sup>

Such polarized history should make us re-examine the contributions made by such men as Farey and Smith to the advance of geology and ask how fairly such 'practical' geologists were treated by the 'gentlemen geologists' of the soon-to-be-formed Geological Society of London, and how their 'practical' achievements have fared at the hands of 'academic' historians. It was only in 1875 that William Topley (1841–1894) noted the remarkable role Farey had played in Sussex.<sup>102</sup>

The stratigraphic emphasis that Farey had originally so encouraged led eventually to the discovery of true Carboniferous Coal, lying unconformably beneath Mesozoic rocks, in Kent nearly a century later.<sup>103</sup> The first thoughts of this had come in 1855 when Robert Godwin-Austen (1808–1884) read a paper on the possible extension of such coal fields in the south-east of England. The 1871 exploratory boring near Battle by the Sub-Wealden Exploration Committee encouraged further efforts and a historically misinformed article, full of hindsight, about Wealden Coal, but which reported an industrial archaeology survival from the 1805 attempt.<sup>104</sup> The later cored boring by the South Eastern Railway Company near Dover, which discovered coal there in 1890, equally inspired another such 'historical' article on James's doomed, and without hindsight misguided, attempts to mine coal in Sussex.<sup>105</sup>

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**Author:** Prof. H. S. Torrens, Lowermill Cottage, Furnace Lane, Madeley, Crewe CW3 9EU.

## NOTES

### Abbreviations

CKS Centre for Kentish Studies, Maidstone  
 DNB *Dictionary of National Biography*  
 ESRO East Sussex Record Office, Lewes  
 GM *Gentleman's Magazine*  
 GSL Geological Society, London  
 SA *Staffordshire Advertiser*,  
 SAC *Sussex Archaeological Collections*  
 SWA *Sussex Weekly Advertiser*.

- <sup>1</sup> H. Cleere & D. Crossley, *The Iron Industry of the Weald* (Cardiff: Merton Priory Press, 1995), 208–11.
- <sup>2</sup> J. H. Farrant, 'The seaborne trade of Sussex, 1720–1845', *SAC* **114** (1976), 111.
- <sup>3</sup> These early Sussex coal 'expectations' will be fully discussed in a future paper.
- <sup>4</sup> SWA, 23 May 1808, 3.
- <sup>5</sup> M. Beswick, 'Bricks for the Martello towers in Sussex', *Sussex Industrial History* **17** (1987), 20–27.
- <sup>6</sup> A. Hudson, 'Gazetteer of barracks in Sussex during the Revolutionary and Napoleonic Wars 1793–1815' (1986, typescript in Sussex Archaeological Society Library), 3. L. J. Bartley, *The Story of Bexhill* (Bexhill: Parsons, 1971), 120–21.
- <sup>7</sup> Numbering follows the coastal section published by W. H. Fitton, 'Observations on some of the strata between the Chalk and Oxford Oolite in the south-east of England', *Transactions of the Geological Society of London* (2) **4** (1836), 103–400, see pls. Xa–b.
- <sup>8</sup> CKS, U269 E173/2, J. Howarth to the Duchess regarding compulsory purchase, 10 & 29 August 1805.
- <sup>9</sup> CKS, U269 A364/3, Original Voucher no. 172.
- <sup>10</sup> C. J. Phillips, *History of the Sackville Family*, **2** (London: Cassell, 1929), 305–6. CKS, U269 E173/2, Routledge to Neale, 17 August 1805.
- <sup>11</sup> CKS, U269 E173/2, Routledge to Neale, 17 August 1805, his sketch (fig. 1) is also preserved.
- <sup>12</sup> CKS, U269 E173/2, Routledge to Neale, August [after 17th, 1805].
- <sup>13</sup> CKS, U269 E173/2, undated [1805].
- <sup>14</sup> E. M. S. P[aine], *The Two James's and the Two Stephensons* (Dawlish: David & Charles, 1961), 24.
- <sup>15</sup> SA, 19 July 1823, 2.
- <sup>16</sup> P[aine], 15, 23–4, 93, 98.
- <sup>17</sup> Robert Stephenson, in S. Smiles, *The Lives of the Engineers*,

**3** (London: Murray, 1862), 190.

- <sup>18</sup> Oxford University Museum, Smith archives.
- <sup>19</sup> J. Farey, 'Mr Smith's geological claims stated', *Philosophical Magazine* **51** (1818), 173–80 (178).
- <sup>20</sup> CKS, U269 E173/2, 10 & 27 October 1805.
- <sup>21</sup> CKS, U269 E173/1, 10 November 1805.
- <sup>22</sup> Much of James's language here is highly arcane. The trade skills and private language then used by such coal seekers had already been reported in 1789 to be their 'grand arcana': J. Brand, *History and Antiquities of Newcastle on Tyne* **2** (London: White, 1789), 679. For some of this language see W. J. Arkell & S. I. Tomkeieff, *English Rock Terms* (London: Oxford University Press, 1953).
- <sup>23</sup> There have been such changes at all these sites since then that nothing of industrial archaeological significance is now to be seen at them.
- <sup>24</sup> CKS, U269 A364/3, Original Voucher 1806–7 no. 172. U269 A140, General Estate Accounts, vols 2, 3, 4, 6 and 7, 1806–1810.
- <sup>25</sup> CKS, U269 A364/3, vouchers nos 170 and 171.
- <sup>26</sup> House of Lords Record Office, Committee Book, **51** (24 April 1806), 120–22.
- <sup>27</sup> J. Lawrie, 'John Fuller Esquire of Rose-Hill', *Proceedings of the Royal Institution of Great Britain*, **44** (1971), 331–57. G. Hutchinson, *Fuller of Sussex: a Georgian Squire* (Hastings: private, 1993). R. G. Thorne, *The House of Commons 1790–1820*, **3** (London: Secker & Warburg, 1986), 845–8.
- <sup>28</sup> Thorne, **4**, 414–15.
- <sup>29</sup> 46 Geo III liv.
- <sup>30</sup> CKS, U269 A364/3, voucher no. 171 notes that early in 1806 James met 'Fereday, Bagnall and other Miners in Staffordshire to get Members of the Company'. P[aine], 13, notes the involvement of 'the late Lord Whitworth, Duchess of Dorset, Mr Vansittart, and others'.
- <sup>31</sup> SA, 28 November 1829, 4.
- <sup>32</sup> P[aine], 95, 102.
- <sup>33</sup> SA, 22 September 1821, 2.
- <sup>34</sup> SA, 23 & 30 January 1847, 5.
- <sup>35</sup> V. Sackville-West, *Knole and the Sackvilles* (London: Lindsay Drummond, 1947), 192, 200, 208.
- <sup>36</sup> SA, 24 May 1817, 2 & 10 February 1821, 2.
- <sup>37</sup> R. P. Fereday, 'The Career of Richard Smith 1783–1868' (unpub. M.A. thesis, Univ. of Keele, 1966), 168–76.
- <sup>38</sup> *The Times*, 3 December 1834, 6.
- <sup>39</sup> ESRO, ADA 164–6 (kindly supplied — with so much else — by William Hedger, who also located the baptisms of three of Routledge's children at Bexhill 1791–95).

- <sup>40</sup> Thorne, **5**, 437–41.
- <sup>41</sup> Liverpool Record Office, 385 JAM 6/1.
- <sup>42</sup> Phillips, **2**, 277–302.
- <sup>43</sup> DNB.
- <sup>44</sup> CKS, U269 E173/2.
- <sup>45</sup> SWA, 2 June 1806, 3, and repeated in *Monthly Magazine*, **21**(1) (July 1806), 584–5.
- <sup>46</sup> SWA, 23 June 1806, 3. *Bath Chronicle*, 26 June 1806, 3.
- <sup>47</sup> ESRO, AMS 5819, plan of the Manor of Bexhill drawn up by James in 1808 shows this first site as ‘the Engine’. A redrawn and modified extract of this map, also showing this first site, is in W. H. Mullens, *A Short History of Bexhill* (Bexhill: private, 1927), facing p. 19. CKS, U269 A140/6 1808–9, and A364/8 for payment of James’ bill for . . . perambulation and Survey of Bexhill manor and fair plan thereof £341-6-6 and his voucher.
- <sup>48</sup> Three versions of the measures sunk and bored through here survive: CKS E 173/2 (MSS watermark 1805); GSL, QP Misc 76 (MSS watermark 1804) donated 5 May 1809 by Dr John Macculloch, 1773–1835; and in Gideon Mantell, *The Fossils of the South Downs* (London: Relfe, 1822), 35–6. A modern re-interpretation appears in F. H. Edmunds, *Wells and Springs of Sussex* (London: Memoirs of the Geological Survey, 1928), 57.
- <sup>49</sup> H. S. Torrens, ‘Some thoughts on the complex and forgotten history of mineral exploration’, *Journal of the Open University Geological Society* **17**(2) (1997), 1–12. The boring rods used at Bexhill were provided by the Birmingham engineer William Whitmore (1747–1819) and he or Boulton & Watt may also have provided the steam engines used, see P[aine], 12.
- <sup>50</sup> SWA, 30 June & 7 July 1806, 3; reprinted in *Monthly Magazine* **22**(2) (August 1806), 94–5.
- <sup>51</sup> CKS, U269 A364/6, Bill’s bill for expenses in 1807, paid 18 June 1808.
- <sup>52</sup> ESRO, SHR 1966. *Monthly Magazine* **27** (April 1809), 309. M. Robbins, ‘The first Sussex railway’, *Railway Magazine* **117** (July 1971), 355–7.
- <sup>53</sup> H. S. Torrens, ‘Patronage and problems: Banks and the earth sciences’, in R. E. R. Banks *et al.* (eds), *Sir Joseph Banks: a Global Perspective* (London: Royal Botanic Gardens, 1994), 49–75.
- <sup>54</sup> Anonymous, ‘Sussex, September 20, 1806’, *Agricultural Magazine* 2nd ser., **1** (September 1806), 211–12. Farey later acknowledged having written this, *Agricultural Magazine* 3rd ser., **2** (January 1808), 31.
- <sup>55</sup> ESRO, AMS 5819 also shows this second site, as ‘Engine Pit’. Another ‘Plan of Bexhill’ by J. Andrews of Epsom dated 1808 in Bexhill Museum marks this site as ‘Coal pits’.
- <sup>56</sup> Mantell, 35–6.
- <sup>57</sup> See H. S. Torrens & T. D. Ford, ‘John Farey (1766–1826): an unrecognised polymath’, in J. Farey, *General View of the Agriculture and Minerals of Derbyshire* **1** (1811, reprinted Matlock: Peak District Mines Historical Society, 1989), 1–28.
- <sup>58</sup> Oxford University Museum, Smith archives.
- <sup>59</sup> J. Farey, ‘On wells and springs’, *Monthly Magazine* **23** (April 1807), 211–12.
- <sup>60</sup> SWA, 29 June 1807, 3.
- <sup>61</sup> SWA, 27 July 1807, 3.
- <sup>62</sup> *The Cyclopaedia* (London: Longman etc.) **8**, part 16, articles ‘Coal’ and ‘Colliery’, published 10 August 1807.
- <sup>63</sup> J. Farey, ‘On the finding of coal’, *Agricultural Magazine* 3rd ser., **1** (1807), 115–17.
- <sup>64</sup> Shown as the Govers, east of Hastings, on the section by Thomas Webster, ‘Observations on the strata at Hastings, in Sussex’, *Transactions of the Geological Society of London* 2nd ser., **2**(1) (1826), 31–6, pl. 5.
- <sup>65</sup> James Ryan patented his boring apparatus, to recover oriented cores from borings for the first time, in 1805. Farey’s is one of the first published statements of its potential; see H. S. Torrens, ‘James Ryan (c. 1770–1847) and the problems of introducing Irish “new technology” to British mines in the early nineteenth century’, in P. J. Bowler & N. Whyte (eds), *Science and Society in Ireland: the Social Context of Science and Technology in Ireland, 1800–1950* (Belfast: Institute of Irish Studies, 1997), 67–83.
- <sup>66</sup> ‘Colliery’, *The Cyclopaedia* **8**, part 16.
- <sup>67</sup> *GM*, **54**(2) (1784), 559.
- <sup>68</sup> J. H. Farrant, ‘Civil engineering in Sussex around 1800, and the career of Cater Rand’, *Sussex Industrial History* **6** (1974), 2–14.
- <sup>69</sup> John Whitehurst, *An Inquiry into the Original State and Formation of the Earth* (London: Bent, 1778).
- <sup>70</sup> MSS Coal 1:29 (dated 1800) in Sutro library, San Francisco, California. SWA, 30 June 1806, 3. Mantell, 34.
- <sup>71</sup> *Brighton Guardian*, 30 June 1830, 4. P. Lucas, *Heathfield Memorials* (London: Humphreys, 1910), 91–4.
- <sup>72</sup> SWA, 13 July 1807, p. 3. *MM* **31** (February 1811), 92.
- <sup>73</sup> ESRO, Lewes Library Society Minute Book, R/L11/1/4 (kindly supplied me by John Farrant).
- <sup>74</sup> Torrens & Ford.
- <sup>75</sup> SWA, 5 & 12 October 1807, 4.
- <sup>76</sup> SWA, 18 January 1808, 3.
- <sup>77</sup> J. Farey, ‘On the finding of coal in the south-eastern counties of England’, *Agricultural Magazine* (Dickson’s) 3rd ser., **2** (Jan. 1808), 22–31, dated 4 January.
- <sup>78</sup> Farey’s report to Fuller seems not to have survived.
- <sup>79</sup> DNB.
- <sup>80</sup> J. Farey, ‘On the supposed universal distribution of fossil coal . . .’, *Nicholson’s Journal of Natural Philosophy* **22** (1809), 68–70.
- <sup>81</sup> CKS, U269 E173/2 (watermark 1808).
- <sup>82</sup> At Tower 51 on the coastal section published by W. H. Fitton, ‘Observations on some of the strata between the chalk and Oxford oolite in the South-East of England’, *Transactions of the Geological Society of London* 2nd ser., **4** (1836), 103–400, see pls. Xa–b. For the geology here see R. D. Lake, ‘The stratigraphy of the Cooden borehole, near Bexhill, Sussex’, *Institute of Geological Sciences Report 75/12* (London, 1975).
- <sup>83</sup> CKS, U269 E173/2, minutes dated 13 July to 12 August 1809.
- <sup>84</sup> ESRO, FRE 2225 (a reference kindly sent me by Philip Bye).
- <sup>85</sup> CKS, U269 A364/9, voucher 213.
- <sup>86</sup> *Monthly Magazine* **31** (May 1811), 392.
- <sup>87</sup> *The Tradesman, or Commercial Magazine* **6** (1 June 1811), 502.
- <sup>88</sup> SWA, 4 March 1811, 3.
- <sup>89</sup> *Victoria County History, Staffordshire* **17** (London: Oxford University Press, 1976), 40. James’s work, in this known coalfield, had earlier drawn the remarkable comment that ‘entrepreneurs like William James of West Bromwich . . . were men as isolated as they were outstanding’: *Victoria County History, Staffordshire* **2** (London: Oxford University

- Press, 1967), 101.
- <sup>90</sup> J. Farey, 'Geological observations . . .', *Philosophical Magazine* **39** (1812), 93–106 (100).
- <sup>91</sup> St Bride Printing History Library, London, R. Taylor & Co., 1812 Ledger p. 164.
- <sup>92</sup> P[aine], 97.
- <sup>93</sup> SWA, 24 August 1812 (from William Hedger).
- <sup>94</sup> The fallout of these trials at the London Geological Society, founded in November 1807, is discussed in a paper in press in *Annals of Science*.
- <sup>95</sup> An Inhabitant, *The Hastings Guide*, 4th edn (London, 1815), 50.
- <sup>96</sup> W. D. Conybeare & W. Phillips, *Outlines of the Geology of England and Wales* (London: Phillips, 1822), 137.
- <sup>97</sup> Webster, 31.
- <sup>98</sup> W. Topley, *Geology of the Weald* (London: Longmans, 1875), 51, 59, confirms the frequent occurrence of lignite in the Bexhill beds.
- <sup>99</sup> W. H. Fitton, *Geological Sketch of the Vicinity of Hastings* (London: Longman etc., 1833), 49.
- <sup>100</sup> R. Porter, 'The Industrial Revolution and the rise of the science of geology', in M. Teich & R. Young (eds), *Changing Perspectives in the History of Science* (London: Heinemann, 1973), 323.
- <sup>101</sup> N. Rupke, *The Great Chain of History* (Oxford: Clarendon Press, 1983), 18, 200.
- <sup>102</sup> Topley, 10–12, 348. Details of modern Wealden stratigraphy will be found in W. Gibbons, *The Weald* (London: Unwin, 1981) or R. W. Gallois, *British Regional Geology: the Wealden District*. 4th edition (London: HMSO, 1965).
- <sup>103</sup> G. Tweedale, 'Geology and industrial consultancy: Sir William Boyd Dawkins (1837–1929) and the Kent Coalfield', *British Journal for the History of Science* **24** (1991), 435–51.
- <sup>104</sup> Anon., 'Under the Wealden', *Engineer* **34** (2 August 1872), 65, with references to earlier 1868 articles also of interest.
- <sup>105</sup> Anon., 'A Sussex coal mine', *Bexhill Chronicle*, 9 April 1889, reprinted in *The Standard*, 20 April 1889, 3.