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CRABTREE AND SCIENCE
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Joseph Crabtree is no less unrecognized for his science than for his poetry, and it is therefore my first intention tonight to trace the impact of his intellect on the men of science of his generation. At the same time my researches have led me to a few fragments of his literary life which I believe have not previously been reported and which I offer with due deference for the attention of the Scholars of our Foundation.

Crabtree's boyhood was spent in the town of his birth, Chipping Sodbury. We hear of him being called 'Cuckoo Crabtree', or more familiarly 'Cuckoo Joe' by his schoolfellows, who thus anticipated Wordsworth's cogent observation that the child is father of the man; and although it is not easy to discern many details of this phase of his life, it is clear that his major interests were already beginning to develop. One scintilla from an early poem has been discovered by our friend Dr. C. K. Ogden in the library of the Athenaeum. Dr. Ogden says that his task was not made easier by the curious shelving system in the library, which places Anaesthetics alongside Aesthetics, but he made his discovery while pursuing a suspicion that Sir Walter Scott had adapted some of Crabtree's verses for his own poems. Scott's parody can easily be recognized from Dr. Ogden's original:

One clouded hour of glorious wife
Is worth a sage without a dame.

For a century it was unsuspected that Scott had adapted these verses, but there is now no doubt that they were written before 1770, and Dr. Ogden has tentatively ascribed them to Crabtree. This is all the more credible when we realize — and we shall find more evidence for this — that Scott had a strong if unconscious partiality for Crabtree's work. In the eighteenth century, so different from the present, it was still possible for a man to be a gentleman and a scientist; and the development of Crabtree's pubescent flair for amorous verse before he left school was already paralleled by an interest in natural science. He cherished a deep respect for Newton, not only because of his achievements as a scientist, but also because of his boyish tricks. Young Newton had scared his neighbours by hoisting a small lantern in a kite at night, giving rise to an early Flying Saucer report; Crabtree read of this escapade and repeated it with some success at Chipping Sodbury. It happened that the light frightened his schoolmaster, who was out poaching at the time, so much so that Crabtree thereafter had all the poaching to himself. Crabtree thenceforward became a fervent believer in everything that Newton said, and he sometimes took as gospel statements which Newton had intended only as guesses. One such surmise was to have a profound effect on Crabtree and indeed, through him, on the development of electricity.

Newton, of course, is famous for his inverse square law of gravitation. It is not quite so well known that he tried to investigate the law of force between magnets, and surmised that the force between them must vary inversely as the cube of the distance between them:

The power of gravity is of a different nature from the power of magnetism. ... The power of magnetism in receding from the magnet decreases not in the duplicate but almost in the triplicate ratio as nearly as I could judge from some rude observations.

Principia. Bk.III

Newton was in fact right, but the forces between single magnetic poles, or between electrostatic charges, turn out to obey an inverse square law like that of gravitation. It is hardly to Crabtree's discredit that his young mind should not have been able to distinguish between poles, which in any event are fictions, and whole magnets, and he grew up therefore in the belief that Newton had said that magnetism and electrostatic force were governed by an inverse cube law.

Crabtree was coming to the end of his school years when he first saw Priestley's *History of Electricity*, published in 1767, and he avidly read this *History* right through. Now when Priestley wrote the bulk of his great work, the law of force between poles and charges was still unknown, but he added an appendix of remarkable interest, relating an experiment which had just been described by his friend Dr. Benjamin Franklin. This showed that there was no force on a charged pith ball inside a charged hollow conductor, and Priestley concluded with the brilliant surmise:

May we not infer from this experiment that the attraction of electricity is subject to the same laws with that

of gravitation, and is therefore according to the squares of the distances...?

And we can vividly picture the young Crabtree writing in the margin: 'No!'

It happens that in a copy of Priestley's *History* in the Natural Philosophy Library at Aberdeen there is indeed a 'No!' pencilled in a youthful hand at this very point. Dare we hope that this copy was that originally read by Crabtree? If anyone thinks that this would be too much of a coincidence, let him contemplate that it is far less improbable than the coincidence that the moon should be of precisely the right size and in the right place to eclipse the sun with exactitude.

Crabtree's disbelief in the inverse square law was to have a profound effect on the development of electrical science, for his forceful wrath would descend on any man of science who dared to support the law of the inverse square. Even after Crabtree went to France in 1783, he felt so strongly that he returned to Birmingham in 1791 to foment the mob against Priestley, coupling the heresy of the inverse square, which they could not understand, with Priestley's pro-Americanism, which they could. They wrecked Priestley's house, and burned the *History of Electricity*. Priestley and his family escaped with their lives, and shortly afterwards emigrated to America.

All this, however, lay twenty years in the future, and in the meantime another man of science had earned Crabtree's enmity even before he left school. Edward Jenner, the renowned discoverer of vaccination, was a Gloucestershire man, and indeed was apprenticed to a surgeon, Mr. Ludlow of Chipping Sodbury, while Crabtree was completing his school days. The original cause of their rivalry is not altogether clear. Some Crabtree Scholars have ascribed it to Jenner's poking fun at Crabtree in the title of his first paper in the Proceedings of the Royal Society: *The Natural History of the Cuckoo*. While superficial chronology might make this praiseworthy suggestion difficult to accept (the Cuckoo paper was published nearly twenty years after Crabtree left school), it is clear that Crabtree's nickname stayed with him in later life, for Wordsworth immortalized his joy in 1802, on learning that Crabtree was not dead, by his poem *To the Cuckoo*:

The same whom in my schoolboy days
I listened to; that Cry
Which made me look a thousand ways
In bush, and tree, and sky.
And I can listen to thee yet;
Can lie upon the plain
And listen, till I do beget
That golden time again.

Perhaps the two similarly strong characters of Crabtree and Jenner were bound to clash. The latter's biographer says of him that in addition to being a man of science, he was a fair musician and a poet, again reminding us of the liberal outlook of the eighteenth-century gentleman. Perhaps Jenner supported the inverse square law. Perhaps he wrote a prettier poem than Crabtree. Perhaps he had a greater success with the wenches of Sodbury. Whatever the cause, the rivalry dogged Jenner's career, and Crabtree had what we must admit was his unworthy way. While Crabtree was frolicking in Oxford, and diverting himself in France, Jenner was painstakingly feeling his way towards vaccination, and laying the foundations of his fame. Crabtree enviously saw his Sodbury rival rise to international recognition, and set to work to frustrate his greatest ambition, the Fellowship of the Royal College of Physicians. Such was Crabtree's power of intrigue and persuasion that he succeeded in 1813 in getting the authorities of the College to refuse a Fellowship to Jenner, already a world-famous figure, unless he would sit an examination in Classics. Now Jenner had been a good classical scholar at school, and would have been able to pass any examination easily, but he resented the affront to his dignity, and he refused to sit. The effect on English educationalists was deep: the fact that the College of Physicians attached so much importance to Classics as to brook not even the exception of Jenner was a lesson not lost on Arnold of Rugby and Cardinal Newman. The martyrdom of Jenner was in vain and the English public schools were lost to the Humanities. But Jenner had the last word. When he heard of the success of Crabtree's campaign, he sent Crabtree a note with just a single sentence showing his command of Latin. It read 'POX VOBISCUM', which from the inventor of vaccination meant all that it said.

While wine and women may have been Crabtree's main preoccupations in Orléans, he still pursued his campaign against the inverse square law. He soon met and annoyed Coulomb, who worked at Blois, only forty miles away. Coulomb had not much to fear from Crabtree's influence in France, but it was otherwise with Cavendish in England. Cavendish's electrical researches were one of the gems of the eighteenth century. His discoveries anticipated by fifty years many of those published in the nineteenth century, but they remained

unknown until 1879, when they were edited and published by Maxwell. Why did Cavendish suppress them? Could not the answer well be that he feared the consequences of publishing discoveries which contained or implied the inverse square law of electrostatics and magnetism? This, of course, applied to all his work in electricity. When we reflect on what befell Priestley, for even hinting at the inverse square law, the silence of Cavendish is a mystery no longer. He was a nervous man, quite unable to stand up with Priestley's courage before a mob blindly infuriated by Crabtree reciting his poem that begins:

Infidel from Newton by whose hand
The mighty inverse cube doth stand
Who claims instead the square inverse
Or inverse fourth or something worse.

And so Cavendish chose silence and safety.

Crabtree's other anathema was the wave theory of light revived by Thomas Young, for the authority of Newton had been thrown on the side of the corpuscular theory. It is not widely known that the celebrated attack of Lord Brougham in the *Edinburgh Review* on Young and his theory was inspired by Crabtree. Young, however, seems to have been aware of the origin of the attack, for it entered into his subconscious mind to reappear in a dispute that he was having with Fresnel. Fresnel's work, Young said, was to his own as the apple is to the tree. Young may have originally said 'crab' for 'apple', but decided that this would give unnecessary offence.

Young became Professor at the Royal Institution, and Crabtree was wont to attend the Friday evening discourses afterwards made so popular by Faraday. Crabtree's last contribution to science, unwitting though it may have been, was indeed a memorable one. It was in 1846 when, as an old man of 92, he sat with a venerable glare in the front row of a Friday evening audience awaiting a discourse from Charles Wheatstone. It is curious that Wheatstone should now be famous for the bridge, which he did not invent, while few of us credit him with the mouth-organ, which he did. Wheatstone, like Cavendish, was nervous, and it is known that one Friday evening he absconded through fright when about to deliver a discourse on his electromagnetic chronoscope. Faraday, going into the lecturers' room, found that he had disappeared, and delivered an impromptu discourse in his stead. Ever since that time, a show is made of guarding the lecturer in the last few minutes before he enters the lecture theatre, so that the Wheatstone fiasco is not repeated. It seems clear that Wheatstone's defection was not a normal loss of nerve — after all, even though nervous, he had lectured many times before. Knowing that he was going to lecture about one of his instruments, whose working was based on the inverse square law, and visualizing old Crabtree's snowy but glowering head resting with clasped hands on his stick, can we not picture Wheatstone's panic? Crabtree, though old, was still to be feared, and Wheatstone — like Cavendish — declined to face him.

Wheatstone's flight had interesting results, for Faraday filled in the gap by talking speculatively of his thoughts on 'Ray-vibrations'. All this is well documented, both in the published discourse, and in Faraday's letters (*Researches in Chemistry and Physics*, London, 1859). Whether Faraday would ever have published his thoughts except in such an emergency we do not know, but he certainly excused their unusually speculative nature on this ground:

I do not think I should have allowed these notions to have escaped from me, had I not been led unawares, and without previous consideration, by the circumstances of the evening on which I had to appear suddenly and occupy the place of another.

They were read by Maxwell, who afterwards acknowledged that they were what first led him to conceive of the electromagnetic theory and electromagnetic waves. Thus Crabtree became the unconscious midwife at the birth of electromagnetism.

While I have outlined some of Crabtree's influence on some aspects of natural science, much remains to be traced by others. Crabtree's fervent Newtonianism was well known to every man of science of his day. It is probably the fact that he did no experiments that has caused his name to sink into obscurity, for he rarely committed himself to paper. It may not be out of place to remark the parallel with Margaret, Duchess of Newcastle, in the preceding century. Science for Crabtree was a matter of verbal disputation, perhaps to be supported by physical violence if necessary. Men of science of the Napoleonic era knew him for what he was, a man to be feared, and one of them, Sir Humphry Davy, entered into a strange deception with Coleridge.

I made the discovery by accident when looking into the possibility that Crabtree had paid a visit to Scotland.

Once again I found the annoying confusion between Crabtree and George Crabbe. Crabbe is given full credit by the *Encyclopedia Britannica* for a passion for the truth, naked and unashamed. 'If', it says, 'he laid more stress on the seamy side of village life, it was because that side of it was more familiar to him.' Why does it fail to realize that this was even more true of Crabtree?

Crabbe, it appears, stayed with Sir Walter Scott in Edinburgh in 1822, when his visit was complicated by the fact that George IV went to Edinburgh at the same time. Lockhart, Scott's biographer, gives a diverting account of some of the complications, but he seems to have no suspicion that Crabtree may have been mixed up with them. However, I believed that Scott must have had some contact with Crabtree, particularly in view of Dr. Ogden's discovery, and so I continued to look for clues in Lockhart. It was thus that I found the surprising incident involving Coleridge. What occurred cannot now be exactly established, for we have two accounts of the episode, one by Coleridge himself, and the other by Lockhart, and they do not entirely agree. I therefore submit my own interpretation of the evidence, for the consideration of other Crabtree Scholars; the accuracy of the facts can be checked by reference to Lockhart and Coleridge.

Scott was visiting London in 1809, and was invited by Sotheby to a dinner party 'with men of celebrity in science, or polite literature'. Coleridge and Humphry Davy were among the company. After dinner, Scott was invited to recite a poem and, fearing a hostile reception, promptly repeated one entitled *Fire, Famine, and Slaughter*, which he had read in the *Morning Post*. Now the poem had been published anonymously, but Lockhart claimed that Scott suspected that it had been written by Coleridge. Coleridge in his version was positive that neither Scott nor anyone else, except Humphry Davy, suspected him of being the author, and indeed it is not easy to see why Scott should have recited one of Coleridge's poems in the circumstances. I suggest that the reason that Coleridge could say so positively that few suspected him of being the author was that he knew quite well that he was not the author; that the poem was in fact Crabtree's, whose robust style was so well known. The very title is uncharacteristic of Coleridge; it fits far better with Crabtree's perpetual sense of impending doom. He may have been inspired by the last line of a play by Davenant, whom he much admired. However that may be, the company fell to criticizing the poem as soon as Scott had finished. At that point Coleridge saw a chance of killing several birds with one stone: he afterwards recorded that when the criticism mounted:

My voice faltered a little for I was somewhat agitated... At length I brought out these words: 'I must confess now, Sir, that I am the author of that poem.'

He thus succeeded in astonishing and embarrassing the company, in bewildering Scott, and in robbing Crabtree of what posterity would have recognized as one of his most famous poems. Now why should Coleridge thus cheat Crabtree? The answer is simple: Coleridge knew the truth about Annette Vallon, and he had always resented what he regarded as Crabtree's imposition on their friend Wordsworth, who had confided in him about Annette. Here was a chance to teach Crabtree a lesson. Crabtree, of course, was unable to claim his own on this occasion, precisely because he knew that Coleridge could ruin him by telling how he failed to claim his own in Orléans.

The whole incident, however, preyed on the sensitive mind of Coleridge. He felt that the world suspected him — so much so that when his poems were collected and published, he included a special appendix to the first volume (p. 274 of the 1836 edition) which provides what he calls 'an apologetic preface' to *Fire, Famine, and Slaughter*. Obviously he was very worried about this poem, for none of the other one hundred and twenty-two poems of the volume has any apology at all. Coleridge artfully claims that the poem describes the French Revolution in terms such that 'neither the images nor the feelings were the result of observation, or in any way derived from realities'. Now everyone knew that Crabtree had been in France during the Revolution — which was why he wrote about it — and Coleridge wished by these remarks to dispel any lingering belief in Crabtree's authorship.

Finally, Coleridge added a clear warning which Crabtree alone could interpret:

But if it be asked why I republished it at all, I answer that the poem had been attributed at different times to different other persons; and what I had dared beget I thought it neither manly nor honourable not to father.

This, we can see now, was a direct reproach to Crabtree for fathering Annette Vallon's child on to Wordsworth, and a confirmation to Crabtree regarding the motives of Coleridge in this otherwise curious incident.

Coleridge had made a full confession to Humphry Davy, but Davy — remembering Crabtree's opposition to

Jenner and other men of science — entirely approved. In return, Coleridge gratefully wrote of Davy in this same preface as:

a man who would have established himself in the first rank of England's living poets, if the Genius of our country had not decreed that he should rather be the first of its philosophers and scientific benefactors.

We can only marvel at what the Genius of our country had mischievously decreed for Joseph Crabtree.

For his activities were indeed rich, and any one Orator can lay bare only a few facets. If I have culled a few flowers of science from the garden of Crabtree studies, there are many more waiting for others to pick. I have been unable, for example, to say anything about Crabtree's Theory of Levity or his ballooning adventures, and can merely remark the coincidence that the first balloon went up in Paris in 1783 within weeks of Crabtree's arrival in France. I would also like to have discussed the intervention of Crabtree in the historic dispute between Chladni and the French Academy of Sciences, regarding the origin of meteorites. This could be an attractive research, since it has been hinted that the reluctance of the Academy to accept Chladni's argument for a celestial origin was due in part to the suspicion that Crabtree had been improving the evidence by dropping hot stones from his balloon. I have not pursued his great dispute with Benjamin Franklin, or those spectacular defences of the phlogiston and caloric theories which culminated in Lavoisier's perishing under the guillotine. These and countless other rarities await the attention of the Crabtree Orators to come.