40
CRABTREE'S MEASURES
John Mullin
1993

Joseph Crabtree's father was identified by Cadwallader in his 1976 Oration as 'Fluellen Crabtree, a cobbler'. There are, I believe, two minor errors here. First, his name may well have been pronounced 'Fluellen' by monoglot Englishmen, but his true name was 'Llewellyn'. Secondly, although he was undoubtedly 'very much into leather', to use the modern idiom, he was not a mere cobbler. Smith informed us in 1959 that he was a civil servant, and that was nearer the mark. Llewellyn Crabtree in fact was a conner, or to be more precise an ale conner, a person who was both an excise man and an expert in assessing the quality of ale by utilizing the physical properties of leather.

It was a highly respected profession: Shakespeare's father held such an office in 1557 in Stratford-upon-Avon. Ale conners, or ale inspectors, *gustatores cervisiae*, were officially appointed after swearing an oath, which originated from the days of Henry V, updated periodically to keep pace with inflation. An early form of the oath ran: 'You shall swear that you shall know of no brewer, cook, or pie-maker in your ward who sells a gallon of best ale for more than three ha'pence, and not otherwise than by measure sealed and full of clear ale.'

The analytical procedures normally adopted by an ale conner were rather unusual. He would first call for a full measure of ale, pour a quantity of it on a wooden bench, and sit in the puddle whilst wearing his official leather breeches. He would then check the brew for clarity and flavour, a much more agreeable task, after which the volumetric capacity of the tankard would be checked, by the simple expedient of filling it up again. When this part of the test had been completed, he would then attempt to rise. If his breeches had stuck to the bench, the ale was demonstrably sugared and therefore adulterated. Ale brewed from pure malt was not supposed, on evaporation, to be adhesive.

Although the office of ale conner was not without its compensations, since innkeepers would not be slow to offer generous refreshment, it also had its disadvantages, since it was often difficult for these servants of the Crown to maintain a sense of equilibrium in the course of their duties. Progressing from one tavern to another, a conner could feel very much like Colombus and his voyage to the New World:

> When he set out, he didn't know where he was going.
> When he arrived, he didn't know where he was.
> When he got back, he didn't know where he had been.

It would not be at all surprising, therefore, if young Joseph Crabtree accompanied his father from time to time, if only to show him the way to go home, and it is more than likely that he would also be called upon to assist in the test procedures. While Crabtree Senior was conscientiously fulfilling the tasks which involved sitting still, Crabtree Junior would most probably be entrusted with checking the volumetric capacity of the empty tankards. In this way, he would soon learn that not all quart pots held a full quart of liquid, and this experience would help to explain his subsequent interests and achievements, which I shall describe in a moment.

At the age of 12, Joseph Crabtree was sent to Yorkshire, to continue his education at a boarding school at Rishworth in the parish of Halifax. But Crabtree only remained at his new school for two years because at the age of 14 he was sent, or perhaps ran away, to sea. The reason for his sudden departure from the school, which had a reputation for preparing pupils for admission to Oxford or Cambridge at the age of 18, has not so far been established, although our attention has already been drawn to one of the School Regulations, and I quote: 'that no child was to be admitted or retained, who should be evil or wickedly disposed or of lewd conversation'. Crabtree was admitted, of that there is no doubt, but he was not retained, at least not beyond the age of 14.

Now I must admit that what follows is to some extent a reconstruction, but I believe that I can throw some light on the matter. You will remember that, at the tender age of 9, on a visit to the port of Bristol, ostensibly to wave at some ships, Crabtree was lured by some unidentified voluptuous maiden up to the crow's nest of a man o' war where, rising to the occasion, he was deprived of his virginity. The experience had a marked effect on this hand-reared callow youth. In fact, it had several, but I have no intention this evening, Mr. President, of discussing Crabtree's medical problems. They have already been described in excruciating detail by several of my predecessors, together with the formulations of the vile unguents that were prescribed to relieve the squalid complaints. However, at school, during one particularly intense bout of his hard-won affliction, Crabtree asked

the headmaster if he could be excused classes. His request was refused, and he was told to stick it out until lunchtime, which he did, interpreting the advice literally, and was promptly expelled for lewd conduct.

In 1768, young Crabtree went to sea with Joseph Banks, the naturalist, on Captain Cook's first voyage to the South Seas. On their long voyage together in hot climates, Banks took quite a liking to Crabtree, admiring his immense latent intellect, amongst other things. It was Banks who introduced Crabtree to Richard Price, the renowned political economist and financial adviser to national governments. Price, who had risen from humble origins in rural Wales, probably saw in the bright young Crabtree something of a reflection of his own youth.

Price introduced Crabtree to one of his close friends, Joseph Priestley, who at that time was investigating the chemical and physical properties of various gases. It is perhaps worth recalling at this point that we were informed by Jones in 1957 that Crabtree had earlier taken an active dislike to Priestley after reading about his belief in the application of the inverse square law to electrostatic attractions, mistakenly thinking that this conflicted with Newton's views on the subject. But it is very difficult to understand how such a relatively minor disagreement could possibly account for the intense animosity which culminated in Crabtree's return from France in 1791 to lead a riotous mob against Priestley's house in Birmingham, an act which eventually drove the famous chemist to emigrate to the United States.

I shall now reveal the real cause of the conflict, Mr. President. When Priestley and Crabtree first met at Price's house in 1772, Priestley had recently found that when he dissolved carbon dioxide in water, he obtained an interesting sparkling drink. He proposed to call it 'impregnated water'. Crabtree was given a sample to taste, but he was not impressed and told Priestley that it needed a bit more work done on it, and in any case with a name like that it wouldn't sell. Experimenting on his own, Crabtree found that if he dissolved a small amount of sodium bicarbonate in carbonic acid aqueous solution, the mixture assumed remarkable properties. When used in moderation, it could, for example, even make whisky palatable. Crabtree had invented soda-water. When Priestley heard about this remarkable discovery, he told all his friends, never once mentioning Crabtree's vital contribution, dashed off a 120-page paper to *Philosophical Transactions* and was awarded the Copley medal of the Royal Society. Crabtree never forgave him.

After his brief sojourn at the University of Oxford, to which he went up and from which he was sent down in double-quick time, Crabtree returned to London. We know that during 1773 he was in partnership with Jeremiah Postlethwaite, who, for some strange reason, had changed his name to Joseph Bramah, a worthy artisan whose technical skills were described by Rowe in 1980. Bramah had a small workshop in Denmark Street, St. Giles, and Crabtree had invented a beer pump that was fabricated and patented by Bramah, with or without Crabtree's permission. But why a beer pump? That is the interesting question. There must have been a very good reason why Crabtree's inventive powers should have turned towards the development of such a specialized contraption. Surely it would indicate that he had more than a passing acquaintance with taverns and their technical problems?

I believe, Mr. President, that I have found the connection. I have discovered that a branch of the Crabtree family owned a tavern here in this part of London, and Crabtree himself resided there during 1774, carrying out trials with the prototype of his invention. Furthermore, the tavern still exists, at least in modified form. Crabtree's uncle, his Uncle Dewi I am led to believe, was landlord of an ale-house called *The Crabtree*, situated on the eastern side of a meadow called Crabtree Field, on the boundary between the parishes of Marylebone and St. Giles, close to the intersection of the roads to Oxford and Tottenham Court, respectively. This clearly cannot be the same Crabtree Field as that referred to by Scott in 1964, since that was identified as being part of the proposed Carmarthen Square site, now part-occupied by UCL. It is possible that the Crabtree family could have owned and named more than one plot of land in this part of London, although I have not been able to confirm it despite diligent searches through the estate maps and land registrations of all the parishes concerned.

The Crabtree tavern itself can no longer be seen. It was rebuilt in the late eighteenth century and renamed *The Blue Posts*, on account of two blue posts that stood in the forecourt as an advertisement for a local fleet of blue-shafted sedan chairs. *The Blue Posts* tavern does still exist, at number six Tottenham Court Road, although the original building was destroyed by enemy bombing in 1941 and later rebuilt in the style that can be seen today. It would seem to me, Mr. President, that the wall of *The Blue Posts* at least deserves consideration as a location for a commemorative Blue Plaque.

Several previous Orators have expressed doubts that because Joseph Crabtree came from a Methodist background, any alleged contact with the brewing trade must be mistaken. Nothing could be further from the truth. The oldest brewery in Wales, a land noted for beer as well as for song, is named after a Methodist minister, the Reverend James Buckley, who married the daughter of Henry Child, maltster, brewer, staunch

Methodist and frequent host, at his home in Llanelli, to John Wesley during his evangelical tours of Wales. Crabtree met Wesley at Child's house in August 1779 and was amused by the description of what Wesley called *The Jumpers*, persons who were moved to near ecstacy under the powerful influence of a good rousing hymn. As Wesley had recorded earlier in his Journal for August 1775:

> Some of them leaped up many times, men and women, several feet from the ground. They clapped their hands with the utmost violence; they shook their heads; they distorted their features; they threw their arms and legs to and fro in all variety of postures; they sang, roared, shouted and screamed with all their might, to the no small terror of those that were near to them.

This behaviour, of course, is not all that unusual nowadays, particularly with members of the younger generation stimulated by certain types of secular music.

It was during their meeting at Llanelli that Crabtree challenged Wesley over the alleged efficacy of prayer, pointing out that in England at least no one had prayers for a long and healthy life said on their behalf more frequently than the Monarch and his family, and that did not seem to have had much effect. The argument could be settled, he suggested, by conducting a quantitative survey to establish the average length of life of different population groups, and comparing the data with those of members of the Royal Household. It was close on 100 years later, however, before Sir Francis Galton, founder of the Eugenics Laboratory here in Gower Street, made his notable statistical study which provided the quantitative evidence to support Crabtree's thesis. Indeed, Galton's enquiry showed that members of the Royal Household had the lowest life expectancy of all the groups studied, and the clergy were not all that far behind either.

Not surprisingly, many of the large breweries of Great Britain in the eighteenth century were linked by family ties. Henry Child's grandfather had owned the Anchor Brewery at Southwark, which was later inherited by Henry Thrale, regular host to Samuel Johnson. Acting on behalf of Child, Crabtree attended the Anchor Brewery auction sale after Thrale's death in April 1781 when, as reported by Boswell, Johnson was observed bustling about like an excise man exclaiming 'we are not here to sell a parcel of boilers and vats, but the potentiality of growing rich, beyond the dreams of avarice'. Last year, Mr. President, in the archives of Buckley's brewery in Llanelli, I was shown a faded beer-stained receipt, faintly countersigned with what appeared to be the initials 'JC', relating to the purchase at that sale of two small vats for the sum of £284 6s 8d. The vats, I regret to say, could no longer be identified.

In 1783, Crabtree joined his Uncle Oliver's wine business, Crabtree and Hillier, in Orléans, where he stayed for several years, making frequent visits back to England to keep in touch with his ever-widening circle of friends. On one of these excursions, in the spring of 1789, Crabtree attended a meeting at Westminster where Sir John Riggs Miller, Member of Parliament for Newport in the County of Cornwall, was explaining his deep concern about the unreliability of the various so-called standard measures kept in and around London. He had found, for example, that the two brass-rod standard yards kept at the Exchequer were both bent and, even when straightened out, they did not agree with one another. At Guildhall he found that two measures of the standard pint did not quite fill the standard quart. Crabtree offered the suggestion that the standard yard itself should be abolished. It was, he said, a quite irrational unit of length, being based on the distance between the nose and outstretched finger tip of King Richard the Lionheart. It would be more logical, he argued, to replace it with the metre, recently proposed in France, a much more sensible unit of length equal to one ten millionth of the distance from the North Pole to the Equator on a line passing through Barcelona.

From first-hand experience, Crabtree was able to explain some of the problems with volumetric units in the wine and ale trades. Ale was sold in bulk by the barrel, sub-divided into the kilderkin (half barrel) and firkin (quarter barrel). Wine, on the other hand, was sold by the tun, sub-divided into the pipe or butt (half tun), firkin (one third tun), hogshead (quarter tun) and barrel (one eighth tun). However, a barrel of ale was larger than a barrel of wine, and a firkin of wine was larger than a firkin of ale. To make matters worse, a barrel of ale was smaller than a barrel of beer. It was no better with the units of weight, or mass as it is called nowadays. Here again, different trades and professions had their own variations. Apothecaries and goldsmiths, for example, preferred ounces and grains (sub-divided into scruples, drachms or pennyweights, according to taste). But their ounce was larger than the more common variety, which measured 16 to the pound, 14 of which made a stone, 8 of which made a hundredweight, 20 of which made a ton. And this ton, bear in mind, was not as heavy as the wine tun, which measured 252 gallons or 1008 Winchester quarts. And you also have to remember that the Winchester quart had nothing in common with those large cylindrical narrow-necked bottles, familiar to all who have ever visited a chemical laboratory, because those Winchesters held more than two standard quarts. It was all very confusing.

Crabtree knew that France had similar difficulties with their weights and measures and he had often discussed the subject with the French statesman Talleyrand, an old acquaintance with whom he had once shared a lady-friend — the hyperloquatious Madame de Staël, no less. The problems, in fact, were international. And it was then that Crabtree had a blinding flash of intuitive insights. The prime objective, he suggested, should be to replace all national units with a new set of international units, one of which could be the metre, if only to please the French, and at the same time to align them with a decimal system. And while they were at it, Crabtree continued, national currencies could also be subjected to the same treatment. Crabtree was thus the first to propose an international programme of metrication and decimalisation.

Miller was impressed with Crabtree's arguments and asked him to contact Talleyrand to see if he could be persuaded to work towards a common objective. Talleyrand replied with a letter of support, which Miller flourished in a House of Commons debate in April 1790. In April 1792, Talleyrand contrived to get himself sent on a diplomatic mission to London and asked Crabtree if he could arrange a meeting with the Younger Pitt to discuss standardization matters. They met, but did not apparently get on very well together, which is perhaps not surprising since neither was what you might call effusive. Pitt, 'had a smile like moonlight glinting on the brass plate of a coffin', whereas Talleyrand was known to have extraordinary control over his features. It was said that 'if, while one was conversing with him, he would receive a kick up the backside, one would never be aware, from any expression of his, of the indignity he had just suffered'. Apparently, Talleyrand's poker face did not even change during that frequently cited incident in 1809, when Emperor Napoleon ranted, raved, hurled abuse and called him 'a load of shit in a silk stocking'. Talleyrand, who had never suffered from *mural dyslexia*, the inability to read writing on a wall, quickly got the message that his future as Grand Chamberlain looked bleak, so he tactfully resigned.

Whatever actually transpired at the meeting between Pitt and Talleyrand we will probably never know, but so far as the international standardization of units was concerned, Britain proceeded to develop the Imperial system and France the metric. France decimalized its currency in 1795, but was beaten to it by the United States, which had decimalized theirs three years earlier. But the seed sown by Crabtree did germinate, and some 200 years later the arguments are nearly over. Crabtree's measures have been adopted internationally and we take it all for granted. We now instinctively know our weight in kilograms, our height in centimetres, and find it difficult to distinguish between a quart and a litre, even when sober. We would now never dream of describing a piece of wood, for example as say 6ft of 3x2, although what we would need to ask for, to guarantee a sensible response from a vendor when attempting to purchase such an item, is still anyone's guess.

Crabtree was fascinated by measurement and quantification and was fond of saying, 'When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind'. William Thomson, later Lord Kelvin, repeated these words, without quoting the source, in a lecture to the Institution of Civil Engineers in 1863, and is often mistakenly credited as the original author.

Crabtree conveyed his enthusiasm for numerical expression to Wordsworth during their several walking tours together. In 1798, for example, Wordsworth gratefully changed the opening of *Lines on Tintern Abbey* from a somewhat pensive 'How long is it?', which Crabtree pointed out could so easily be misinterpreted, to the much sharper 'Five years have past; five summers, with the length of five long winters!', which is now generally regarded as going a bit over the top. But after that you couldn't stop Wordsworth, as in *The Thorn*, written in the same year:

> There is a fresh and lovely sight,
> A beauteous heap, a hill of moss,
> Just half a foot in height.

According to his notebook, it was actually just under 5½ inches, but even when unconventionally he rounded it up to six, he still couldn't fit it in. And then a few verses later comes this gem:

> And to the left, three yards beyond,
> You see a little muddy pond
> I've measured it from side to side:
> Tis three feet long and two feet wide.

Which brings tears to the eyes.

And now I must draw to a close. None of us here tonight needs to be reminded that Joseph Crabtree was a man of many talents. For proof that he was highly respected as a man of achievement, there is no need to go any further than the National Portrait Gallery, where you can see an engraving entitled 'Distinguished Men of Science' (see page 324). Amongst the notables in the group are Telford, Brunel, Watt, Cavendish, Dalton, Davy and Banks. Crabtree stands on the right, with his back to the viewer, characteristically preserving anonymity. He appears to be engaged in conversation with Richard Trevithick, possibly asking him how much he made out of his experimental circular-track passenger railway in 1808, located in what was later to become the UCL quadrangle.

Many have tried to guess the identity of this enigmatic figure in the picture, and one at least has suggested that it could be Joseph Bramah. But we know better than that. Bramah, whose real name was Postlethwaite, was undoubtedly a skilled artisan, the fabricator of a beer pump and later, so we have been informed, a water closet. But would these 'achievements' have warranted his inclusion in this 'Top 50' group? Would he have been accepted in such distinguished company? No, this is not Joseph Bramah. It is Joseph Crabtree, and immediate steps should be taken to end any uncertainty.