



## Private prescription:

A thought-provoking tonic on the lighter side

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London in 1809. Over the next two decades Brockedon regularly contributed to exhibitions, with several of his pictures on biblical subjects becoming well known. He also travelled through the Alps and Italy, publishing several books, which he illustrated along with other artists, and he became a member of the Academies of Rome and Florence [1]. In 1830, he co-founded the Royal Geographic Society and was a member of its first Council. Throughout his life, however, Brockedon maintained an interest in science and technology and was well acquainted with the great scientists and

# Pill-punching patents

On 8 December 1843 – 160 years ago – a patent was published that would have a profound effect on drug delivery for the next century and a half and, indeed, still has today. Assigned to William Brockedon of Middlesex, England, (Figure 1) and given the number 9977, it was entitled ‘Shaping Pills, Lozenges and Black Lead by Pressure in Dies’. The patent described a simple device, consisting, essentially, of a hole or die bored through a piece of metal within which a powder was compressed between two cylindrical punches with concave ends. One of these punches was inserted into the base of the die at a fixed depth, the other was inserted into the top of the die and ‘worked by means of a fly press or by other convenient means’. In view of the importance of this invention, it is pertinent to look at the background of both the inventor and pharmaceutical practice of the time.

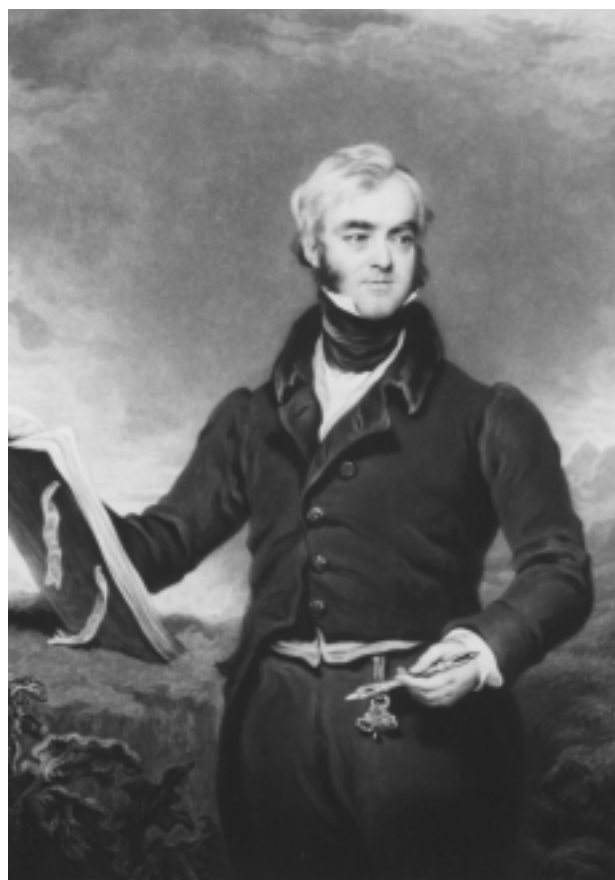


Figure 1. William Brockedon –47 years of age (Courtesy of the Royal Society).

### Watchmaker, artist and inventor

William Brockedon was born on 13 October 1787 in Devon, England; the

son of a watchmaker. However, he soon gave up watch making to concentrate on his hobby of sketching and painting, enrolling at the Royal Academy in

engineers of his time. He is known to have sketched Michael Faraday, Charles Babbage, John Dalton and Charles Wheatstone and had close connections with both Marc Isambard Brunel and his more famous son, Isambard Kingdom Brunel. Marc Isambard Brunel nominated Brockedon for election to the Royal Society in December 1834.

Brockedon's career as an inventor began in 1838 when he patented a substitute for a bottle cork, consisting of a felt core covered by vulcanised rubber. Other patents, for improvements in stoppers, methods for waterproofing roofs, sealing the valves of musical instruments and the design of flexible catheters for treating bladder ailments, soon followed. His interest in medicine even stretched to inserting inflatable rubber plugs into gunshot wounds to arrest bleeding [2]. In his later years, he was granted a patent

for the use of rubber in controlling gun recoil.

Brockedon died at the age of 66 on 29 August 1854 and was buried in the

burial ground of St George the Martyr in Bloomsbury, London [3]. Interestingly, the cemetery has been converted into St George's Gardens and is positioned alongside the School of Pharmacy, University of London – an institute that has been a great employer of Brockedon's invention.

### Compressed pills

Prior to the pill-punching patent, pills and medicated lozenges were invariably made using gums and other adhesive materials, together with liquids to render the powder mass suitable for moulding into shape. Brockedon stated in his patent that 'it is well known that in some cases (these materials) interfere with and prejudice the desired action' of the product, and the object of his invention was to compress medicinal agents without them. He claimed that his process was 'particularly applicable when using matters readily soluble in the stomach, such as the deliquescent salts used medicinally, the carbonates, tartrates and nitrates of soda and potash'. Within a year, samples of compressed pills, as the product was then known, were being offered to the pharmaceutical profession, as shown by the following extract from the *Pharmaceutical Journal* of that year [4]:

'We have received a specimen of bi-carbonate of potash compressed into the form of a pill by a process invented by Mr Brockedon, and for which he has taken out a patent. We understand the process is applicable to the compression of a variety of other substances into a solid mass, without the intervention of gum or other adhesive material. Mr Brockedon has promised to favour us with a detailed account of this process for publication in an early number.'

Compressed pills of chlorate of potash, bicarbonate of soda and others were

soon being exported worldwide. Commodore Matthew Perry – the US naval officer who headed the expedition to force Japan to enter into trade and diplomatic relations with the West after more than two centuries of isolation – is reported to have taken some of these on his trip in 1854, after ordering them from the druggist and importer E. Milhau of New York City [4]. One of the earliest American druggists to stock the product was Frederick Brown of Philadelphia [4].

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*'...the humble tablet will still be around when other delivery systems have bitten the dust!'*

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The decades that followed saw an explosive growth in the industry, with patents from both Europe and the US for increasingly complicated machines, new formulations and trademarks. The right and title to manufacture compressed pills via Brockedon's process was purchased by a London-based company, F. Newberry & Son, in 1871 [5], before being sold on to Burroughs Wellcome & Co. In 1875, Jacob Dunton, a wholesale druggist from Philadelphia, was the first to secure a patent for the preprocessing of materials by drying before compaction and the use of a lubricant to prevent adherence to the die. Shortly after this, in 1877, John Wyeth and Brother, from Philadelphia, registered a trademark for compressed tablets [4], heralding the birth of the modern tablet formulation.

### The humble tablet

It is interesting to note that, in 1895, it was proclaimed that 'tablets had had their day...and will pass away...to make room for something else' [6]. A somewhat erroneous statement, considering that recent surveys, a century or so later [7,8] have shown that compressed tablets account for

more than 30% of the dosage forms employed for new medical entities in the US and more than 40% of the formulations on the market in the UK. Scientists who work in the field of powder compaction are often derogatively referred to as 'pill-punchers' by those working in the more fashionable areas of advanced drug delivery, but it will be interesting to see the statistics over the next few decades. I wager that the humble tablet will still be around even when other delivery systems have bitten the dust!

### References

- 1 Stephen, L. (1969) *The Concise Dictionary of National Biography*, Oxford University Press
- 2 Foley, V.L. and Belcastro, P.F. (1987) From bullets to pills: the mechanization of tablet manufacture. *Pharm. Tech.* 11, 110–116
- 3 Wilkinson, L. (1971) William Brockedon. *Notes and Records of The Royal Society of London* 26, 65–72
- 4 Kebler, L.F. (1914) The tablet industry – its evolution and present status – the composition of tablets and methods of analysis. *J. Am. Pharm. Assoc.* 3, 820–848
- 5 Newberry, F. (1881) *Chemist and Druggist* 23, 555
- 6 Anon (1895) *Pharm. J.* 54, 583
- 7 Sam, A.P. and Fokkens, J.G. (1997) The drug delivery system – adding the therapeutics and economics to pharmacotherapy. *Pharm. Tech. Eur.* 9, 58–66
- 8 Wells, J. (1988) *Pharmaceutical Preformulation – The Physicochemical Properties of Drug Substances*, Ellis Horwood

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