

Britain's Small Wheel Bicycle Revolution

By Dan Farrell, Bradford on Avon, England

As the motor car came within reach of the man in the street, cycle use in the UK declined. In the 1950s, this decline seemed terminal. Bicycles were unfashionable, yesterday's mode of transport. The car was king. During the first Suez crisis in 1956, fuel was rationed in the UK. Perhaps this future full of shiny cars and endless tarmac roads was not assured, or at least not on a ration of 200 miles of petrol a month.

A man in Wiltshire was troubled by this restriction and bought himself a lightweight bicycle – a Hetchins – as, in his own words “a serious alternative means of locomotion”. He found a ‘revelation of joy’ in riding this, but thought it a little cumbersome, and found carrying his briefcase difficult. His interest was piqued. He would later say “I rode it thoughtfully, inviting it to speak to me.”¹ He resolved to improve on it. This man was, of course, Alex Moulton. His background was unusual and it is worth exploring, but for now I will only mention that his great-grandfather was the rubber pioneer Stephen Moulton, Charles Goodyear's emissary to England in the 1840s.²

The Revolutionary Objective

Bicycles had featured in Moulton's mind before – we know that he approached Raleigh with a design for bicycle suspension as early as 1948.³ But this was different. Alex Moulton's intent in 1960 was to make a bicycle that was:⁴

1. More convenient and pleasing to use;
2. Suitable for all of the family to use;
3. Easy to lift, stow and park; with provision for carrying things on it.

Moulton questioned everything, including riding position. He concluded that the conventional riding position was optimal. He also queried how large the wheels were, and found that the reasons for the large size were largely irrelevant in post-war Britain. He had, of course, seen his friend and collaborator Alec Issigonis do the same thing in automotive circles – first with the Morris Minor and then – later - with the Mini. However, his first data on efficiency of small wheels came from aircraft undercarriage, one of the few areas where low rolling resistance is as important as on a bicycle. **Figure 1** shows one of his very early drawings.

Moulton embodied the Moulton bicycle thus:⁵



Figure 3. The first rideable prototype of the Moulton bicycle- monocoque construction, the 'noisy bicycle'. Courtesy of the Moulton Bicycle Company.

1. Small wheels;
2. Suspension front and rear;
3. A low, step-through frame with adjustability provided through seat pillar, stem etc.

The small wheels, of course, liberated a lot of room for carrying things.

He was also clearly influenced by the Vespa scooter, as these early drawings show [Figure 2].

Figure 3 shows the first rideable prototype, and Alex later recalled that he had created this terrible thing – a noisy bicycle – and this started the move towards

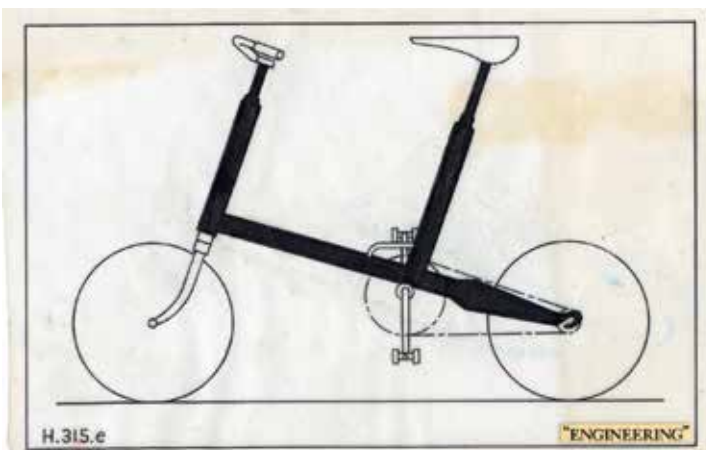


Figure 1. An early drawing (1959) of the Moulton bicycle. Reproduced from Engineering Magazine, 9th November 1962.

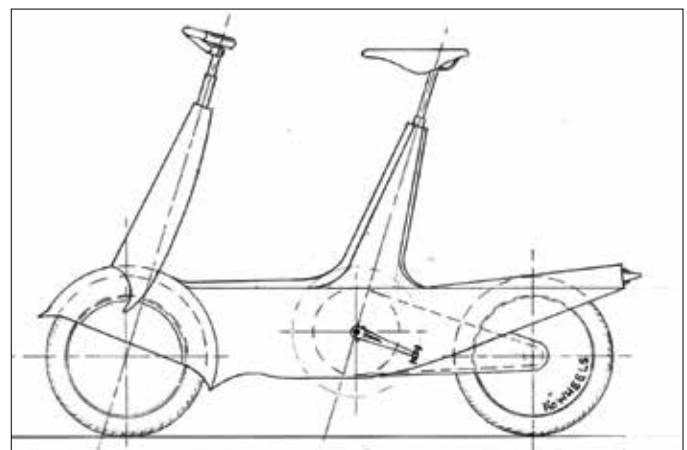


Figure 2. An early sketch (1959) of the Moulton bicycle, with resemblance to the 'Vespa' scooter. From the Alex Moulton archive, courtesy of the Alex Moulton Charitable Trust.

tubular construction.⁶

The Moulton eventually took the form shown in **Figure 4**, and the addition of suspension was inevitable. Whilst his first designs didn't have suspension, he soon realised that it was highly desirable for ride comfort and road-holding. He was, after all, first and foremost a suspension designer. He would later refer to the absurdity of wheeled transport not having a suspension system, even railway trains have them.⁷

Moulton never intended to make bicycles himself, so he approached Raleigh to do so. Raleigh, of course, was the hugely dominant cycle company, and had absorbed almost all of their competitors and had recently merged with Tube Investments.

Raleigh were initially very interested, but eventually dropped the Moulton project due to concern over financial viability. There was nervousness by all about the small wheels; no-one really knew how people would react. Small wheeled adult bikes were uncharted territory.

Launch and Success

In 1962 Moulton built a new factory and launched his new bicycle with great success. The story goes that on the first day of the Earl's Court show in 1962, Moulton spoke to the firm building his new factory and ordered it to be doubled in size. Later in the week George Harriman, Managing Director of BMC, told Alex not to hesitate to take orders as BMC (British Motor Corporation) would make them for him.⁸

In the spirit of "Win on Sunday, sell on Monday", racing cyclist John Woodburn was enlisted to attempt to break the

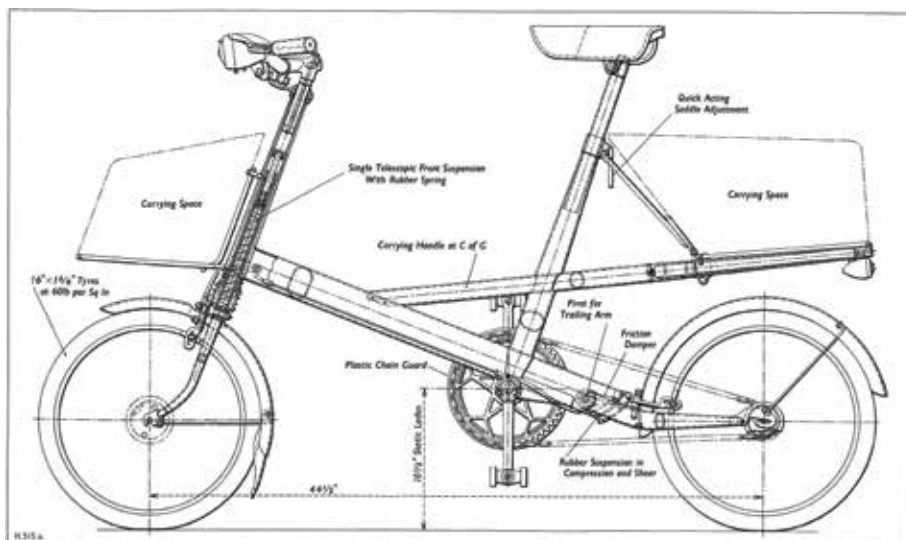


Figure 4. General arrangement of the production version of the Series 1 Moulton Bicycle. Reproduced from Engineering Magazine, 9th November 1962, copyright belongs to the Moulton Bicycle Company.

Cardiff to London distance record. He did indeed do this on December 9th, 1962, immediately putting the Moulton on the map as a serious bicycle.

Note that Moulton's bikes were not folders, or indeed separable. This was all about a better bicycle, more pleasing to own and use.⁹ Stowaway – separable – models did come, partially led by the strong relationship between Moulton and BMC. Raleigh were spooked both by the success of the Moulton and by BMC's involvement. TI Raleigh were the giants in the bike world, but BMC dwarfed them.

Moulton had less than two years of 'blue ocean' for his bicycle to sink or swim. In that time, he became the second largest single name maker in the UK.¹⁰ As the bicycle market picked up after years of decline, others entered the small wheel market. Amongst the first out of the blocks was the Dawes Newpin in 1964, closely followed by the Kingpin in 1965 [Figure 5]. This was certainly inspired by Moulton but was significantly different – larger wheels, 'H' frame layout – and was a very practical machine. And the wheels really were larger – 451 is 30% larger than 349. 30% larger than 451 is 586, in effect the English 26 x 1 3/8" roadster size.

Dawes may have merely irked Alex Moulton, whereas Raleigh – or more specifically the Raleigh RSW16 [Figure 6] – provoked more of a reaction. Raleigh's bicycle was much more in the image of the Moulton and was clearly a direct competitor in appearance if not in performance. Raleigh put their full

weight behind the RSW 16, including an unprecedented launch spend and some rather unsubstantiated claims including the proclamation that the RSW 16 was "the greatest advance in two-wheeled design this century".¹¹ One of Alex's friends – I think Lord Hailsham – wrote a postscript on one of his letters "I see Raleigh have launched a copycat bicycle in competition with yours. Perhaps an advertisement could be placed – "Raleigh – the almost all-steal bicycle".¹²

The upshot of all of this was that by 1966 the small-wheel market – that hadn't existed in early 1962 – was looking rather crowded. Also, Raleigh was the default choice of bicycle for many and, whilst the RSW looked like a Moulton, it didn't go like one and the riding experience was disappointing. Many say that the RSW was responsible for the public



Figure 5. Advertisement for the Dawes Kingpin. Reproduced from <http://daweskingpinbike.blogspot.com/2013/10/dawes-kingpin.html>, accessed May 2018.

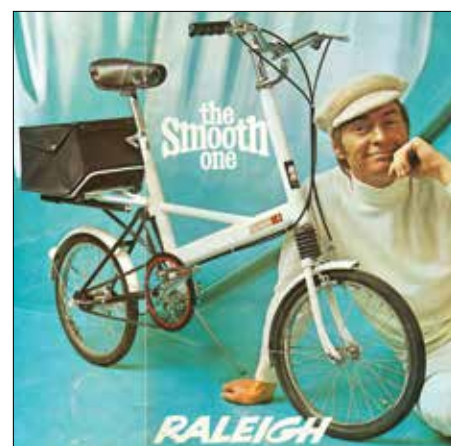


Figure 6. The Moulton MkIII, 1970. Reproduced from 'The Smooth One', Raleigh Moulton brochure.

perception that small wheels are ‘slow’ or ‘not serious’. This may not be entirely the case – I think that this prejudice is more related to ‘small wheels are for children’s bikes’ and even back to the ordinary days where the larger the wheel the better the rider was a logical link.

On top of this competition, Moulton was also affected by warranty issues and dealer resistance. The resulting dramatic drop in sales put Moulton and his manufacturing partner BMC into an awkward spot and in 1967, following a failure to react to drop in demand, they were massively overstocked and experiencing cashflow issues.¹³ Moulton sold out to Raleigh later that year and was retained by them as a consultant. The deal was an unlikely and uneasy match for both partners.

Whilst many have thought that Raleigh bought Moulton in order to kill it, this is far from the truth. Raleigh’s intent with Moulton was straightforward – whilst the smaller Moulton Mini was acceptable in terms of production and profit, Raleigh felt that the full-size model was troublesome in both areas and must be re-designed as soon as possible.¹⁴ The resulting Moulton Mark III [Figure 7] was launched in 1970 (the interim Moulton Major had the structural integrity but not the margin, and I suggest that at least one



Figure 7. *The Raleigh Twenty. This is image is from a Raleigh catalogue in the early 1970s.*

of the reasons for the delay in introducing the Mark III was the build-up of raw material stocks to make the ‘Series 2’ models).

Frame part and lug maker Donald Haden cannot recall supplying any of the complex pressings and assemblies (they made front and rear forks for Moulton) to Raleigh. Indeed Raleigh avoided sub-contractors wherever possible; and it is difficult to conclude that Raleigh tooled up to make all these parts for a model that they wanted to replace as soon as possible¹⁵.

In 1968, with more than a sideways glance at Dawes and none of the fanfare of the RSW launch, Raleigh introduced the Twenty [Figure 8]. With larger 20” wheels, this, like the Kingpin, was not a Moulton copy and owed more to the Dawes model. Whichever, it was an extraordinary success. It became the definitive ‘shopper’ bike, it was Raleigh’s biggest seller and at its height in 1975 it managed 140,000 unit sales¹⁶.

So, at this point we have three designs – the Moulton – in Mark III incarnation from 1970, its pale imitator the RSW, and the larger wheeled Kingpin and Twenty. The latter pair clearly took the ‘shopper’ market from the RSW. Raleigh positioned the Moulton as a town bike – a fashion accessory – rather than a serious bike. All the Moulton ‘performance’ (S) models were deleted on the sale to Raleigh and, left with a build specification similar to the RSW and ham-

pered by cost and complexity, in a war of attrition it was not strongly placed and both the RSW and the Moulton bowed out in 1974. The Twenty would run for another decade, until the ‘conspicuous consumption’ of the 1980s and UK transport policy skewed in favour of the motor car killed the ‘shopper’ bike.

Moulton wrote sternly to Leslie Roberts (Raleigh Chairman) about the deletion of the Moulton bicycle and reminded him that the 1967 sale was completed on the basis of an ongoing relationship. He had kept his side of the bargain and he expected Raleigh to do likewise.

Leslie was unmoved but gracious in response – “*right from the start I have always thought that the Moulton was an excellent machine, my main concern being its ability to yield a profit. Despite our best efforts, nothing in the intervening 15 years has made me change my mind. Nevertheless, the glory is all yours.*”¹

The 1970s bought a shift in the small wheel bicycle market, and the first real – and successful – portable bicycle, the Bickerton Portable [Figure 9]. Harry Bickerton was an aeronautical engineer who was frustrated by how difficult combining public and personal transport was. Taking a bike on the train was, at the time, expensive. These days of course it is merely difficult.

Harry considered many ways to get to and from the station – including roller skates – before concluding that a portable bicycle was the best option.¹⁸ Of course, it could also be useful for those with boats, planes, on buses, anywhere. He designed his bicycle to be as light and as small as possible.

Like Moulton, it used methods of manufacture unknown to the cycle industry. Unlike Moulton, its manufacture was not sophisticated – ‘knife and fork’ methods and the Aga in Harry’s kitchen used for heat treatment. Harry’s bike used a 14” front wheel and a 16” rear – the same as the Moulton Mini and standard Moulton respectively. The Bickerton was astonishingly light at under 10 kilogrammes. It was built of aluminium and had no welded joints. The frame folded, the handlebars folded, and it stowed into a bag. When ridden, the same bag could hang from the handlebars to carry luggage. It adjusted to suit almost anyone.

Riding a Bickerton is an unusual expe-



Figure 8. *Harry Bickerton and the Bickerton Portable bicycle, 1971. Image supplied by Mark Bickerton.*

rience, and many cyclists found the ride unnerving. Whereas Moulton designed a stiff frame and introduced suspension to articulate the frame very precisely, Bickerton designed a bike that was strong enough to carry you but had very little of the rigidity of a conventional machine. Harry Bickerton himself found the Bickerton bicycle “*really marvellous to ride. Acceleration is amazing, hill-climbing outstanding, and the general responsiveness and performance is quite exhilarating.*”¹⁹ Richard Ballantine described how



Figure 9. Early Brompton prototype. Image reproduced from The Telegraph website, www.telegraph.co.uk/technology/picture-galleries/6753771/Hottest-gadgets.html?image=6. accessed May 2018.



Figure 10. The current Brompton bicycle. Image courtesy of Brompton Bicycle Ltd.



Figure 11. The current Moulton SPEED bicycle. Image courtesy of the Moulton Bicycle Company.

if you ride it hard, it does move under you “sometimes in several directions at once”.²⁰ But that’s not necessarily a bad thing. The ride is comfortable, the bike is light, and it folds up small. What’s not to like? It sold by the 1000s, despite its price tag - £125 in 1975.

The crucial difference here is that Bickerton’s design intent was completely different to Moulton’s. That’s not to say there is no crossover and some of the manifestation of these intents does not bring the same results – most obviously in the size of the wheels! It worked both ways as well – around this time Alex Moulton decided that all his bicycles should separate into two parts – hitherto, almost all of them didn’t (and indeed the Moulton Stowaway was deleted in 1965).

Another man inspired by all of this was Andrew Ritchie. His aim was to create an improved compact folding bike, so his intent was similar to that of Harry Bickerton. He spent the best part of the 1970s in his flat on the Brompton Road working on his designs, interspersed with time working as a gardener. Whilst his original designs superficially resembled Bickertons [Figure 10], later ones are very similar to what we know and love today.

At first glance the Brompton is quite a simple affair, but as one delves deeper the detail in the design that allows it to fold so neatly and compactly is quite extraordinary. Ritchie struggled for many years to raise money to undertake small production runs, and it was not until the mid-1980s that his bicycle became a commercial proposition. By the mid-1990s 5,000 were being made each year. In more recent years, as cycling – and in particular cycling to work – has become more socially acceptable in the UK, growth has been exceptional and Brompton is now Britain’s largest bicycle maker selling about 40,000 units/year.²¹

This brings us neatly to the current UK small wheel bicycle market. The ‘compact folder’ genre is dominated by the Brompton [Figure 10]. The ‘shopper’ segment has all but disappeared – in effect it did in the 1980s - and perhaps most closely replaced by 20” wheel folder, typified by Tern and Dahon (all imported). The ‘performance’ small wheel bicycle has its archetype in the Moulton, re-introduced in the 1980s as a touring and racing machine consciously

into the low volume/high quality market [Figure 11].

In the spirit of ‘the future from the past’, where do we go from here? The compact folder is already an integral and highly valuable part of an integrated transport system. The performance market is a proven niche and is likely to sustain and grow. The shopper market – what could be called ‘the domestic cargo bike’ - could thrive given a safe environment. For many people these could be very practical, but they need to be more convenient and pleasing to use; easy to lift, stow and park; and with provision for carrying things on it - which sounds rather like what Moulton proposed in 1960 – a serious alternative means of locomotion. ●

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