

# Fastest Slide Rule in the West!

*A delicious misquote reveals overlooked innovation*

## Introduction

The literal quote was “*The Fastest Slide Rule in Whitehall*” and is attributable to the British science fiction writer and futurist *Sir Arthur C. Clarke*, CBE, FRAS (1917–2008) [1]. He is best remembered for the 1968 film “*2001: A Space Odyssey*” that was loosely based on a short story he wrote in 1948. However, before he became a world-famous writer, Arthur C. Clarke was a civil servant working for the UK government. He worked in Whitehall<sup>1</sup> and used a *Simplon XL-10* slide rule to help him audit teachers’ pensions [1]. He later colourfully summed up those early working days with his memorable “fastest slide rule” quote.

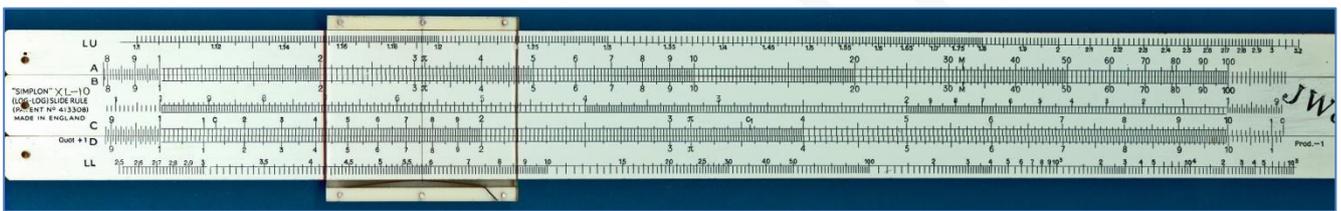


Fig. 1: Arthur C. Clarke’s slide rule of choice – a Simplon XL-10

In 1956 Arthur C. Clarke emigrated to Sri Lanka and his trusty slide rule went with him to the island [1]. This is high praise for a brand of slide rule often scorned by collectors as being inferior and uninteresting. This scorn is unjustified in this author's opinion. Moreover the maker of all Simplon branded slide rules is often overlooked: *Dargue Bros. Ltd.* They were a UK based company that tried hard to stand out from other slide rule makers by their low production costs and innovative designs.

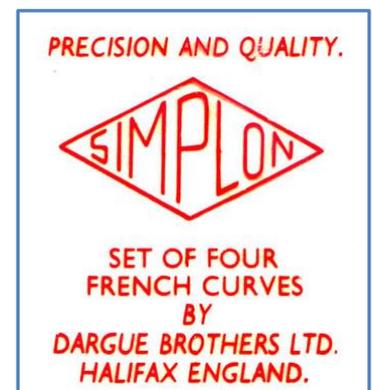


Fig. 2: Just a brand name

## Dargue Brothers Limited

The company was founded in 1908 by two brothers: *Frederick Lewin Dargue* (1876-1942) and *Algernon William Dargue* (1878-1963) [2]. Despite a French-looking surname the genealogy of the family roots are thought to be Scottish. In 1909 they established the *Simplon Works* in

<sup>1</sup> A renowned road in central London where many governmental civil servants work.

South Street, Halifax – a town in the Yorkshire and Humber region of North-East England. It was an Early Renaissance centre for the wool trade but these days Halifax is better known as the hometown of confectionery favourites *Rolo* and *Quality Street*. Younger brother Algernon managed the Halifax operations whereas Frederick looked after the marketing side working as a commercial traveller [2]. Dargue became a limited company in 1912.

From the start the company was partly a manufacturer and partly a reseller. At one point they strayed into making radios but their core business was always office supplies and related drawing and mathematical instruments [4]. This proved a profitable UK niche market as, at the beginning of the 20<sup>th</sup> century, most drawing office equipment was being imported. The company started by making Drawing Boards, T squares and Protractors. Later they were first in the UK to produce semi-mechanical Drafting Machines. They complemented their own-brand office products by also reselling office furniture [3,4]. The business flourished as by 1949 they were also operating from Wakefield Road in the neighbouring village of Copley. However, this may just have been an interim measure as in 1951 they opened the *New Simplon Works* in South Parade, Halifax [5]. By 1957 their fame warranted showcasing their cantilevered Drafting Board at the prestigious *Birmingham British Industries Fair* [4]. The best years for the company were probably the 1950s/60s. Nevertheless in 1976 they were taken over by the Leeds-based *E. J. Arnold & Son Ltd*. This phase was short-lived as the ex-Dargue part of the new business was in turn taken over by *Button & Co.* in 1978. Sad to say, a year later, the second new owners ceased trading [4].

### Why SIMPLON?

The founding brothers picked SIMPLON as the generic brand name for everything they made or retailed. So much so that the company name is often overlooked or the brand name is mistaken for the company name. They undoubtedly chose SIMPLON so that they could take advantage of the international fame of the *Simplon Tunnel* [3,4]. It became a household name when shortly before *Dargue Bros. Ltd.* was founded the *Simplon Railway Tunnel* was opened in



Fig. 3: Simplon Tunnel before opening in 1906

1906. The tunnel connected Switzerland to Italy through the Alps and under the Simplon Pass. It is a staggering 19.8 km long and until 1982 it remained the longest railway tunnel anywhere in the world [6].



**Fig.4: Dargue Japanese-made Concise No. 28 [7]**

### SIMPLON Slide Rules

*Dargue Bros. Ltd.* started (re)selling slide rules two decades after the company was founded – around 1930. At first they sold *Concise* circular slide rules under license [7]. By 1931 they were also reselling slide rules from *Hemmi* and *Faber-Castell* alongside their in-house produced *Simplon* branded slide rules [8].

It is difficult to judge how important (or profitable) the slide rule business was to Dargue. Their flagship products were their Drafting Boards but the slide rule production had longevity. They were still making them late into the 1950s/60s. They produced their slide rules in two distinct ranges: (i) “Sub-Ivory” and (ii) “Honduras”.

### The SIMPLON “Sub-Ivory” range

This range was in production for just a few years - from 1931 to no later than 1939 [9]. They were all rectilinear in form, with a single hairline glass or plastic cursor and a closed-frame construction.

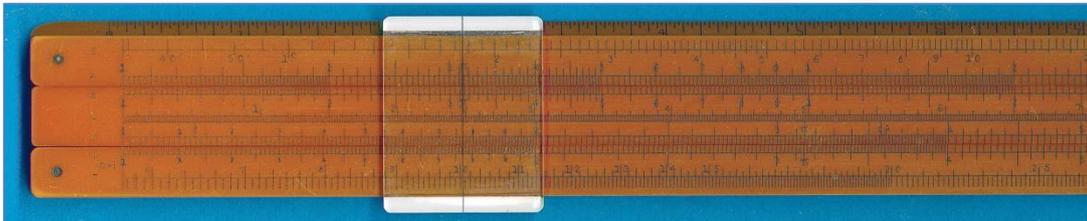
Model #	Type	Size	Scales	Comments
SR-1	Mannheim	5"	inch \ A / B,C / D	Cheapest model
SR-2	Mannheim	5"	inch \ A / B,C / D	SR-1 but with a clear-view cursor & sturdier construction
SR-3	Uniface	5"	inch \ S,A / B,C / D,T	Pocket version of SR-5 without L scale but with aluminium strengthening strip
SR-4	Student Mannheim	10"	inch \ A / B,C / D	
SR-5	Uniface	10"	inch \ S,A / B,L,C / D,T	Full length version of SR-3 + extra L scale but without aluminium strengthening strip
SR-6	Enhanced Mannheim <sup>2</sup>	10"	inch \ A / B,C / D,L / S,T /	Slide <b>not</b> reversible but 1 or 2 windows in the back & with aluminium strengthening strip

**Table 1: All the known SIMPLON Sub-Ivory range of slide rules [8,9]**

The models stand out for their unusual dirty orange/butterscotch colour and on some, an odd multilayered and screwed together construction. Despite the exotic “Sub-Ivory” name they were made from an early form

<sup>2</sup> An alternative version exists with the L scale sandwiched between B & C on the slide.

of plastic and the scales were incised/imprinted. The colour suggests the use of *Catalin* – a thermosetting polymer developed by the US *Catalin Corporation* in 1927 after they acquired the patents for Bakelite. Despite being a revolutionary plastic, Bakelite is not suited to slide rule production. After (re)heating different thicknesses do not shrink uniformly [10]. This could mean that the scales on the thick stock and the thinner slide do not line up correctly. Another UK maker, *Blundell Rules Ltd.* (BRL), found this out to their cost a decade later. For BRL the production waste rate was a crippling 50-60% [10]. This may be why Dargue had to resort to a multilayer construction for some models and why they stopped production of the range in 1939. In any case, by 1939 most of the readily available *Catalin* was needed for electrical insulation in WWII. Despite most models being basic with conventional scale layouts they are striking, tactile and rare. Furthermore the *SR-3* and *SR-5* models especially stand out and show Dargue's flair for innovation.



**Fig. 5: Enlarged SR-5 showing a top S scale and a bottom T scale on the front face**

Other manufacturers offered slide rules with more complex scale layouts or even early specialist models for some trades or professions. However, in the 1930s many slide rules would have been used for solving general arithmetic-based problems, these problems often involved trigonometry in some way. But surprisingly most other slide rule makers were slow to follow Dargue's innovative lead with their *Uniface* types and did not put trigonometric scales onto the front of the stock until two decades later. Thereafter, masses of cheap plastic slide rules for schools came on to the market with trigonometric scales now conveniently on the front face.

### **The SIMPLON "Honduras" range**

After producing both ranges in parallel, Dargue chose to continue with just the Honduras range after 1939. Apart from the same rectilinear form and closed-frame construction, the contrast between the two ranges is striking. In the Honduras range Dargue used wood instead of *Catalin* - "*Honduras Mahogany*<sup>3</sup> or *Honduras Pearwood*<sup>2</sup>" [8]. For most models the scales were now printed on paper and then sealed with clear celluloid onto the stock and the slide. Most of the cursors were now made from plastic.

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<sup>3</sup> Hardwoods originally from the *Republic of Honduras* but later generically used for hardwood stocks coming from several Central and South America based countries.

Dargue persisted with this range because of the lower production costs. The retail price of the equivalent model out of the Sub-Ivory range was 50% more expensive [8]. Whereas Dargue boasted in 1931 that their S.B.5 pocket model was: “the lowest priced wooden slide rule with celluloid facings on the market<sup>4</sup>.” Moreover Dargue considered their S.P.10 model “the best 5/-<sup>5</sup> 10-inch slide rule obtainable” [8].

Model #	Type	Size	Scales	Comments
<b>S.B.10 Bilateral</b>	Log-Log	10"	LL2,A / B,CI,C / D,LL3 // A,S,L,T,D on back of stock	Transposable extra-wide cursor
<b>S.B. 5 Bilateral</b>	Enhanced Mannheim	5"	A / B,C / D // A,S,L,T,D on back of stock	Pocket version of S.B.10 without LL scales but with transposable cursor
<b>S.D.10 Duplex Bilateral</b>	Enhanced Mannheim	10"	A / B,C / D // A,S,L,T,D on back of stock	Transposable glass cursor & plain white celluloid faced back of slide & stock
<b>S.E.10 Electro Bilateral</b>	Electro	10"	LL2,A / B,CI,C / D,LL3 / A,S,T,D / L,D on back of stock & W,V in well of stock	Transposable 3 hairline cursor with slide <b>not</b> reversible + W & V scales in well + Table of Constants on back
<b>S.M.10 Major Bilateral</b>	Log-Log	10"	LL2,A / B,CI,C / D,LL3 / A,S,T,D / L,D on back of stock	Later model with cursor <b>not</b> transposable & slide <b>not</b> reversible + Table of Constants on back
<b>S.P.10 Primary</b>	Log-Log	10"	LL2,A / B,CI,C / D,LL3	Extra-wide cursor + Table of Constants on back
<b>S.P. 5 Primary</b>	Mannheim	5"	A / B,C / D	Pocket version of S.P.10 without LL & CI scales but with Table of Constants on back
<b>S.R.10 Rietz Bilateral</b>	Rietz	10"	K,A / B,C / D,L // A,S,L,T,D on back of stock	Later model with transposable extra-wide cursor
<b>WR1-A Selecta</b>	Mannheim	10"	A / B,C / D	Plain white celluloid faced slide & back
<b>WR2-A Service</b>	Mannheim	10"	A / B,C / D	WR1-A but with Table of Constants on back
<b>WR-5</b>	Uniface	10"	inch \ S,A / B,L,C / D,T cm on back of stock	SR-5 layout + inch/cm scales & plain white celluloid faced back
<b>WR-6 Standard</b>	Enhanced Mannheim <sup>6</sup>	10"	inch \ A / B,C / D,L / S,T / cm on back of stock	<i>De-Luxe</i> model with glass cursor + Table of Constants on white celluloid faced back

<sup>4</sup> Unlikely as a similar early UNIQUE 5 L/L model would have cost roughly 25% less.

<sup>5</sup> Notation used for pre-decimal British pounds sterling - now it would be GBP 25 pence.

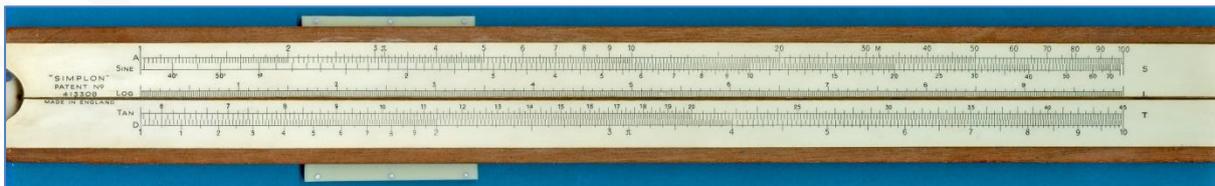
<sup>6</sup> Possibly a later or specially commissioned version exists with an additional top LL scale.

Model #	Type	Size	Scales	Comments
<b>WR-7</b>	Rietz	10"	inch \ K,A / B,C / D,L / S,T / cm on back of stock	Glass cursor + Table of Constants on white celluloid faced back
<b>XL-10 Bilateral</b>	Log-Log	10"	LL2,A / B,CI,C / D,LL3 / / A,S,L,T,D on back of stock	Later reissued S.B.10 with transposable extra-wide cursor & redrawn A & D scales on back

**Table 2: All the known SIMPLON Honduras range of slide rules [8]**

Underpinning the whole range is patent *GB413308*. The founding brothers jointly applied<sup>7</sup> for the patent in 1932. But it was not granted until July 9<sup>th</sup> 1934 [11]. This is why early models just have: "*Patent Pending*". The patent cites design improvements as a means of reducing the cost of production. Not having the inherent rigidity of the Sub-Ivory models, Dargue got the patent for an imbedded flat biconcave spring, which ensured the tension needed between the stock and the slide, and also the automatic take up of any slack through wear. The patent undoubtedly helped Dargue to achieve a successful and enduring budget price point for the Honduras range. However, having such a low cost base meant they could not match the high-quality slide rules from competing commercial giants such as *Faber-Castell*, *Nestler* and *Keuffel & Esser*. Instead Dargue relied on selling at competitive prices and finding novel ways to make their slide rules stand out. Less obvious are the many innovative design concepts Dargue incorporated into many of the Honduras models.

Dargue launched the range with possibly their most dramatic and pioneering innovation, namely their *Bilateral* models. In 1931, apart from possibly some advertising or a Table of Constants/Conversion Factors, the backs of closed-frame linear slide rules were otherwise left blank. Dargue claimed having the trigonometric scales on the back of the slide was a flawed convention because of: "*possible line up inaccuracies between the stock and the slide when reversed*" [8]. This may harp back to shrinkage problems Dargue had with *Catalin*. Therefore, breaking with convention, Dargue put such trigonometric scales, with a dedicated A and D scale, mostly on the back of their closed-frame stocks. On some models an additional L scale was added through the middle of the back of the stock.



**Fig. 6: Back of S.B.10 showing a full set of Bilateral A,S,L,T,D scales**

<sup>7</sup> Patent application number 34598 – it was Dargue’s only slide rule related patent.

Dargue made seven such *Bilateral* models. However, no interaction between the scales on the front and on the back of the stock was possible. Sadly this reduced the usefulness of the *Bilateral* scales on the back to being merely trigonometric and log/anti-log “look-up tables”. A second advantage claimed for *Bilaterals* was that, unlike traditional scale layouts, the design saved having to reverse the slide. But even if the slide did not need reversing, the cursor did! Inexplicably Dargue never made a duplex cursor. Instead they opted for a transposable cursor and either two parallel cursor channels in the top and bottom side edges or the possibly cheaper single wide cursor channel top and bottom.

The models not based on a bilateral design had straightforward and mostly simplex-based scale layouts. But two of the *Bilaterals* had an extra noteworthy feature. Contradictorily the *S.E.10 Electro* and the later *S.M.10 Major* have their trigonometric scales on the back of the slide – leaving just a pair of *Bilateral* L and D scales on the back of the stock. But the slides on both models are not reversible; having the slide tongues at the bottom it is impossible to reverse it into the grooves of the well. So for the *S.E.10* and *S.M.10* models Dargue again came up with an innovative solution, namely that these models have a chamfered edge at the left-hand end of the underside of the well. This acts as the cursor for the scales on the back of the slide.

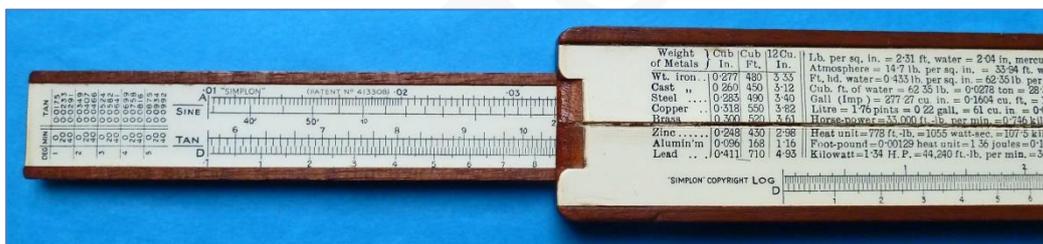
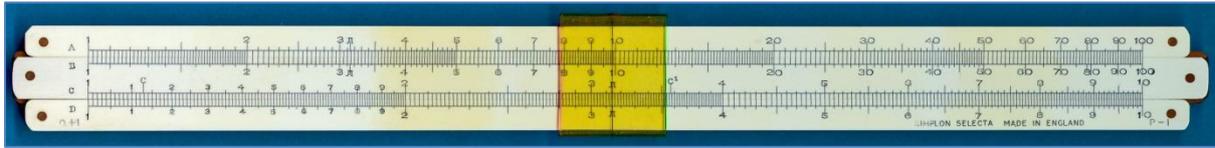


Fig. 7: Back of S.E.10 Bilateral model showing the chamfered edge fixed cursor

The chamfered edge on the *S.E.10* shown is an inverted but fixed version of the chisel cursor found on the left-hand end of the slide for the W and V scales in the well of the stock. Most makers used similar styled chisel cursors on their *Electro* types and some makers included windows in the back of the stock to read the scales on the back of the slide without needing to reverse it. However, Dargue’s innovative and clever adaptation of the underside of the well as a fixed cursor was unique.

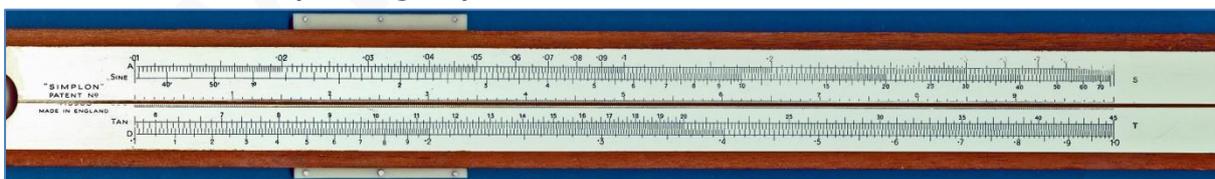
The sheer variety of models in *Table 2* shows that Dargue was trying hard to appeal to a broad slide rule using public – from Schools and Technical Colleges to Mechanical and Electrical Engineers [8]. This is also reflected in the two classes of slide rules found in the range. All five listed 10-inch *WR* prefixed models had higher quality finishing and higher retail prices.



**Fig. 8: WR1-A Selecta model showing superior build finish and incised scales**

Besides the *Uniface* scale layout used for the *WR-5* they all had features not found on other models in the range. The slide is, for the first time, reversible<sup>8</sup> but the cursor is no longer transposable. Three of the *WR* models had a bevelled top edge for an inch scale (cm scale on the back). Strikingly, all of them have thick "ivory white" celluloid facings. The veneers on the front face are secured with wooden dowels instead of metal pins. Moreover the scales are no longer preprinted on paper. Like the models in the Sub-Ivory range they are imprinted/incised into the celluloid facings. However, these refinements came at a price. The *WR* models no longer conformed to the budget price point for the range. For example, the top of the range *WR-7* model was just a standard *Rietz* type but it cost GBP 2 pounds and 4 shillings sterling<sup>9</sup> (£2.4s.0d.) in 1931 [8]. This may have deterred buyers, and is why such models are much rarer and difficult to find.

The last innovation is a feature also only found on just two of the *Bilaterals* - the *S.E.10* and fittingly the model of choice for Arthur C. Clarke. The *XL-10* was a late addition to the range - possibly no earlier than the 1940s. At first sight the *XL-10 Bilateral* is just a reissued version of the *S.B.10 Bilateral*. But on closer examination the A and D scales on the back of the stock (back of slide on the *S.E.10* - see *Fig. 7*) were at some point modified. The A and D scales on the back of the *S.B.10* and similar models in the range have the standard 2 and 1-cycle annotations associated with such scales - i.e. the tick marks run respectfully from 1-10-100 and 1-10 (see *Fig. 6*).



**Fig. 9: Back of XL-10 Bilateral model showing the redrawn A and D scales**

The A and D scales on the back of the *S.E.10* slide and the back of the stock on the *XL-10* shown are still 2 and 1-cycle but the tick-marks now run from 0.01-0.1-1.0 and from 0.1-1.0. This is a user-friendly refinement and atypical for a slide rule. Anyone unfamiliar with using a slide rule always struggles with where to put the decimal point in the

<sup>8</sup> The tongues and grooves are now centred making the slide reversible.

<sup>9</sup> On a "price then, price now" basis that would be over GBP 136 in 2018.

result. The redrawn versions of the *Bilateral* A and D scales on the *S.E.10* and *XL-10* now give the decimally correct values for  $\sin(x)$  and  $\tan(x)$ . For example, the classic Sine of 30 degrees is shown opposite a tick mark now helpfully labelled “.5” on the adjacent A scale.

### The Dargue Legacy

When it comes to 20<sup>th</sup> century office supplies, *Dargue Bros. Ltd.* was undoubtedly an unsung star of the UK market. If proof was needed, the company held well over 30 related patents – many of the early ones in the names of the founding brothers.

As a maker of slide rules *Dargue Bros. Ltd.* is also unfairly overlooked as they were innovators. It is true that by concentrating on keeping their production costs low, the build quality of their models could never match a *Faber-Castell* or a *Nestler*. However, even if some of their innovations were eccentric, producing duplex-style *Bilaterals* as early as 1931 made them pioneers and makers ahead of their time. For example, *Faber-Castell* only started with prototype duplex designs in 1935 [12]. Also *Dargue Bros, Ltd's* novel scale layout of their *Uniface* types was, for its time, inspired.

So it is surprising that after being in business for over six decades *Dargue Bros. Ltd.* “disappeared overnight” into obscurity after a takeover in 1976. Did the company suffer the malaise that many family businesses suffer when the founders bow out? The elder Dargue brother, Frederick, died long before the takeover in 1942. Algernon Dargue did not pass away until 1963 but he would have surely retired some 20 years before. However, sometime before 1953 one of Frederick’s two children [2], *Eric Lewin Dargue* (1911-1979), joined the company. He is cited as the inventor on most company held patents granted after 1952 – the last one from 1969 [11]. So could it have been Eric’s retirement in 1976 that primed the takeover? If not, then it was the coming of the Electronic Age that was the likely catalyst for *Dargue* closing down in Halifax.

Inexplicably and tragically *Dargue Bros. Ltd.* is now largely forgotten. However, at least a memorable quote by Arthur C. Clarke will ensure that one *Dargue*-made slide rule is forever linked to one of the most influential cinematic films ever made and a film that ironically features an artefact that was beyond comprehension!

## Acknowledgements and References

Two decades ago a memorable misquote reported in an early edition of the *UKSRC Skid Stick* caught my eye [1]. The news item was from the late and great collector *Colin Barnes* (1940-2016). At the time I thought it had potential for a longer tale. The IM2018 gave me a chance to realise that potential as a fitting tribute to a greatly missed friend.

Colin provided the inspiration but *Andrew Robinson* of the *Halifax Antiquarian Society* also deserves a word of thanks. As a member of the society's *Industrial Heritage Group* he helpfully provided digital copies of pages from key reference documents and many of the details I needed to recount the history of *Dargue Bros. Ltd.*

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