



BH

**BLUNDELL
HARLING
LIMITED**





INDEX

Page

5

6

7

8

11

12

13

17

18

20

21

BH

**BLUNDELL
HARLING
LIMITED**



INDEX

	Page
W.H. Harling slide rules	5
Manufacturing process of Harling slide rules	6
A brief history of Blundell Harling Limited	6
Manufacturing process over the years	8
Special design slide rules, charts, discs	11
Some people of Blundell and Harling	12
Pages from brochures	13
Slide rules and discs, an overview	17
Index B & H slide rules and discs	18
Introduction to detailed descriptions	29
144 pages detailed descriptions and pictures	34



Blundell building

Colophon

Author: Peter Soole
Editors: Peter Soole, Peter Hopp, IJzebrand Schuitema,
Herman van Herwijnen
Detailed rule descriptions:
Herman van Herwijnen, IJzebrand Schuitema
Photographs, Make up and Printing:
Herman van Herwijnen

BLUNDELL - BLUNDELL HARLING - W. H. HARLING SLIDE RULES

Written by Peter Soole

W. H. HARLING SLIDE RULES

The Company was founded in 1848. W. H. Harling was an instrument maker, apprenticed to W. F. Stanley, who decided to manufacture drawing instruments independently. Harling instruments soon built up a reputation for high quality and today are much valued by collectors. Harling Instruments were exhibited in 1851 at the Great Exhibition. The Great Exhibition was intended to be a celebration of British Engineering achievement.

Like most manufacturers of the period, total self sufficiency was normal and so a wood department was created to make instrument cases. The Company even made its own sandpaper.

The wood department was soon making other products including scale rule blanks and later slide rules. Only the finest quality wood was used including mahogany for tee squares and slide rules and boxwood for scale rules and parallel rules. Walnut was used for the instrument cases.

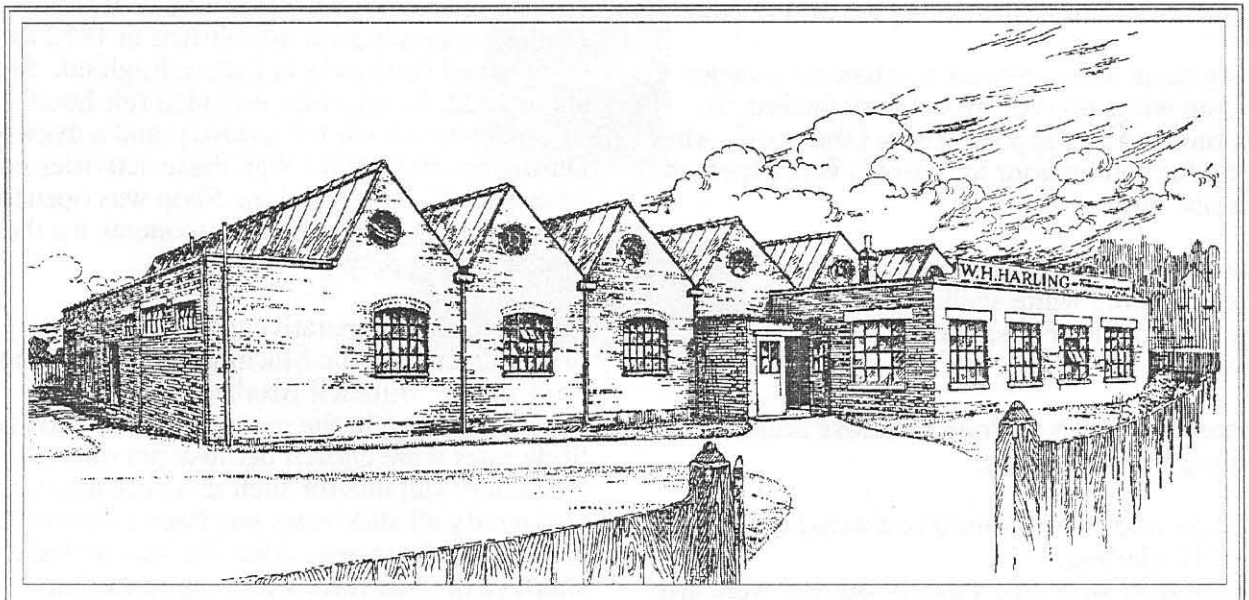
Wood was purchased in log form and kept for a minimum of 2 years after splitting before manufacture.

W. H. Harling frequently made their products for other companies such as Stanley and Halden and also trained apprentices.

Once such apprentice was A. G. Thornton who later began making his own slide rules. An interesting note in the journal of the time concerns the arrival back in the factory of A. G. Thornton one Saturday after lunch showing signs of consuming too much beer. He was fined 6d (\$0.02) and sent home.

It has not been possible to date the exact start of slide rule production, but it was in the 19th century as there are 20" slides in existence including the 47 Finsbury Pavement address. This was vacated in 1899.

Slide rule production ceased in about 1938, but resumed intermittently during the war period. The last slide rule was made in 1947.



W. H. HARLING'S DRAWING INSTRUMENT FACTORY, MOUNT PLEASANT HILL, UPPER CLAPTON, E. 5
(ERECTED 1913, AND ADDITION 1920 AND 1937).

MANUFACTURING PROCESS OF W. H. HARLING SLIDE RULES

Mahogany wood for the body was cut and stacked with separating strips for two years to dry and stabilise.

The wood body was made in three parts. The base and one side were solid. The slide and second side were machined separately all on a spindle moulder.

The second side of the body was held down, on 20" slide rules, by brass screws which engaged into a threaded insert.

One end of the body, the second side and slide were stamped with the same number to ensure they remained together.

White cellulose acetate strips were cemented on using a fish glue, and dried out under pressure applied with a stone weight.

When drying was complete the slide rule was machine trimmed.

Dividing and figuring were all applied by hand using an inscribed brass master.

The blank rule was clamped to the master and a special set square used to transfer the logarithmic scales. The set square had a tooth which engaged into each incision on the master progressively. Lines on the slide rule were scribed on by hand using a scribing knife against the set square edge.

Figuring and lettering were applied by hand using cold punches. The craftsmen worked with great speed.

Gauge lines were scribed using a marking gauge.

Filling paste was a mixture of charcoal powder and step white powder mixed with linseed oil. This mixture was applied with a fabric pad. After drying for half an hour the surplus was wiped off with saw dust.

Finally the surface was completed by hand polishing using white shellac. The slide tongues were coated with French polish to give good movement.

Cursors were built up from cellulose acetate. Reading line scribed on.

20" slide rules were housed in a wood box made by W. H. Harling. The standard slide rule was 20" but 10" were also made to special order.



Mr. Allison Blundell founder of Blundell Rules Ltd.

A BRIEF HISTORY OF BLUNDELL HARLING LIMITED

The Company origins was Blundell Brothers Limited, a family firm established in 1852 as drapers and furnishers in Luton, England. Since about 1922, its activities included felt-hood manufacture for the hat industry, and a dyeworks. During the 1939-1945 War, these activities had to be restricted, but a Machine Shop was opened in order to supply machined components for the then Ministry of Supply.

In 1945, it was imperative to develop other types of manufacture if the Machine Shop was not to close down. Blundell Brothers began experimentation in the manufacture of slide rules. Slide rules were chosen because not only was the machinery suitable for such diversification, but also nearly all slide rules had been manufactured for years in Germany. After the war period a shortage of slide rules was experienced in England.

By 1948, sufficient progress had been made to form a separate Company, named Blundell Rules Limited, although manufacture continued in the same premises owned by the parent Company, just outside Luton. Progress was very slow and difficult in those first years because of lack of technical know-how. By 1955 the Company had fully developed its own manufacturing techniques and was beginning to satisfy a limited market. It was also beginning to make specialist instruments for Government departments.



Peter Soole, Manager - Technical Sales, Slide Rule Designer (left) instructing Peter Trapnell (draftsman) how to draw new special designs.

This was just in time, because the parent Company was taken over in 1955 and Blundell Rules Limited was served with notice to vacate its premises. Rather than close down, the Company decided to move away from Luton and the Midlands, where large industries had first call on skilled and semi-skilled labour.

Weymouth, on the South Coast of England, was selected as the Weymouth Corporation offered a site on their small industrial estate. A factory was built and the Company moved into it in January 1956. At first, about twelve employees from Luton agreed to come, and about thirty from Weymouth were trained. From then the Company developed stage by stage until by 1963 it had secured a place as a manufacturer of quality slide rules, scales and associated specialist instruments - many for Government and technical colleges.

In January 1964 the Company purchased the assets of W. H. Harling Limited of Clapton, London (Established 1848), makers of high quality brass drawing instruments, mahogany T-squares, etc. The growing range of drawing office and specialist products ushered in a period of considerable growth for the Company, necessitating the employment and training of many more local people.

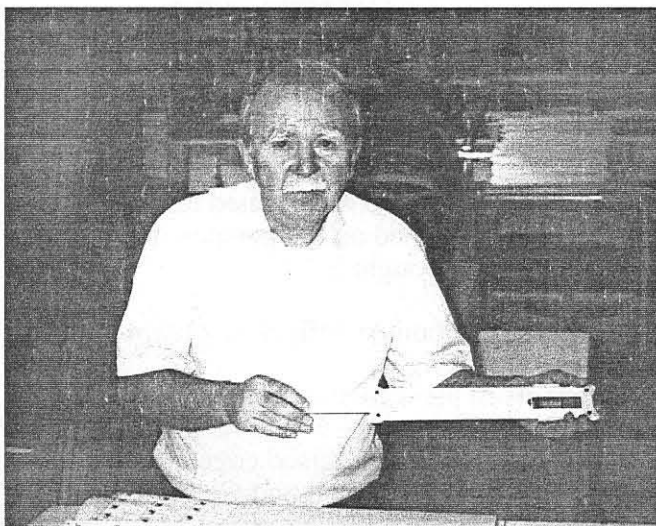
The 1970's saw the decline of the slide rule - replaced by the electronic calculator - and the Company focused on other product development. Metrication aids in many forms brought Instruments for this purpose.

Another product range is Aeronautical Navigation Plotters for general aviation. These are the Dalton type.

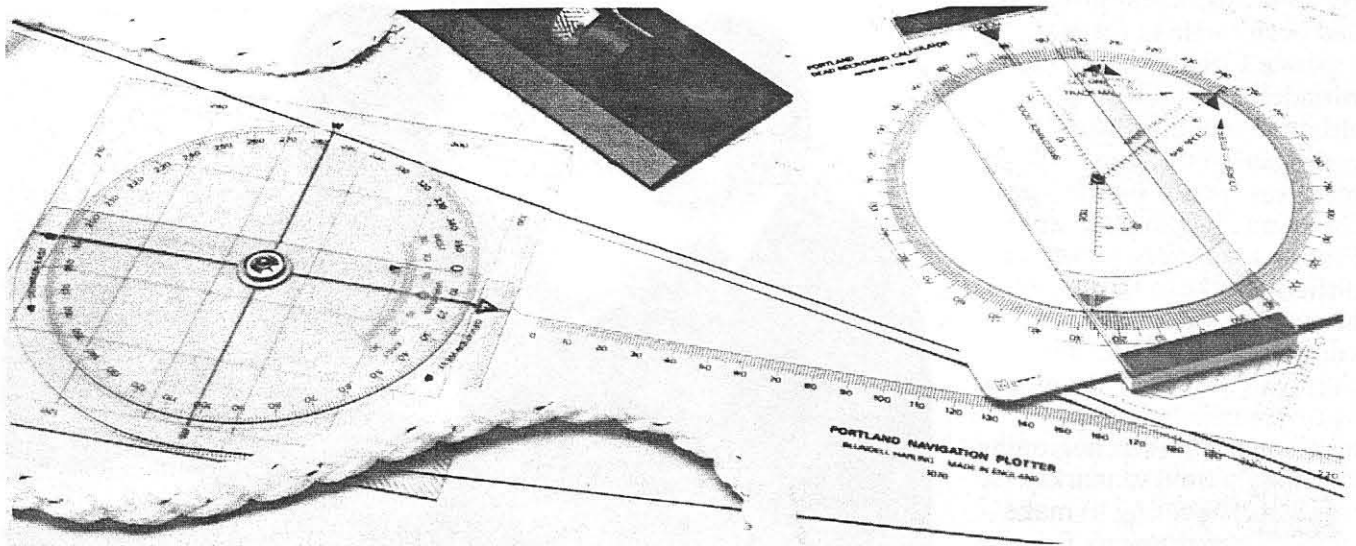
1989 saw the introduction of a new range of office and computer furniture now sold under the Magpie trademark.

Today, Blundell Harling makes a wide range of standard equipment and accessories for Drawing Office and Graphics. Many special products (including calculators), are supplied on contract or to industrial customers, and a range of plotters and other specialist items for the Armed Forces. A significant proportion of the Company's production is in the advertising/business gift market.

Small batches of Humidity Slide Rules, using the Super Duplex construction, are still being made as 2000 approaches.



Mr. Barry Camp Production Manager



MANUFACTURING PROCESS OVER THE YEARS

BAKELITE SLIDE RULES

Manufacturing can be summarised in the following way:

- Bakelite ground to thickness.
- Sprayed Sterns white enamel.
- Low temperature stoved. Repeated twice.
- Wet and dry sanded to remove high spots.
- Blind blocked with heated dies.
- Wet and dry again to remove displaced enamel set up by blocking.
- Hand filled using paint supplied by Croda of Dunstable.
- Machining operations undertaken on a high speed routing machine 24000 rpm.
- Further light buff and polish.
- Slide tension created by a centre cut to weaken back.
- A spring tension device was designed to adjust friction on the slide. Patent taken out.

Cursor Construction:

The frame, made from plated brass, was subcontracted out with a glass cursor ground to size. The glass was coated with acid resist paint and 2 lines scribed on resist using a scribing block and acid etched. Resist removed and filled with paste.

The boxes were bought in.

During inspection, 40% of complete slide rules were rejected mostly due to inaccuracy. These were stored in an air raid shelter for some time before disposal.

1st SERIES PVC SLIDE RULES

Due to high wastage on Bakelite slide rule production, an alternative material was sought. The wastage was mainly due to uneven stability of body and slide, caused by different thickness.

Poly Vinyl Chloride (PVC) was sought coloured white.

The first PVC used was sourced in USA and was called GEON. Many manufacturing stages were eliminated and being softer than bakelite less heat was required in the embossing die. The dies were deep etched brass or copper plate.

The bodies were machined from solid to oversized form. After blocking and filling machining completed the slide rule profile.

Geon was expensive so Astralon from Germany was substituted, although it did not machine so well as Geon.

A slotted head was added to the spring.

White perspex (acrylic) was used for 6" rules in addition to Astralon for a short period.

Astralon Slide Rules saw the introduction of a new cursor. A perspex plate was riveted to 2 metal runners. Lines scribed on the perspex and filled. The frames were bought in.

Astralon was becoming difficult to obtain in sufficient quantity. Experiments in pressure moulding were tried successfully. Engravings would be flush with material surface without raised edges. Astralon did not pressure mould well and Cobex PVC made by BX Plastics in England was tried. This was more suitable and adopted for the new process.

OMEGA

The slide rule range was redesigned for the new process and called the Omega range. Traditional solid back construction was retained.

The upper part was moulded separately from the base in sheet form. The sheets were filled and polished.

The moulded slide rule strips were guillotined into threes. Adjacent bodies and slides were kept together right through to assembly. Location holes punched. Tongues and grooves machined and taped together. The base was roughed out. Centre relieved and glue retaining cut included. Centre cut made for tension adjuster.

From location pins upper parts were cemented to base.

Further machining trimmed the outside and formed bevel. A pressure moulded bevel strip now cemented on together with insert in well.

The slide rule thumb cut and trig windows included. The spring holes were drilled and springs inserted.

A cursor slot was cut and bevel trimmed.

A new injection moulded cursor was designed using acrylic material. This was flat with the lines scribed on and hand filled.

Later a magnifying cursor was introduced.

JANUS DUAL FACED SLIDE RULES



By 1958 imported slide rules included dual faced types. To compete with these trials were undertaken with a dual faced rule.

Early production rules were made from solid Astralon material pressure moulded down to stops to achieve constant thickness. After moulding the blanks were hand filled, sawn to singles and machine fitted.

The sheet material had varying thickness and high pressure was needed to prevent tapering thickness from one end of rule to other.

The slide had an outward facing tongue. The high pressure frequently failed to eliminate the natural thickness taper in material resulting in high wastage.

The process was changed to a three part laminated construction in Cobex. The faces in pairs were

pressure moulded, filled and polished. Kept together the faces were machine trimmed oversize.

The core from thicker material was machine flattened to precise thickness. The three pieces of material were placed into a vacuum jig after coating with cement, and the cement allowed to set.

The engraving included a small dot at one end and parallel lines at the other end to enable exactly positioned holes to be drilled. The rule was sawn to three components and placed on machining jig using location hole. Tongues and grooves were cut with the tongue reversed out of the body.

The 3 components were precisely positioned to each other and taped together. Assembly was placed into jig for end piece drilling. The top hole was larger for adjustment.

The slide rule was assembled using 4 chrome plated end plates. Stability was maintained by the tightness of the screws. Chrome plated brass cursor rails were supplied by a local company, Patrick Engineering. The rails were assembled onto injection moulded acrylic plates. The lines were scribed on and hand filled. The plate holes were oval to allow adjustment. The spring screw attached.

A hinged lidded box was supplied with wood frame. It was covered with black paper and fastened with brass clips. A lightweight version was also produced without the core (T51).

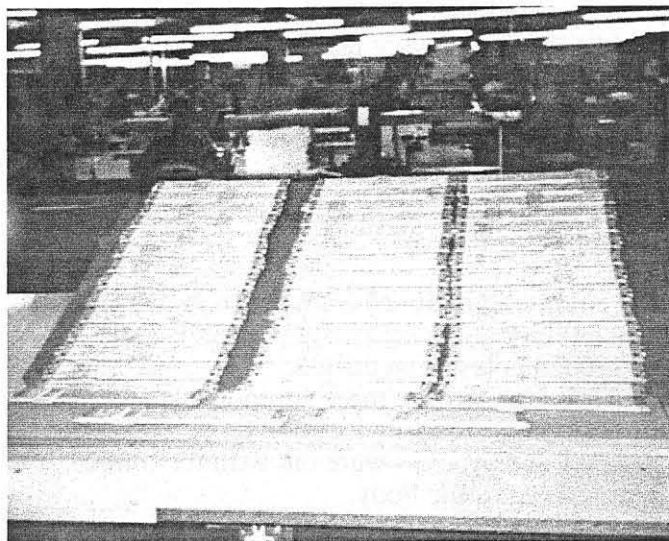
ACADEMY 300 SERIES

By 1958 students were using slide rules and lightweight, low cost models were being introduced into the market by Continental manufacturers.

The Academy slide rules were introduced to compete in this market.

The 300 range was process engraved (pressure moulded) using Darvic PVC sheet. Three separate strips were engraved and filled using filling paste supplied by Croda of Luton. The strips were punched to provide locating holes and machined on a vertical mill. The three strips were kept together at all times.

After lining up the components were taped together and end pieces cemented on the reverse side. Finally, the ends parted off by a milling cutter, cleaned and polished.



Early end pieces were prefabricated from sheet material but later were injection mouldings. The cursors were Diakon material flat section with a scribed line.

Packaging initially was a paper covered slide lidded box with red printing. Later this was changed to a PVC case.

ACADEMY 800 SERIES

This was an improved version of the 300 series. The changes were the introduction of new end pieces with extensions which kept the cursor captive. A moulded slide lidded box was introduced and a magnifying cursor. The material remained Darvic.

To economise the production the rules were engraved in sheet form 6 up. They were filled all black only.

After filling and cleaning the sheets were cut into strips and kept in sets of three. Locating holes were punched and then the strips were machined. The strips were lined up, taped and captive end pieces cemented on.

The rules were then parted off and polished. Convex cursor then fitted.

After a period of time, a mechanised new production process was evolved. The slide rules would be foil blocked and two colour printing reintroduced. The material would be ABS.

New machines were built. These were a special design foil blocking presses and a guillotining and punching machine to produce the strips. Two Special Purpose Automatic Slide rule Machines were built to machine the tongues and grooves (called SPASM). A twin bladed saw parted off the ends.

One SPASM made the tongued slide and the other the two body parts.

The three strips were taped together and end pieces glued on. The holes were used for blocking location. The slide was removed and side pieces and slide blocked together one or two colours. When two colours were required, two blocking presses were used simultaneously. The slide replaced and both ends parted off simultaneously. A foil blocked cursor was fitted.

900 SERIES DUPLEX

The 900 slide rules were foil blocked and manufactured on the SPASM system. Being double sided they were passed four times through the foil blocking system. The manufacturing process was similar to the 800 series. The printing jigs were adjusted in position to ensure line up back to front.

Packaging was a blow moulded box or PVC case.

The cursor was made from two single cursors interlocked back to back.

500 SERIES DUPLEX

The 500 series Duplex slide rules were made from Darvic PVC sheet. The sheets were process engraved two up (i.e. four faces). The markings were hand filled black, red and green as required. The sheets were buffed and polished.

The slide rules were cut into pairs front and reverse and machine flattened to make uniform thickness. Two opposite were trimmed and one end trimmed. The slides separated and locating holes punched. The opposite sides were cemented together in a vacuum jig. After separating by saw the tongues and grooves were machined on a router. The components were lined up with tape and injection moulded end pieces cemented on. The slide rules were given a final buff and polish.

End holes were drilled and rubber feet inserted. An injection moulded adjustable cursor was fitted. The reading lines were put on by a special cursor press, and hand filled. Transparent yellow bands were sprayed on over the principle scales.

Packaging was a soft lined welded PVC case one piece. It was fastened with press buttons. A green printed card outer box was provided.

500 SERIES SUPER DUPLEX

These slide rules were made from white acrylic in a solid component.

The acrylic sheet was sawn to one up blanks over size. The blanks were machine flattened to correct thickness.

Both sides were process engraved at same time. The rule was hand filled black.

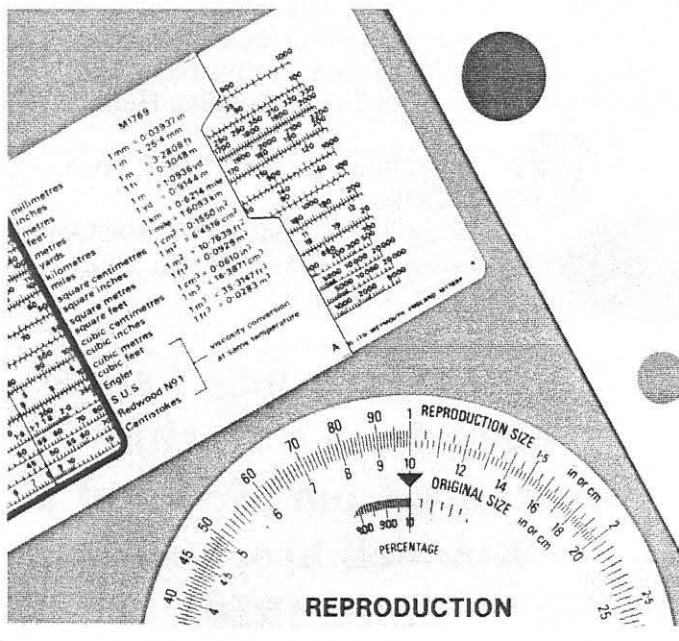
Locating holes were drilled and components sawn to singles. Tongues and grooves were machined on a router. The individual components were lined up with tape. Darvic PVC strip bridges cemented on and riveted.

The slide rules were buffed and polished and refilled as necessary. Red reciprocal figures were then blocked on locating from drilled holes. The slide rules were parted off. Rubber feet were assembled into end caps, opposite sides put together and cemented to slide rule over the Darvic bridges. The cursor was injection moulded in four components, two side pieces and two plates.

The side piece opposite the spring was glued to one plate and placed onto rule and lined up. After setting the second plate was cemented on and lined up. The top piece then cemented into position.

Finally, the spring slid into place.

Packaging was a welded soft lined PVC case with press button lid. Included in the presentation box was the Blundell Harling publication "The Slide Rule in Everyday Use".



SPECIAL DESIGN SLIDE RULES, SLIDE CHARTS AND DISC CALCULATORS

The presentation of a gift as an incentive to buy has been an activity of manufacturing and service companies since the Nineteenth Century. The potential of Blundell Slide Rules was quickly seen and they were being purchased for this purpose from the earliest days. Even the first pocket slide rule the P8 was sold with a client name printed on the reverse.

Soon the standard constructions and manufacturing process were being adapted to make special designs to order. An early user of the developing techniques was the Ministry of Defence who designed graphical plotters for Gunnery, Naval and Air Navigation use. In the 1960s and 1970s manufacture of military designs was an important activity. In the 1980's increasing use of electronics brought about the decline of this market.

Industrial and commercial users have commissioned Blundell Rules and Blundell Harling to design and make specials and continue to do so.

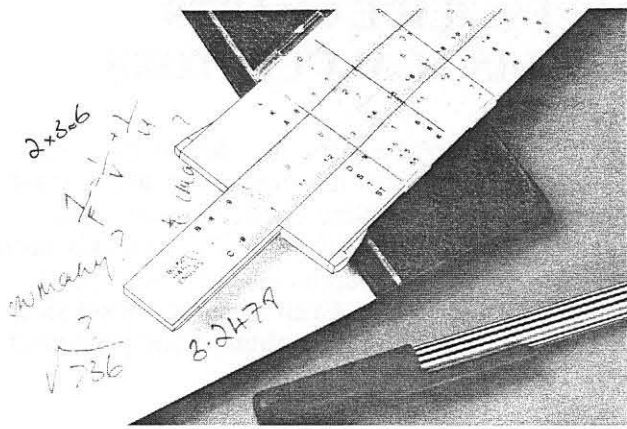
Many specials were designed to fit the standard constructions and can be found on all types. A need for a simpler and less expensive construction was addressed by the development of the Plastograph. This was made from pressure moulded Cobex and Darvic sheet and built up by laminating using adhesives. The edges were machine finished.

In 1960 screen printing was introduced as an alternative and cheaper printing process when engraving was too expensive. Gradually, screen printing took over and by 1990 it was the predominant process.

The Plastograph gave way to the Foldograph whereby the outer envelope is heat folded from a one piece transparent PVC sheet. The slide remains the same although now all screen printed.

The screen printing process is now so precise that accurate circular slide rules can be made and scale rules to international standards. An international award has been given to the Company by the European Federation of Screen Printing Associations (FESPA). Many circular specials have also been made.

When Blundell Rules moved to Weymouth in 1956 a numbering system was adopted starting P1000, numerically progressing. P6000 was



passed in 1997, and it is intended this system will continue indefinitely.

As 2000 approaches special slide charts and disc calculators continue to be designed and made now drawn on CAD systems. Most are data presenters but logarithmic types are also made.

A record of all types is kept by Blundell Harling but is not published as some of the material is confidential to companies who commissioned the designs.

Standard designs have always been produced with well know brand names. Slide Rules were made in large quantities for the retail company W. H. Smith in England among others.

SOME PEOPLE OF BLUNDELL HARLING, MANY OF WHOM HAVE PROVIDED INFORMATION MAKING THIS ARTICLE POSSIBLE

The Company was founded by **Alison Blundell** (1896 - 1990). He was a Director of Blundell Bros of Luton and began experiments in slide rule manufacture using the facilities already there. He was assisted by **Fritz Hamelberger** who had left Germany in the 1930's. Fritz Hamelberger had worked with a German slide manufacturer.

Alison Blundell was Managing Director from 1948 to 1951, and Chairman from 1951 to 1973. His son **Terence Blundell** joined Blundell Harling in 1965, after training as an accountant. Terence Blundell was Joint Managing Director with **John Young** from 1973 to 1991. He is now the Chairman of the Company.

Peter Stevens was originally a Director of W. H. Harling. He was a Director of Blundell Harling from 1964 until he retired in 1989.

Vic Best joined as a trainee at Blundell Bros in 1938. After war service in flying boats he rejoined Blundell Bros in 1946. He retired as Works Manager in 1988 and was involved in the manufacture of all slide rule types.

David Rawlings joined Blundell Rules in 1955 as a trainee. He retired as Production Director in 1996. Modernisation of the manufacturing processes was carried out by him.

Barry Camp came as a trainee in 1957. He has been working on all slide rule production since then and today is Manager of plastic component production.

John Denman joined W. H. Harling as a trainee in 1947 and retired in 1997. He saw the last Harling slide rule made in 1947.

Peter Soole was an engineering apprentice at the De Havilland Aircraft Company during 1955-1960. He joined Blundell Rules in 1960 and has designed many of the special purpose slide rules made by the Company. He is the writer of this article and was encouraged to do this by IJzebrand Schuitema member of the Dutch Circle of Slide Rule Collectors and European representative of the Oughtred Society. The text was typed by **Lindsey Hubbard** at Blundell Harling Limited.

Thanks to them all for their time freely given.

Literature in the Journal of the Oughtred Society

- The Blundell Vector Slide Rule. The Journal of the Oughtred Society Vol. 5 no.1 March 1996 by Bob Otnes and Conrad Shure.
- The pilot Balloon Slide Rule. JOC, Vol. 5 no. 2. October 1996 by Bobby Feazel
- Some Specialty Slide Rules. JOC, Vol. 6 no. 1 March 1997 by Benjamin L. Schwartz, Ph.D. amongst others about Taylor Relative Humidity Calculator.
- Blundell-Blundell Harling. JOC, Vol. 7 no. 1 Spring 1998 by Peter Soole.
- The W.H. Harling, Ltd. Company by Bob Otnes and A Brief History of the W.H. Harling, Ltd. Company by Peter Stevens

The next four pages show parts from a Harling brochure from 1936 and a Blundell brochure dated 1958

DRAWING MATERIALS



W. H. HARLING, LTD.
MANUFACTURERS
ESTABLISHED 1851.

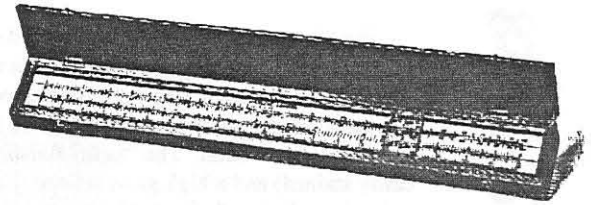
117, MOORGATE, LONDON, E.C. 2.
AND GROSVENOR WORKS,
MOUNT PLEASANT HILL,
UPPER CLAPTON, E. 5.

TELEGRAMS: "CLINOGRAPH, LONDON." TELEPHONE: No. 8858 METROPOLITAN

Copyright, Entered at Stationers' Hall

SLIDE RULES

The following Slide Rules are made throughout in our factory at Upper Clapton. They are all fitted with screw adjustments so that any shrinkage or expansion of the slide can be corrected.



- 700 W. H. Harling's 20-inch SLIDE RULE, standard pattern, made of well-seasoned mahogany, faced with white celluloid, adjustable friction slide, full view glass cursor, graduated with the following scales: A, B, C, D, and log scales on face of rule, sines and tangents on underside of slide, inches and 10th and millimetres on edges, fitted in polished wood case. Overall length of rule, 21 1/2 inches Code
l s. d. Word
3 0 0 *Sira*
- 702 SAME RULE as No. 700, but having triple or cubing scale graduated on top edge of face ... 3 3 0 *Slire*

The Scales of the above rules are not closely divided, so that they may be read easily and quickly, the graduation is as follows:—

A, B, C and D scales:—1 to 2 into 100 parts. 2 to 4 into 50 parts. 4 to 10 into 20 parts.

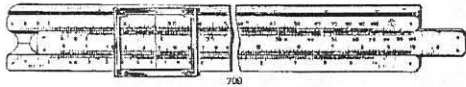
We also supply these rules with the C and D scales more closely divided, viz.:—

- 1 to 2 into 200 parts. 2 to 6 into 100 parts. 6 to 10 into 50 parts.
- 704 As No. 700, but with close graduations 3 5 0 *Sliro*
- 706 As No. 702, ditto ditto 3 7 6 *Slirn*
- (Spare cursor for either of above Rules, 5/6, new glass only 2/-).

- 708 20-inch LOG LOG-SLIDE RULES (our own make). Similar to 700 but having in addition a log log-scale. A pointer is fitted on the cursor (working against the inches and 10ths scale on bevelled edge), for finding the mean height of indicator diagrams, fitted in polished mahogany case ... 3 10 0 *Slilo*

(Spare cursor for 708 Rule, 6/6; new glass, 2/-).

SLIDE RULES BY VARIOUS MAKERS. P.I.C. BRITISH MADE SLIDE RULES.



- 709 SLIDE RULE, 10 in. P.I.C. "Standard" pattern, made of well seasoned wood, celluloid faced, having A, B, C and D scales on face of rule, and sines, tangents and logs on back of slide Code
s. d. Word
21 0 *Slira*



- 711 SLIDE RULE, 10 in. "P.I.C." as No. 709, with addition of log log scale (1.1 to 100,000) on face of rule 24 0 *Slite*
- 713 SLIDE RULE, 10 in. "P.I.C." Electrical, as No. 711 but with addition of dynamo and volt Scales ... 27 6 *Sliti*
- 715 SLIDE RULE, 10 in. "P.I.C." celluloid faced, with glass cursor, but having A, B, C and D scales only ... 10 6 *Slilo*

FABER'S SLIDE RULES (Foreign).



- 716 SLIDE RULE, 10 in. A. W. Faber's "Standard" pattern, celluloid faced, having A, B, C, and D and Reciprocal scales on the face of rule, and sines, tangents and logs on the back of slide ... 21 0 *Slifa*
- 718 SLIDE RULE, 10 in. A. W. Faber's "Electrical" pattern, having in addition to scales of the "Standard" pattern, a log log slide scale for calculating roots and powers to any exponent ... 31 6 *Slife*

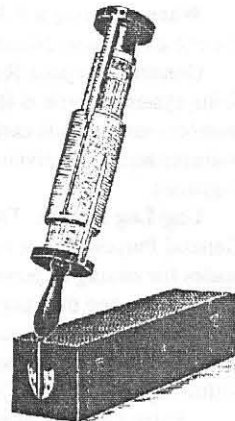
NESTLER'S SLIDE RULES (Foreign).

- 722 SLIDE RULE, 10 in. Nestler's "Standard" pattern ... 16 0 *Slina*

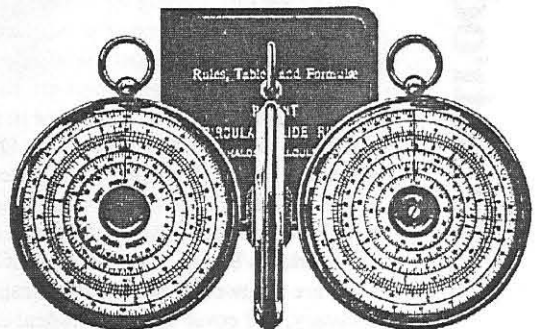


- 723 SLIDE RULE, 10 in. Nestler's DUPLEX ... 42 0 *Sloud*
- 725 SLIDE RULE, 10 in. Nestler's DUPLEX LOG-LOG (as illustrated) 63 0 *Sloaf*

CALCULATORS



- 734 FULLER'S CYLINDRICAL SLIDE RULE (equivalent to a straight slide rule, 83 feet long), giving logarithms, multiplications, divisions, proportions, etc., etc., results in four or five figures. Supplied in mahogany case with book of instructions Code
s. d. Word
110 0 *Cilca*
- 736 Ditto, with scale of sines 130 0 *Cilci*



- 744 HALDEN'S "CALCULEX" CIRCULAR POCKET CALCULATOR (equivalent to a 10 in. Straight Slide Rule) Code
s. d. Word
21 0 *Culex*

WHY AND HOW TO CHOOSE A B·R·L SLIDE RULE

For some years we have concentrated on the manufacture of B.R.L. Slide Rules made from plastic materials. Using specially chosen material of highest dimensional stability, capable of taking the finest engravings of unsurpassed clarity and durability, we are absolutely convinced that no conventional construction of slide rules in wood faced with celluloid, can compare with the B.R.L. production. The "satin" finish presents a compromise between a matt surface (thus easily stained) and a high gloss reflecting surface which can result in eyestrain for the continuous user. Completely unaffected by dry or humid conditions, B.R.L. slide rules only need the care one would expect to give to any high grade precision instrument, and today B.R.L. is the hall mark of the finest British production.

On many occasions, we find there is some confusion or doubt in the mind of the potential user as to which type of slide rule is required, hence the following notes, outlining the merits of the various types which are at present available in the comprehensive range of B.R.L. slide rules. All are of the highest degree of accuracy, fine engraving and durability, but differ in the number and choice of scales carried on the rule.

Generally speaking, it is a mistake to select a rule carrying more scales than are likely to be needed, since the less there is on the face, the more easily can the scales be read.

A unique feature of our more expensive models is the special tension device enabling the user to adjust the slide movement to his own requirement.

The following models are fitted with this as a standard feature:

A.G.5. A.L.6. E.18. A.U.7. T.11. T.12. E.13. E.13c. C.21. E.25. D.26.

All the 10" slide Rules can be fitted with our " Fullview " magnifier which has been widely appreciated.

It is convenient to classify the range of B.R.L. rules into five categories, viz:

- General Purpose
- Log-Log
- Technicians
- Commercial
- Students

When selecting a B.R.L. slide rule, it is hoped the following notes will assist the purchaser to choose a rule most suited to his requirements:

General Purpose Range. This consists of 4-10" and 4-6" models. They are based on the Reitz system, which is shown in full in models A.G.5, P.10 and P.14, while the less expensive numbers are variants carrying fewer scales in different combinations. Used mainly for multiplication and division, with scales for squaring, cubing, logarithms, and trigonometrical functions.

Log-Log Range. This consists of 2-10" and 1-6" Models. The system is not unlike the General Purpose range except that the cubing and Log scales are omitted in favour of 2 Log- Log scales for raising to powers or extracting roots. Model A.L.4 is a less expensive variant of the full system, and the range is particularly useful to Engineers.

Technicians Range. This consists of 10 different models including those for Electricians. In general they are wide faced rules with a larger range of scales of special application. The following special scales will be found in the appropriate models:

Extra Log-Log Scale. T.11, T.12, E.13, D.26, T.50, T.51.

Vector Scale. ($\sqrt{1-x^2}$) T.11, T.12, E.13, D.26.

Folded Scales. T.12, E.13, T.50, T.51.

Reciprocal Log-Log Scales.-'JANUS' Series. T.50, T.51.

Scales for Electrical Calculations. E.18, E.25, E.13, P.16.

Under this heading we would draw attention to Model T.50 in the 'JANUS' Series, which is certainly the Aristocrat of present day slide rules. Its junior edition No. T.51 of modified construction, is also a most useful rule.

Commercial Range. There are two models to choose from, namely C.21 and C.24. Both are designed to be of special assistance in problems concerning £.s.d. and either can be of great assistance in Counting Houses, Cost Offices, Sales Departments and similar places. Special scales are included to cover profit on cost and profit on return as well as ordinary calculating scales. We also manufacture a larger instrument under the name of KALKUTAX. This deals with Purchase Tax as well as discount and uplift, and is invaluable in a busy office.

Students Range. This consists of two models, one " General Purpose " and one "LogLog." They are lightweight rules at the cheapest price possible consistent with B.R.L. standards of accuracy, and cover all that a student can want, until he begins to specialise.

ACCESSORIES FOR SLIDE RULES

(Text and part of picture of a page from a brochure)

MAGNIFYING ATTACHMENTS

Ref. No. Description

L.18 **The B.R.L. FULLVIEW
MAGNIFIER**

A very handy attachment giving a large and clear field of vision. It consists of a rimmed lens with a hinge, fitted to a Perspex pedestal. This fits instantly into a small lug on the cursor and, when not in use, can be kept in a pocket in the lid of a specially deep slide rule case.

If a slide rule, which is normally packed in an instrument case, and a magnifier are ordered together, the correct size case will be supplied, but new cases can be obtained separately if needed, see below.

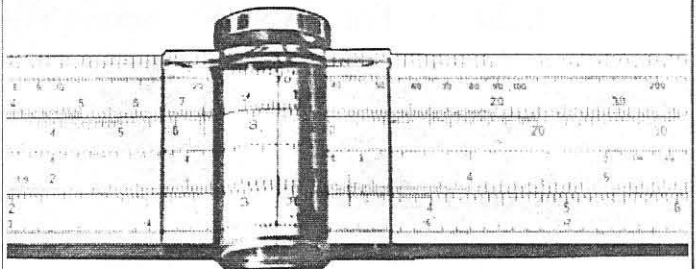
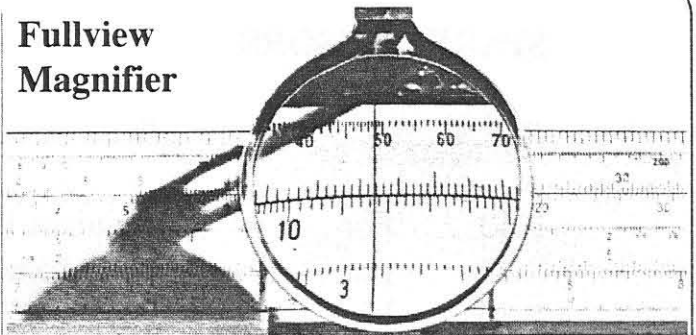
The Fullview is not available for 6" slide rules.

Complete, including all parts.
Lens and pedestal only.

L.17 Lug only, including cost of fitting to cursor.
Stocks of cursors are kept fitted with this lug. In this case, the combined price of cursor and lug applies.

W.1 Deep lidded case to house both slide rule and magnifier
For standard 10" rules.
For wide-face 10" rules.

Fullview Magnifier



Magnex

ESPECIALLY
USEFUL WITH
DUPLEX RULES
INSTANTLY REVERSIBLE

Ref. No. Description

L.22 **The NEW MAGNEX**

A half round lens to clip on Cursor (Provisional patent). This is a new design fitted with a spring clip at one end to ensure a good fit. When not wanted it can instantly be removed

Size 1 up to 1 1/2".

Size 2 from 1 1/2" to 2".

W.9 Leather pouches for either size.
Purchase tax on pouch.

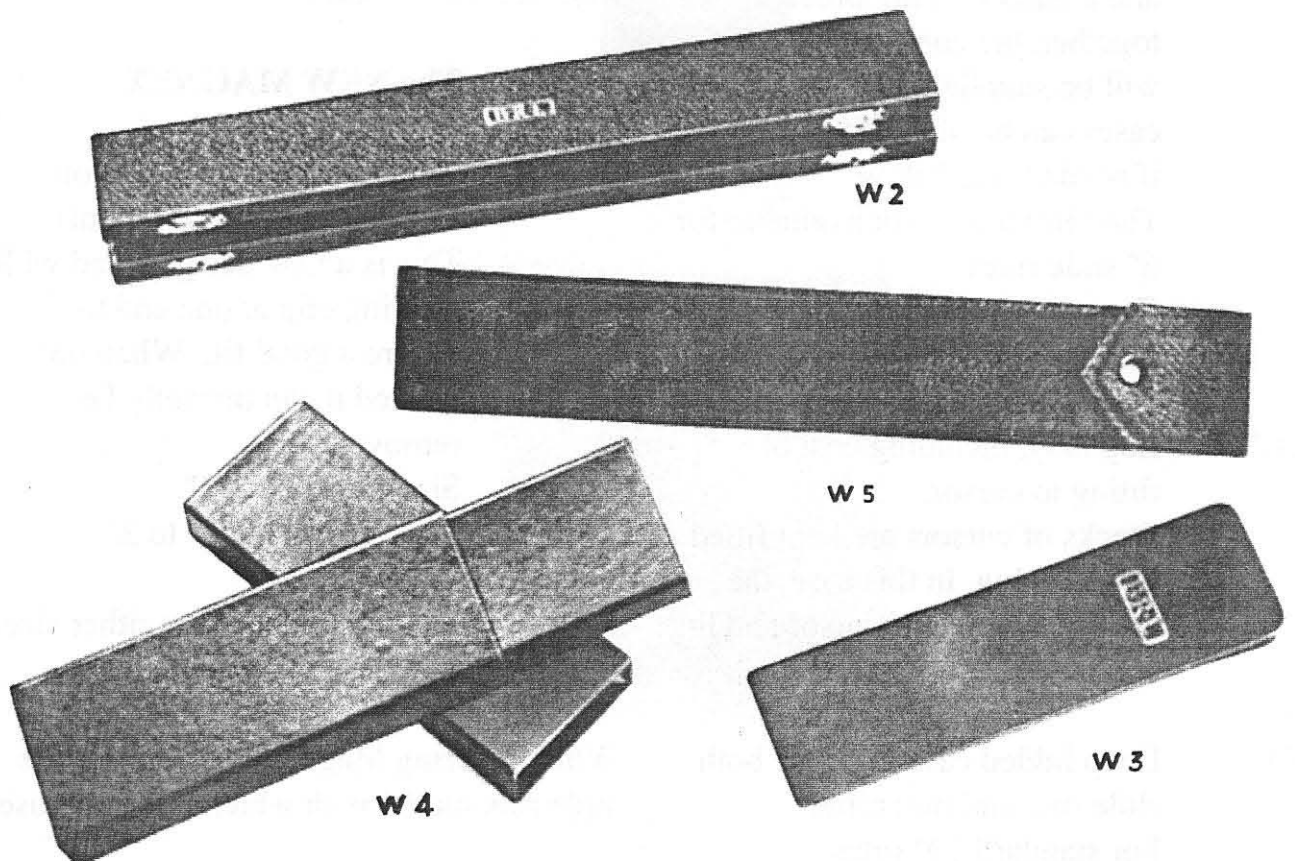
When ordering Magnex, please state the slide rule model with which it is to be used.

SPARE CURSORS

<i>Ref. No.</i>		<i>Description</i>
L.13	For	Standard 10" Rules
L.14	For	Wide-face 10" Rules
L.15	For	Pocket Rules 6"
L.16	For	Standard 20" Rules
L.20	For 'JANUS'	Series-Senior Models T.50, etc.
L.21	For 'JANUS'	Series-Junior Models T.51, etc.

CONTAINERS

<i>Ref. No.</i>	<i>Description</i>	
W.2	Instrument type hinged case	For standard 10" rules For wide-face 10" rules
W.3	Leather Case in Brown Hide	For pocket Slide Rules
W.4	Strong covered cardboard box	For standard 10" Rules For wide-face 10" rules
W.5	Imitation Leather Case with pressbutton flap	For standard 10" rules



O

Harling

V

Bakelite

E

Astralon

Pocket

R

Descal

Omega

V

Duplex

I

Janus

Students

E

Academy

W

WHERE TO FIND DETAILS ON RULES AND DISCS

NCV code	Picture	Page number	NCV code	Picture	Page number	NCV code	Picture	Page number
Wood	X	20, 34	Model 1		22, 49	T51		24, 62
Students	X	20, 35	Model 2		22, 49	T51 .01		24, 62
700	X	20, 36	Students 1	X	22, 49	N52	X	24, 63
700.01		20, 37	Students 2		22, 49	TR53		24, 64
702		20, 37	Popular 1	X	22, 50	JV56		24, 64
704		20, 37	WG5		22, 51	300	X	24, 64
706		20, 37	T20	X	22, 51	302	X	24, 65
708		20, 37	P8	X	22, 52	302 .01	X	24, 65
1526	X	20, 38	P10	X	22, 53	303	X	24, 66
G1	X	20, 38	P14	X	22, 53	304	X	24, 66
G2	X	20, 39	P15	X	22, 54	305C	X	24, 67
E3	X	20, 39	P16		22, 54	307		24, 67
L4	X	20, 40	P17		22, 54	308	X	24, 68
G5		20, 40	P19		22, 55	310	X	24, 69
L6	X	20, 41	P28		22, 55	312	X	24, 70
U7	X	20, 41	P31		22, 55	800	X	25, 70
AG1	X	21, 42	401	X	23, 55	802	X	25, 71
AG2	X	21, 42	402	X	23, 56	803	X	25, 72
AL4		21, 43	403	X	23, 56	803P	X	25, 73
AL4 .01		21, 43	404	X	23, 57	804		25, 73
AG5		21, 43	405	X	23, 57	805		25, 73
AL6	X	21, 43	406		23, 57	808	X	25, 74
AL6.01	X	21, 44	407	X	23, 58	810		25, 75
AU7		21, 44	409	X	23, 68	812	X	25, 76
T11	X	21, 45	410		23, 58	813	X	25, 77
T12	X	21, 46	600		23, 59	500		25, 77
T13		21, 46	601	X	23, 59	502		25, 77
D26		21, 46	602		23, 59	503		25, 77
E13		21, 46	603		23, 59	504		25, 78
E13c	X	21, 47	604		23, 59	505		25, 78
E18		21, 47	605		23, 60	506		25, 78
E25	X	21, 48	606		23, 60	503D.01	X	26, 79
G22		21, 48	607		23, 60	504.01	X	26, 80
G22/2	X	21, 48	608		23, 60	A505.01	X	26, 81
G23		21, 49	610		23, 60	506.01	X	26, 82
G27		21, 49	T50	X	24, 61	904	X	26, 83
G29		21, 49	T50 .01	X	24, 62	905	X	26, 84

NCV code	Picture	Page number
S143/5E	X	26, 85
S143-10	X	26, 85
S143-10 Factory	X	26, 86
S143-20	X	26, 86
S150-10		26, 87
S150-10P	X	26, 87
S150-20	X	26, 88
DM1	X	27, 88
DM2		27, 88
DM5		27, 89
DM6		27, 89
Smith Simplified Rietz	X	27, 89
Smith Rietz	X	27, 90
Smith Log-log trig	X	27, 91
310B Descal	X	27, 92
314B Descal		27, 92
315 Descal	X	27, 93
316 Descal	X	27, 94
C24 Cost & Profit	X	95
P1365 Water Flow	X	95
P1553 Armstrong	X	96
P1644 Armstrong	X	97
P1732/A Valve	X	98
P1843 Blood	X	99
P2808 Ultrasonic		100
P3241 Rapid Glaze	X	101
P3259	X	102
P3259.01	X	103
P3483 Hydraulic	X	104
P3512 Textile	X	105
FC3540 Valve	X	106
P3706 Friction Loss	X	107
P3969-77 Textile	X	108
P4366 Ultrasonic	X	109
P4463 Illuminance	X	110
P4603 Orifice	X	111

NCV code	Picture	Page number
P4740 Cell Reactor	X	112
P4743 Valve	X	113
P4843 Hydraulic	X	114
P5088 H Slide Rule	X	115
F5100 Black Body	X	116
P5475 Radiac 2	X	117
P5597 Aluminium	X	118
P5637 Hospitality	X	119
P5705 Torque	X	120
P5709 Radiography	X	121
P5798 BMI	X	122
P5852 Fuel Oil	X	123
P5897 Aviation	X	124
P5931 Zeneca	X	125
P5939 Converter	X	126
Artillery MK2 10" Ω	X	127
Artillery MK2 10"	X	128
Artillery MK3 10"	X	129
Balloon IV A	X	130
Bearing	X	131
BP-OIL	X	132
Cardiovascular	X	133
Conversion 0490.37	X	134
Dead Reckoning 1084	X	135
Exchange	X	136
H Slide Rule	X	137
Hercules MK 1	X	138
Holophane	X	139
Humidity	X	140
Humidity MK6	X	141
Hygro	X	142
Kodak	X	143
Lens	X	144
Lens Osprey	X	145
Lifeboat 9/4531	X	146

NCV code	Picture	Page number
Lincoln MK 2	X	147, 148
Management NMR365	X	149
Mortar 81 mm MK 1	X	150
NL 11-95	X	151
O.S.686 A MK 1	X	152
Photographic	X	153
Radiac 644944	X	154
Radiac 1.01	X	155
Radiac 1.02	X	156
Radiac 1.03	X	157
Radiac 1.04	X	158
Reproduction 048080	X	159
Shackleton MK 3	X	160, 161
Speed Time 1066	X	162
Tank	X	162
Turning	X	163
Valve	X	164
Vector	X	164
VF0129	X	165
Victor K MK2	X	166, 167
Victor K MK2.01	X	168, 169
Vulcan B MK2	X	170, 171
Vulcan B MK2.01	X	172, 173
Vulcan B/K MK2	X	174, 175
Protractor A MKIV	X	176
Protractor A.01 MKIV	X	177

CATALOGUE OF BLUNDELL AND HARLING SLIDE RULES AND DISCS

DESCRIPTIONS TAKEN FROM CONTEMPORARY CATALOGUES AND FROM ACTUAL ITEMS

W.H. HARLING SLIDE RULES

1890 approx. - 1938. Made in the factory in Upper Clapton. For the 20" models the well seasoned wood base is faced with celluloid. Screw adjustment for slide tension.

Wooden slide rule	Front 1) [A = B C = D] 2) Back 3) = S T = 4)
Students Slide Rule	Front 26cm / A = B C = D \ 11inch
700	Front 20inch / A = B C = D 20inch] 50cm Back = S T =
700 Variant	Front 20inch / A = B C = D 20inch] 50cm Back = S T =
702	Front 20inch / K A = B C = D 20inch] 50cm Back = S T =
704 Variant of 700	Front 20inch / A = B C = D 20inch] 50cm Back = S T =
706 Variant of 702	Front 20inch / K A = B C = D 20inch] 50cm Back = S T =
708	Front 20inch / LL A = B C = D 20inch] 50cm Back = S T =
1526 Time Speed and Distance Rule	Front 1) = 2) 3) = 4) 5) = 6) = 7) See picture

BLUNDELL HARLING BAKELITE SLIDE RULES 10"

1947-1949. Made of laminated bakelite. Green paper covered rigid box.

G 1 Students	Front K A = B C L C = D L
G 2	Front K A = B Rec C = D L
E 3 Electrical	Front Volt A = B Cos C °F = D Dyn
L 4	Front U.L. A = B Rec C = D L.L.
G 5	Front K A = B Rec C = D L Back = S ST T =
L 6	Front UL A = B Rec C = D LL Back = S S&T T =
U 7	Front U.L. CU. A = B S. S&T. T. REC. C = D MAN. L.L.

BLUNDELL HARLING ASTRALON SLIDE RULES 10"

1949-1958. Made of ivory co polymer giving smooth action and permanent engraving. Stable at all ordinary temperatures. Metal frame cursor or Diakon moulded cursor (in brochures indicated with suffix D). Blue paper covered box.

AG 1	Front <u>10inch</u> / K A = B R C = D M Back <u>26cm</u>
AG 2	Front <u>10inch</u> / K A = B R C = D M Back <u>26cm</u>
AL 4	Front UL A = B R C = D LL
AL 4 Variant	Front LL2 A = B R C = D LL3
AG 5	Front <u>10inch</u> / K A = B R C = D M Back <u>26cm</u> = S ST T =
AL 6	Front <u>25cm</u> / U.L. A = B R C = D L.L. Back = S ST T = <u>10inch</u>
AL 6 Variant	Front <u>10inch</u> / LL2 A = B R C = D LL3 Back = S ST T = <u>25cm</u>
AU 7	Front UL K A = B R C = D M LL Back = S ST T =
T 11 Technicians	Front <u>10inch</u> / L.1 U.L. A = B R C = D <u>P</u> LL Back = S ST T =
T 12 Technicians	Front <u>10inch</u> / K LI UL DF = CF CRF CR C = D <u>P</u> LL A Back = S ST T L =
T 13 Technicians	Front K LL1 LL2 DF = CF CRF CI C = D P LL3 A V D
D 26	Front <u>10inch</u> / M K A = B R L C = D P S T Back = LL1 LL2 LL3 = <u>25cm</u>
E 13 Electricians	Front <u>10inch</u> / K LL1 LL2 DF = CF 1) CRF CR C = D LL3 A #Volt Gen# Back = S ST T M = <u>25cm</u>
E 13c Electricians Variant	Front <u>10inch</u> / K LI UL DF = CF 1) CRF CR C = D <u>P</u> 1 LL A #Volt Gen# Back = S S&T T Man = <u>25cm</u>
E 18 Electricians	Front <u>10inch</u> / V D A = B C = D °F °C cos #Volt Gen# Back = S ST T = <u>25cm</u>
E 25 Electricians	Front <u>10inch</u> / LL3 A = B R C = D LL3 K #Volt Dyn# Back <u>25cm</u> = S ST T =
G 22	Front <u>10inch</u> / A = B C = D Back <u>26cm</u>
G 22/2	Front A = B C = D
G 23	Front <u>10inch</u> / K A = B R C = D M Back <u>26cm</u>
G 27	Front <u>10inch</u> / A CF = DF C = D Back <u>26cm</u>
G 29	Front <u>10inch</u> / A = B R C = D Back = S L T =

Lightweight version (no bevel) in Astralon series

Students Model 1	Front K A = B Cl C = D L
Students Model 2	Front LL1 A = B Cl C = D LL2
Students no. 1	Front K A = B R C = D M
Students no. 2	Front LL2 A = B R C = D LL3
Popular no. 1	Front L K A = B Cl C = D S ST T

1949-1958 Wood slide rule, Astralon Slide

WG 5	Front K A = B R C = D M
------	-------------------------

BLUNDELL HARLING 20" SLIDE RULE
BAKELITE BASE ASTRALON FACE

T 20 Technicians	Front L.1 U.L. A = B R C = D M LL.
------------------	------------------------------------

BLUNDELL HARLING SLIDE RULES POCKET 5"
BAKELITE

1947-1949. Leather Case.

P 8	Front A = B Cl C = D Back 6inch = = 15cm
-----	---

BLUNDELL HARLING ASTRALON SLIDE RULES POCKET 5"
METAL CURSOR FRAME. Also existing with DIAKON MOULDED CURSOR which have same numbers with suffix D.

1948-1958. Leather case

P 10	Front 6inch / CUBE A = B REC C = D MAN Back = S S&T T = 15cm
P 14	Front 6inch / CUBE A = B REC. C = D MAN. Back = S ST T = 15cm
P 15	Front 6inch / A = B REC C = D Back = S S&T T = 15cm
P 16 Electricians	Front 6inch / Volt Dyn A = B cos C = D LL1 LL2 Res Cos Back = S ST T = 15cm
P 17	Front 6inch / U.L. A = B R C = D LL. Back = S. S.&T. T. = 15cm
P 19	Front 6inch / A = B R C = D Back 15cm
P 28	Front 6inch / M K A = B R C = D P S T Back = LL1 LL2 LL3 = 15cm
P 31	Front 6inch / A = B R C = D Back 15cm

BLUNDELL HARLING OMEGA SLIDE RULES

1958-1970. This series is of traditional construction, one edge being bevelled and divided 1" x 32nds or cm x mm. The 10" models are supplied in rigid cloth covered boxes and the 5" in a soft lined sheath for the pocket.

400 SERIES

401 Rietz Omega	Front 11inch / K A = B CI C = D L Back = S T ST =
402 Log - log Omega	Front 11inch / LL2 A = B CI C = D LL3 Back = S T ST =
403 Darmstadt Omega	Front 11inch / L K A = B CI C = D P Sin Tan Back = LL1 LL2 LL3 =
404 Electro Omega	Front 11inch / LL2 A = B CI C = D LL3 #1)# Back = S L T =
405 Omega	Front 11inch / A = B C = D
406 Omega	Front inch / A = B CI C = D Back = S T ST =
407 Technico Omega	Front 11inch / K LL1 LL2 DF = CF CIF CI C = D P LL3 A Back S ST T L
409 Mercantile Omega	Front 11inch / M1 1) 2) IL IR C = D M2 M3
410 Technico Omega	Front 11inch / A DF = CF CI C = D K Back = B S L T =

600 SERIES

600 Mannheim	Front S T A = B CI C = D K L
601 Rietz Omega	Front 6inch / K A = B CI C = D L Back = S S&T T =
602 Log - log Omega	Front 6inch / LL2 A = B CI C = D LL3 Back = S T ST =
603 Darmstadt Omega	Front 6inch / L K A = B CI C = D P S T Back = LL3 LL2 LL1 =
604 Electro Omega	Front 6inch / LL2 A = B CI C = D LL3 #1)# Back = S L T =
605 Omega	Front 6inch / A = B C = D
606 Omega	Front 6inch / A = B CI C = D Back = S T ST =
607 Technico Omega	Front 6inch / K LL1 LL2 DF = CF CIF CI C = D P LL3 A Back = S ST T L =
608 Five/Ten Omega	Front 6inch / D C ₁ = C ₂ CI ₁ CI ₂ D ₁ = D ₂ L Back = S ₁ S ₂ T ₁ T ₂ =
610 Technico Omega	Front 6inch / A DF = CF CI C = D K Back = B S L T =

BLUNDELL HARLING JANUS SLIDE RULES - DOUBLE SIDED

1957-1965. Engraved duplex type with metal end pieces. Screw assembly with facility for adjustment. Acrylic cursor with metal rails. Early models supplied in black paper covered hinged box. Final production cloth covered card box.

T 50 Janus	Front L P A = B T ST S = D DI K Back LL01 LL02 LL03 DF = CF C1F CI C = D LL3 LL2 LL1
T 50 Janus Variant	Front K LL0 A = B CI C = D LL00 S ST T Back L LL1 DF = CF C1F CI C = D LL3 LL2
T 51 Janus	Front K LL0 A = B CI C = D LL00 S ST T Back L LL1 DF = CF C1F CI C = D LL3 LL2
T 51 Janus Variant	Front L P A = B T ST S = D DI K Back LL01 LL02 LL03 DF = CF C1F CI C = D LL3 LL2 LL1
N 52 (Navigator) Janus	Front S1 A = B TA TB ST S C = D K L Back 1) 2) 3) 4) 5) = 6) 7) CI 8) 9) C = D SM KM
TR 53 (Traction Engineers)	Front LL1 A = B CI C = D LL2 Back ΔV1 ΔV2 T F V S1 S2
JV 56 Vector Janus	Front Sh1 Sh2 Th A = C T ST S D = DI K L Back LL01 LL02 LL03 DF = CF C1F CI C = D LL3 LL2 LL1

BLUNDELL HARLING ACADEMY 300 SLIDE RULES

1958-1970. An inexpensive range for students, apprentices and occasional users. Bonded plastic end pieces are used in this series and the cursor was flat. Supplied individually boxed and in plastic containers.

300 Academy	Front K A = B CI C = D L
302 Log - log Academy	Front L LL2 LL3 A = B CI C = D S T ST
302 Log - log Academy Variant	Front K LL2 LL3 A = B CI C = D L T S
303 Rietz Academy	Front L K A = B CI C = D S ST T
304 Darmstadt Academy	Front L K A = B CI C = D P Sin Tan Back = LL1 LL2 LL3 =
305 C Electro Academy	Front 1) EFF GEN.MOT. A = B CI C = D K LL2 LL3 Back = S L T =
307 Air Navigation Academy	Front A = B C = D T Other Scales
308 Accountants Academy	Front S LL1 M = T IL IR C = D LL3 LL2
310 Academy	Front D = C CI A K
312 Simplified Rietz Academy	Front CUBE A = B REC C = D MAN

BLUNDELL HARLING ACADEMY 800 SLIDE RULES

1970-1982. The cursors are convex, moulded in one piece and incorporate three or four hair-lines according to the model they are fitted to. Easily removed or replaced, they are captive in that the design of the bridging pieces does not allow them to slide off. Principal scales defined by the use of coloured bands. For protection a rigid plastic box is provided with all 10" models.

800	Front A = B C = D
802 Log - log Academy	Front K LL2 LL3 A = B L CI C = D S T ST
803 Rietz Academy	Front L K A = B CI C = D S T ST
803 P (Projection)	Front L K A = B CI C = D S ST T
804 Academy	Front L K A = B CI C = D P S T Back = LL1 LL2 LL3 =
805 Electrical Academy	Front Volt Motor Eff A = B CI C = D K LL2 LL3
808 Accountants Academy	Front S LL1 DF = CF IL IR C = D LL3 LL2 Back M = T =
810 Navigational Academy	Front speed time distance
812 Classmate Academy	Front S T A = B CI C = D K L
813 Classmate Academy	Front S T A = B CI C = D K L

BLUNDELL HARLING ACADEMY DUPLEX SLIDE RULES

1965-1970. The Academy Duplex Range designed to provide a comprehensive series of two sided models in the modern style. The Academy Duplex Slide Rule with the exception of model 500 supplied in a semi rigid PVC case.

500 Academy	Front L K A = B CI C = D LL3 LL2 Back T ST DF = CF CIF C = D P S
502 Academy	Front L K A = B CI C = D LL3 LL2 LL1 Back T ST DF = CF CIF CI C = D P S
503 Commerce Academy	Front L K A = B CI C = D S ST T Back M1 Year Days = Weeks Decrease/Increase C = D M2 M3
504 Sea Navigation Academy	Front S1 A = B T1 T2 ST S C = D K L Back P DF = CF CIF CI C = D
505 Academy	Front LL01 LL02 LL03 A = B L CI C = D LL3 LL2 LL1 Back T ST DF = CF CIF CI C = D P S
506 Electro Academy	Front S1 S2 Th A = B T ST S D = DI K L Back LL01 LL02 LL03 DF = CF CIF CI C = D LL3 LL2 LL1

BLUNDELL HARLING ACADEMY SUPER DUPLEX SLIDE RULES

1970-1980. As above but with the decimal system applied in money scales (503) and patented end plates.

503 D Commerce Academy Variant	Front L K A = B CI C = D LL3 LL2 Back M1 M2 1) = 2) 3) C = D M3 M4
504 Sea Navigation Academy Variant	Front SI A = B TA TB ST S C = D K L Back P DF = CF CIF CI C = D LL3 LL2
505 Academy Variant	Front LL01 LL02 LL03 A = B L CI C = D LL3 LL2 LL1 Back K P ST DF = CF CIF CI C = D T S
506 Electro Academy Variant	Front Sinh1 Sinh2 Tanh A = B T ST S D = DI K L Back LL01 LL02 LL03 DF = CF CIF CI C = D LL3 LL2 LL1

LAST PRODUCTION BLUNDELL HARLING SLIDE RULES

BLUNDELL HARLING ACADEMY DUPLEX SLIDE RULES

1975-1982. Construction as Academy 800 series, but double sided interlocking convex cursor.

904 Academy	Front ST A = B CI C = D S T Back K L DF = CF CIF C = D LL2 LL3
905 Academy	Front LL01 LL02 LL03 A = B L CI C = D LL3 LL2 LL1 Back K P ST DF = CF CIF CI C = D T S

BLUNDELL HARLING SCHOOL EDUCATION SLIDE RULES

1975-1982. Construction as Academy 800 series, but more narrow.

S 143 / 5 E	Front K A = B CI C = D L
S 143 - 10	Front K A = B CI C = D L
S 143 - 10 (Factory model)	Front K A = B CI C = D L
S 143 - 20	Front K A = B CI C = D L
S 150 - 10	Front S T A = B CI C = D K L
S 150 - 10 P (Projection)	Front S T A = B CI C = D K L
S 150 - 20	Front S T A = B CI C = D K L

BLUNDELL HARLING DEMONSTRATION SLIDE RULES 60"

Made from hardwood. Early models had printed PVC faces bonded on. Later models featured a white spray paint finish and the scaling was screen printed.

DM 1 Rietz Instruction rule	Front K A = B R C = D M Back = S ST T =
DM 2 Instruction rule	Front LL01 LL02 LL03 A = B L CI C = D LL3 LL2 LL1 Back K P ST DF = CF CIF CI C = D T S
DM 5 Simplified Rietz Instruction rule	Front K A = B CI C = D L
DM 6 Instruction rule	Front L LL2 LL3 A = B CI C = D S T ST

BLUNDELL HARLING SLIDE RULES MADE FOR W.H. SMITH

W.H. Smith Simplified Rietz	Front K A = B CI C = D L
W.H. Smith Rietz	Front L K A = B CI C = D S T ST
W.H. Smith Log - log trig	Front K LL2 LL3 A = B L CI C = D S T ST

BLUNDELL HARLING DISCS OF SERIES DESCAL

310 Descal	Front L D = C CI A K
314 Descal	Front C = D %
315 Descal	Front LL3 LL2 LL1 D = C CI A K
316 Descal	Front C = D

**BLUNDELL HARLING SPECIAL
SLIDE RULES, DISCS AND PROTRACTORS**
See detailed descriptions and pictures

BLINDNESS TRAINING DEMONSTRATION

PLATE NO. 122 5B

Blindness training demonstration. The number and name of the person on whom the
demonstration is being given should be written on the back of the card.

NAME OF PERSON ON WHOM DEMONSTRATION IS GIVEN

NO. OF PERSON ON WHOM DEMONSTRATION IS GIVEN

Blindness training demonstration. The number and name of the person on whom the
demonstration is being given should be written on the back of the card.

NAME OF PERSON ON WHOM DEMONSTRATION IS GIVEN

NO. OF PERSON ON WHOM DEMONSTRATION IS GIVEN

BLINDNESS TRAINING DEMONSTRATION

W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2
W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2
W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2

BLINDNESS TRAINING DEMONSTRATION

W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2
W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2
W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2
W.H. Smith & Co. Ltd. 100, Strand, London, W.C.2

BLINDNESS TRAINING DEMONSTRATION
IN THE FIELD OF VISUAL PERCEPTION

For the demonstration and pictures

Cursor

D

Scale codes

E

NCV-code

Sizes

T

Text back

Material

A

Text front

I

Form

Application

L

S

Match number

DETAILED DESCRIPTIONS

INTRODUCTION

When describing in detail slide rules and discs one has to make a choice what to describe and how. The Dutch Circle of Slide Rule Collectors has developed a method which is for 98% perfect. This is achieved by using pre-defined sentences which avoids that the, so very often equal, properties of the different items are described in different ways.

The following detailed descriptions give information on the rules and discs as found in catalogues, brochures and price lists or give a detailed standard write up when a rule, in possession of one of the editors, was used for the description.

The descriptions taken from brochures may have flaws such as:

1. Not the correct letter code used for indicating a scale. Is it R or CI, is it U.L. or LL2, is it M or L, etc.? See note on scale codes next column. The scale is correct but the code used in real life may be different from the one shown in the description in this catalogue.
 2. Not indicating whether there are cm- and/or inch scales and how long these scales are.
 3. Not indicating where scales on the back are located.
 4. No details on text on rule and slide
 5. No information on the colours used in scales and text.
 6. No assurance that a rule marked as a 10" rule in the brochure has indeed an A-scale that is 10 inch long. Some are 25 cm, some are 9.5 inch.
 7. No length, width and thickness data
 8. No assurance that a picture shown in the used brochures is representative for a group of rules this one picture apparently represents.
 9. Material of which rule was made may be a variation of PVC and has some times its own name like Co-Polymer or Astralon
- In the brochures often the name "log-log" is added when LL1, LL2 and/or LL3 scales are present. This is left out as it is obvious from the scale codes mentioned that these scales are present. The same is true for the term "Basic" and "General purposes" which does not add important information.

Some names indicating a group of rules are used like "Janus", "Omega", "Academy".

Scale codes

The following scale codes, which are different from the codes used by many other manufacturers, have been used by Blundell .

<u>Blundell</u>		<u>Other</u>
L.I	=	LL1
U.L.	=	LL2
L.L.	=	LL3
LL	=	LL1+LL2+LL3
M or MAN	=	L
R or REC	=	CI

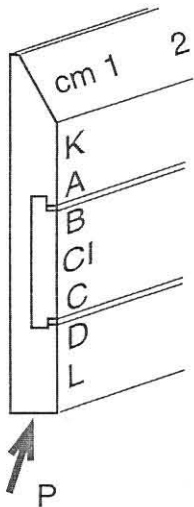
Assumed common and therefore not mentioned in the description are:

Because so many rules are white only if a rule is not white this is mentioned. There are a number of these standard properties not mentioned see below.

- The front side of the SR is the side that has the A-scale ($x^2 = 1-10-100$) or if there is no A-scale the DF-scale.
- Scale-codes (K L A B etc.) are printed on the left hand side of the SR and formulas (x , x^2 , $1/x$, \sin , tg) on the right hand side.
- Scales are not extending below 1 and above 10, 100 or 1000 (example: A-scale goes from 1-100 and not from 0.8 to 110)
- A-scales have the numbers 1-10-100 and K-scales 1-10-100-1000.
- A cm- or inch-scale is ending with a whole number.
- Scales have no horizontal lines.
- Text on a SR is printed horizontal.
- Letters, numbers and gauge marks are printed in black.
- SR has one slide. The body is rectangular.
- SR is without end plates.
- SR is white including the end plates, if present.
- The cursor is made of flat perspex with or without metal spring.
- A slide has the same length as the body.
- Scale strips, when present, are glued on.

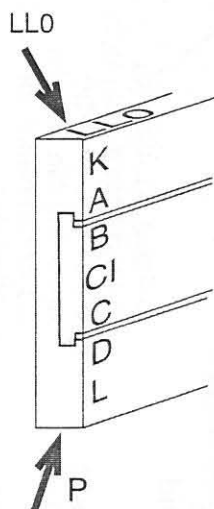
CODING OF SCALES

Please note in the examples shown the method of coding the scales that are on the sides of the rules. To separate the codes two spaces are put between the codes. What is on the slide is between two = signs



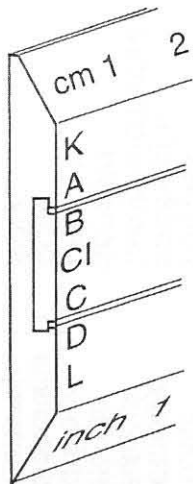
Coding

25cm / K A = B C | C = D L] P



Coding

LL0 [K A = B C | C = D L] P



Coding

25cm / K A = B C | C = D L \ 10inch

For the scales on the back of the body and slide a separate field is used in the computer data base. When scales do not have codes left or right of the scales then the code is underlined.

Example: 25cm = S ST T = 10inch means that on the back of a rule the 25 cm scale and the 10 inch scale are on the body and the S, ST and T scales on the back of the slide. The letters cm and inch are not present, neither are the code letters S, ST and T shown, and are therefore underlined in the coding.

The scales under the slide (often electro scales or cm scales) are put between two number signs like #Dynamo/Motor Volt# and are put behind the scale code description of the front.

EXPLANATION OF LAYOUT

closed frame
open frame
single disc
2 discs
3 discs
4 discs
x discs
x discs and slide
windows and slide
windows and disc
cup and x slide(s)
cylinder 1 slide
folded metal
folded plastic
folded cardboard
disc rectangle

Name
Code
Variant

Sizes in mm

Name beginning with
manufacturers name and
with any number placed
most right

Name		NCV-code		Match no.		Own no.	
Form	Application	Material	Sizes	Manufacturer	Construction	Match no.	Own no.
Length of main scale	cm inch	generic log/tech technical conversion financial military aviation medical calculate photography nautical chemistry electrical concrete hydrology radioactivity astronomy	Front	Scales on the front, under slide and on the sides		Unique number for linking master file with other files like the personal file and for communication between collectors	Years:
			Back				
12.5	slide rule	plastic	plastic	plastic wood/plastic wood/celluloid wood/metal all wood bamboo/plastic plastic/metal metal metal/bakelite brass perspex cardboard cardboard/plastic celluloid bakelite bone ivory	Years of production or patent known or mentioned on rule	12.5	12.5
25	disc(s)	wood/plastic	wood/celluloid				
50	cylinder	wood/metal	wood/metal	25	50	50	50
5	slide chart	all wood	all wood				
10	watch type	military	bamboo/plastic	10	10	10	10
20	rule/addiator	aviation	plastic/metal				
	rule/cursor no slide	medical	metal	20	20	20	20
	rule no cursor no	calculate	metal/bakelite				
	slide	photography	brass	20	20	20	20
	2 fold rule	nautical	perspex				
	projection	chemistry	cardboard	20	20	20	20
	sector	electrical	cardboard/plastic				
	protractor	concrete	celluloid	20	20	20	20
	Gunter rule	hydrology	bakelite				
		radioactivity	bone	20	20	20	20
		astronomy	ivory				

Length of main scale
12.5
25
50
5
10
20

Note: in all lists data can be added or changed

LIST OF MOST USED CODES

Codes	Formula	Range	
A	=B ²	x ²	1-10-100
B	=b ²	x ²	1-10-100
C	=b =T1 =E	x	1-10
D	=B =Z =V	x	1-10
AI		1/x ²	1-001
BI	1/B ²	100/x ²	100-1
CI	=a =P1 =R	1/x	1-0.1
DI		1/x	1-0.1
CF	=KZ	πx	3-10-33
DF	=T =T2	πx	3-10-33
CIF	=P2	1/πx	0.33-0.1-0.03
DIF		1/πx	0.33-0.1-0.03
K	=B ³ =CU =R	x ³	1-10-100-1000
L	=M =MAN =lg	log x	0.0-1.0
LL0		e ^{0.001x}	1.001-1.01
LL1	=L.I =ZZ1	e ^{0.01x}	1.01-1.11
LL2	=U.L. =ZZ2	e ^{0.1x}	1.1-3.0
LL3	=L.L. =ZZ3	e ^x	2.5-100 000
LL00	=LL/0	1/e ^{0.001x}	0.999-0.990
LL01	=LL/1	1/e ^{0.01x}	0.99-0.90
LL02	=LL/2	1/e ^{0.1x}	0.91-0.35
LL03	=LL/3	1/e ^x	0.4-0.00001
S	=sin	sin and cos x	5.5-90° and 84.5-0°
ST	=S&T =SRT	sin and tg x	0.55-6° and 89.45-84° for small angles
T	=tg =tan	tgx cot <45°	5.5-45° and 84.5-45°
T1		tg and cot x	5-49° and 49-85°
T2		tg and cot x	41-85° and 5-49°
Ch		coth	0.1-1-3.0 cotangus hyperbolicus
Th		tanh	0.1-1-3.0 tangus hyperbolicus
Sh1		sinh	0.1-0.9 sinus hyperbolicus
Sh2		sinh	0.85-1-3.0 simus hyperbolicus
R1	=W1' =W1	√x	1-3.2
R2	=W2' =W2	√10x	3-10
P		√1 - (0.1x) ²	0.996-0
P1		√1 - x ²	0.995-0
P2		√1 - x ²	0.99995-0.995
Dynamo			20-100
Motor			20-100
Volt			0.5-10 also 0.2-20
Some times scales are defined differently for instance:			
CI		10/x	10-1.0
DI		10/x	10-1.0
CIF		10/πx	3.6-1-0.28
CF and DF		also for √10x and 3.6x	