

Which? Slide Rule

Should you go for the "best model" or the "best buy"?

Times gone bye

I am sure many of you can still vividly remember leaving your parents' home and setting up your own home for the first time. Besides the new financial burden of a mortgage or the monthly rent, there was so much to buy. Often looking up the relevant published "consumer test report" to find the best *washing machine*, the best *carpet tiles* or the best *type of roof insulation* was a prerequisite to parting with any of our hard-earned cash. Today we probably do the same but now look online and for the likes of the best *eBike* or the best *mobile phone running Android*.

Consumer Organisations

The majority of such test reports were compiled by national consumer watchdogs or "consumer champions". Most countries had one or more unbiased not-for-profit organisations, often set-up as charities, to do the research and publish the results. The forerunners to such organisations were the standard bodies that emerged at the beginning of the 20th Century. One UK-based consumer champion, *Which?*, even became a well-known brand name. This organisation, like many, funded its work by membership subscriptions. Subscribers receiving a monthly magazine full of test reports whereas non-subscribers had to make do with a general summary. *Which?* was founded in 1957 and its first magazine was published in October of the same year. Over the years it expanded into a group of companies and it is still operating today – albeit now with more of an online presence [1]. *Which?*'s success grew out of the evergreen popularity with the general public for independent tests on home orientated items and in particular "white goods". So it must have been an editorial and world-wide first when the *Which?* May 1961 issue came out boasting a test on of all things: **Slide Rules** [2].

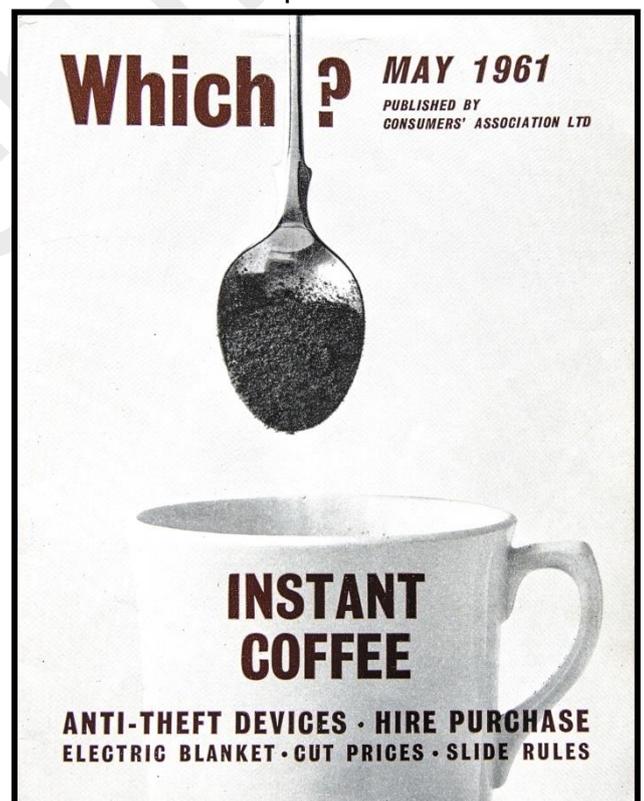


Figure 1: *Which?* front cover May 1961

Testing slide rules

Interestingly *Which?* tested for four qualities they felt any slide rule **must have**:

1. Accuracy
2. Durability
3. Legibility

4. Convenience

Possibly to limit the number of models they had to test, *Which?* decided to focus on relatively cheap and simple models marketed to students. They selected models from various makers or retailers with either Mannheim or Rietz style scale layouts. However, some had additional Log Log scales. Apart from three pocket-sized examples, all the other models in the test set had a 10 inch (25 cm) format. Nevertheless the 29 selected linear slide rules represented a broad spectrum of different raw materials and construction – i.e. wood, plastic, simplex, duplex and different types of veneering.

11 SLIDE RULES		Gratings						
Name	Model*	Price	Country of origin	Scales	Case	Instructions	Rule	
ARISTO	Simplex 911	£ 1 1 6	W. Germany	AB, CD	Good	Good	Good	
	Scholar 0903	1 7 6		AB, CD, CI, K, L, S, ST, T	Good	Very Good	Good	
	Scholar 0903/VS	1 13 0		AB, CD, CI, K, L, S, ST, T, CF, DF†	Good	Very Good	Good	
	Scholar Log. Log. 0903/LL	1 13 0		AB, CD, CI, K, L, S, ST, T, LL ₁ , LL ₂	Good	Very Good	Good	
BLUNDELL ACADEMY	Simplified Rietz 300	1 5 0	UK	AB, CD, CI, K, L	Fair	Good	Fair	
	Rietz 303	1 7 6		AB, CD, CI, K, L, S, ST, T	Fair	Good	Fair	
	Log. Log. Trig. 302	1 10 0		AB, CD, CI, K, L, S, T, LL ₁ , LL ₂	Fair	Good	Fair	
	Darmstadt 304	1 17 6		AB, CD, CI, K, L, S, T, LL ₁ , LL ₂ , LL ₃ , P	Fair	Good	Fair	
DARGUE SIMPLON	Primary 2306	17 6	UK	AB, CD, CI, LL ₁ , LL ₂	Poor	Very Good	Fair	
	Bi-Lateral 2307	1 1 0		AB, CD, CI, L, S, T, LL ₁ , LL ₂	Poor	Very Good	Fair	
ECOBRA	Elementary 1311	1 6 6	W. Germany	AB, CD, K, L	Fair	Very Good	Fair	
FABER-CASTELL	Rietz 57/87	1 7 6	W. Germany	AB, CD, CI, K, L, S, ST, T	Good	Good	Good	
	Advanced Rietz 57/88	1 13 0		AB, CD, CI, K, L, S, T ₁ , T ₂	Good	Good	Good	
	Log. Log. 57/92	1 13 0		AB, CD, CI, L, S, T, LL ₁ , LL ₂	Good	Good	Good	
	Super Log. Log. 57/89	1 18 0		AB, CD, CI, K, L, S, ST, T ₁ , T ₂ , LL ₁ , LL ₂	Good	Good	Good	
	Duplo 52/82	2 5 0		AB, CD, CI, L, S, ST, T ₁ , T ₂ , LL ₁ , LL ₂ , CF, DF†	Good	Very Good	Good	
HELLERMAN	Rietz 501	1 18 0	Denmark	AB, CD, CI, K, L, S, ST, T	Very Good	Good	Good	
HEMMI SUN	Student 8 in. 45	1 1 0	Japan	AB, CD, CF, DF, CI, L, S, T	Good	Fair	Good	
	Student 40RK	1 5 0		AB, CD, CI, K, L, S, T	Good	Fair	Good	
JEFFY (Woolworth's)	4 in.	6 0	UK	AB, CD, CI, K	Fair	Good	Poor	
NESTLER	Alpha 0251	1 6 3	W. Germany	AB, CD, CI, K, L, S, ST, T	Fair	Fair	Good	
	Rietz 5 in. 0123	1 13 3		AB, CD, CI, K, L, S, ST, T	Very Good	Fair	Good	
	Multimathic 0250	1 16 9		AB, CD, CI, K, L, S, ST, T, LL ₁ , LL ₂	Fair	Fair	Good	
	Rietz 0239	1 11 6		AB, CD, CI, K, L, S, ST, T	Good	Fair	Very Good	
THORNTON P.I.C.	Rietz (Improved) 171	1 10 0	UK	AB, CD, CI, K, L, S, IS, B, IB	Good	Very Good	Good	
	Log. Log. (Improved) 172	1 19 9		AB, CD, CI, S, IS, B, IB, LL ₁ , LL ₂ , Y, Z	Good	Very Good	Good	
UNIQUE	Student Log. Log. 5 in. 5 L/L	8 0	UK	AB, CD, LL ₁ , LL ₂	Poor	Good	Poor	
	Student Log. Log. 10 L/L	11 6		AB, CD, LL ₁ , LL ₂	Poor	Good	Poor	
	Universal II U.2	16 0		AB, CD, S, T, LL ₁ , LL ₂	Poor	Good	Fair	

* All rules 10 in., unless specified otherwise	KEY TO SCALES	AB	— x ²	ST	— Sin ⁻¹ x and Tan ⁻¹ x for small values of x
† CI and CD scales duplicated on back of rule		CD	— x	LL ₁	— e ^{0.1x}
		CI	— $\frac{1}{x}$	LL ₂	— e ^{0.1x}
		L	— x ²	LL ₃	— e ^x
		K	— Log x	P	— $\sqrt{1-x^2}$
	S	— Sin ⁻¹ x	CF, DF	— x scales displaced by π or $\sqrt{10}$	
	T	— Tan ⁻¹ x (T ₁ from 5.5° to 45°, T ₂ from 45° to 84.3°)	\$, IS	— Differential Sine scales	
			B, IB	— Differential Tan scales	
			Y, Z	— Differential Log-Log scales	

Table 1: Summary of test results on 29 slide rules from 11 different makers or retailers

Please note that although the summary lists grading's for the slide rule case and for the accompanying instructions, these grades played **no part** in the final recommendations.

Accuracy

From 66 manual settings by multiple users, the test panel concluded the average setting error was so small that it was **insignificant** for all of the models. A further test involved manually inspecting the results of 20-25 test calculations performed on two samples of each model. One or two small errors were noted but apart from one model, this error rate was again considered insignificant. Therefore all except the *UNIQUE Universal II Log Log (U2)* were considered fit-for-purpose.

Durability

In the user handling tests the scales peeled off the *Woolworth's Jiffy* and the *UNIQUE's* and to a lesser extent, off the *Dargue Simplon's*. Moreover when being flexed, two of the *Blundell Academy* models fell apart because of the poor gluing of the plastic end braces/straps. To test for wear the slide rules were put in a test bed and the slide and cursor mechanically moved backwards and forwards along the stock 10.000 times. However, when a maker had more than 1 model of the same type, only one sample of each type was tested. The *Aristo's* wore out the most and the scales on the *Ecobra* were easily scratched off. Further the cursors eventually jammed on the *Dargue Simplon's*, the *Faber-Castell 57/87*, the *Hellerman* and the *Hemmi's*. However, the test notes acknowledged that the nature of this test was far more demanding than what would be considered "normal use".

Then to see how they performed under the extremes of temperature and humidity the slide rules were subjected to 95° F (35° C) and 95% relative humidity for seven 24-hour periods. None lost any functionality although the tick marks on the *Aristo 0903VS* did lose some of their black ink. The respective lengths of the scales were compared before and after the test. No discernible differences were found with most models. However, a marginal 0.03 mm difference was found on the *Nestler 0250* and a fractionally larger difference on the *Faber-Castell 57/88* and on the *Hemmi 40RK*. The largest difference, 0.01 mm, was found on the *UNIQUE 10 L/L* and on the *Dargue Simplon Primary (S.P.10)*.

Legibility

Users found the models from *Aristo* and *Hemmi* were the easiest to make out. Least legible were the *Dargue Simplon's* and the Student models (5 L/L and 10 L/L) from *UNIQUE*.

Convenience

The type of construction used for the *Dargue Simplon's*, the *Hemmi's*, the *Nestler 0239* and the *UNIQUE's* was praised because it allowed for the manual adjustment of the tension between the slide and the stock during the lifetime of the slide rule. Nevertheless, the accolade for the smoothest running slides went to the *Aristo's*, the *Blundell Academy's*, the *Faber-Castell's* and the *Hemmi's*. Questionably the *Faber-Castell 52/82*, the *Nestler 0250* and the *Nestler 0251* were criticised because their double-side cursors meant these models could not be laid flat on a desk!

The results

As part of the overall results the defects and the noteworthy features of each maker or retailer were listed. Achieving less than 3-digit precision, all three pocket-sized models were considered **inadequate** for students. With the exception of the *UNIQUE Universal II Log Log (U2)* all the remaining models were found to offer 3-digit precision. However, because of defects it was recommended **not to buy** any of the models from *Dargue*, *Blundell* or *Ecobra*. In conclusion, as is the tradition with such reports, the "best in test" accolades were awarded.

Best Model

It was a close-run contest between two but the *Nestler 0239* just pipped the *Hemmi 40RK* for the “best model in test” award.

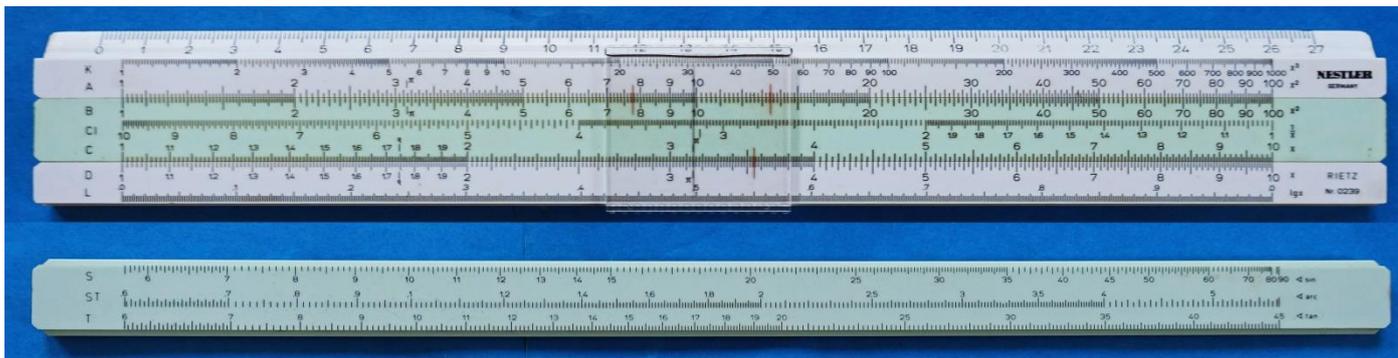


Figure 2: Nestler 10-inch (25cm) plastic two-tone Rietz 0239

Ironically this model may not have been made by *Nestler* but was made for them by the Japanese maker: *Fuji Keiki Manufacturing Co.* Their *Fuji 251* could be its twin [3].

Best Buy

Unusually for a consumer test report the favourites for the best buy were the same front-runners for the best model category. This is probably because the listed retail prices for all of the tested 10-inch models were much of a muchness. So the *Nestler 0239* and the *Hemmi 40RK* were the **jointly** recommended as the “best buys in test”.

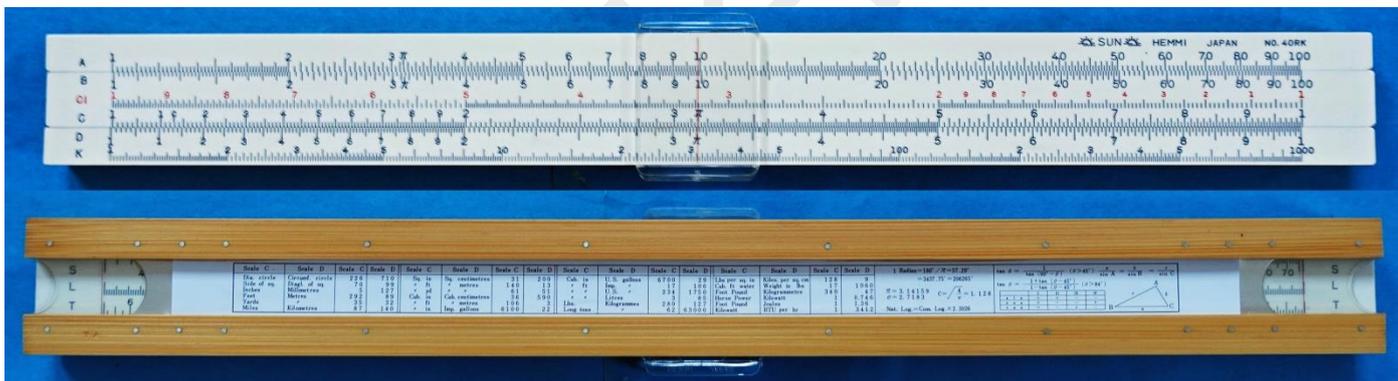


Figure 3: Hemmi 10-inch (25 cm) bamboo Rietz-like 40RK

However, the report recognised that **neither** of the recommended best buys had Log Log scales. So if having these scales was essential to a student, then the recommendation was to buy either the *Aristo 0903LL* or the *Faber-Castell 57/92*. Finally to cover the other end of the range, the *Aristo 911* was recommended for any student just wanting to buy a simple slide rule with a basic set of Mannheim scales.

Epilogue

Does anyone know of any other Consumer Organisation tests of slide rules? When first published, the *Which?* test report caused at least one maker, *Blundell Rules*, to take immediate remedial action. The UK maker was stung by two of its models dramatically falling apart after being flexed at the start of the durability test. So within hours of the magazine hitting the news-stands the then company Technical Director, **Peter Soole**, was on his way to an emergency meeting with their adhesive

suppliers [4]. The next day a solution was found and henceforth all Blundell end braces/straps were glued using a new and improved adhesive. At the time Peter found the potential damage to company sales worrying but difficult to assess. Anyhow by 1961 the slide rule would soon be in its twilight years. Within a decade the electronic pocket calculator would come onto the market. So the timing of the *Which?* test on slide rules and its focus on models primarily marketed to students is intriguing. Clearly Consumer Organisations tested what they considered were “hot items” of the day. At the time, could the prevailing level of marketing by the makers of slide rules to students have been the catalyst? *ARISTO* in particular realised promoting their slide rules in schools and with teachers was an astute way of fostering brand loyalty in the next generation of engineers and technicians. In the early 1950s they started publishing their popular “*ARISTO Bulletin*” series of free educational booklets for teachers, schools and universities [5].

Acknowledgement and Bibliography

I am indebted to collector friend **Peter Holland**. At 38th RST online ZOOM meeting for German-speaking collectors in January 2022, Peter gave a presentation based on a copy of the *Which?* magazine he had bought off eBay in 2020. Afterwards Peter kindly offered me the opportunity to write an English-language article based on his great find.

- [1] **Which?**: “UK’s Consumer Champion”, <https://www.which.co.uk/> .
- [2] **Which?**: “Slide Rules”, Consumer’s Association Limited magazine, Issue May, 1961, pg. 116-119.
- [3] **Fernandez, Jose**: “Fuji Illustrated Catalogue”, Proceedings 20th International Meeting of Collectors of Historical Calculating Instruments, September 2014, The Netherlands, CD-ROM supplement, Pg. 53/117.
- [4] **Soole, Peter**: “Troubles at Blundells”, Slide Rule Gazette, Issue 4, ISSN 1472-0000, Autumn 2003, Pg. 57-61.
- [5] **Kühn, Klaus & Kleine, Karl**: “Dennert & Pape, *ARISTO 1872–1978*”, Zuckschwerdt Verlag, ISBN 3-88603-863-7, 2004, CD-ROM 1 supplements.