

A Calculated Gamble

*The most endearing quality of the slide rule is its endless adaptability
- from calculating catenaries to the odds of winning*

Introduction

Like many avid collectors I struggle to manage my collection and to keep all the items consistently catalogued. Luckily a decade ago when I started putting my collection online¹, I decided alongside the maker, model name/number, etc I would also catalogue every item with a generic *type* to reflect its purpose and any specialist use. With this extra classification I could then cross-reference models with similar scale layouts or purpose but from different makers. However, cataloguing everything with a type has proven unexpectedly useful. For example, with a simple search I can list all the pocket or desktop models in the collection or list all the hyperbolic types best suited to calculating catenaries. Moreover this feature can also highlight unforeseen groupings – like all the items that have something to do with gambling!

Gambling slide rules

The top three traditional global vices are: *smoking, gambling* and *drinking*. A Saturday student job for a Turf Accountant or bookmaker convinced me gambling never pays and I never liked the taste of cigarettes. However, I probably overcompensated by developing a lasting appreciation for real ale and wine. As multiplication and division are its core functions, the slide rule lent itself more to gambling and drinking than to smoking. Many articles have been published on gauging and on alcohol rules but a few innovatively designed gambling slide rules were made. However, such specialist models are rare and largely unknown. Gambling examples exist for either:

- calculating the potential pay out for a given wager
- deciding the smartest or most statistically astute advantage play

How much could I win?

Dutch maker **ALRO** started producing their striking “flagship” Ø 13 metal cased circular slide rules in 1936 [1]. A unique selling point of the design was that when folded back, the metal case doubled up as a handy desk stand. The method of construction used a central nut and a bolt to pack together all the non-moving parts into a tight stack of discs [1]. Although complex, this design ensured a smooth operation but it also meant that a many different scale layouts could easily be incorporated into the stack – by ALRO or sometimes by their owners!



Figure 1: ALRO 200 R (Rietz)
in the desk stand position

¹ See: <https://sliderules.nl>

One of the ALRO's in my collection came with a handwritten note saying it was originally owned by Captain **Hans Feierabend** of the now defunct Dutch shipping company *Van Nievelt Goudriaan & Co Stoomvaartmaatschappij*. Besides being a merchant seaman, the Captain must also have been a keen gambler as he adapted his model 200 R to calculate the potential pay-out winnings when playing roulette.



Figure 2: Metal and paper ALRO 200 R adapted for gambling

After adding two circular paper overlays to the 200 R's stack of discs only the outer C scale and the inner D scale of the original Rietz scale layout remain visible. From the nature of the handwritten annotations the ALRO **Roulette** slide rule was designed for a French roulette table. Three types of roulette table are played on. American roulette tables, unlike their European and French counterparts, have an extra "double zero" 38th slot on the roulette wheel. As usually the casino wins when zero or double zero comes up, American tables slightly favour the house and reduces the players odds of winning. European and French roulette tables are similar with just minor differences in the layout of the numbers playing chart and the prevailing language – French roulette tables are inescapably in French whereas their European counterparts are in English.

As shown in Figure 2, most of the handwritten labels on the outer overlay opposite the C scale are in somewhat cryptic but still understandable French. They are all gauge marks for the respective pay-out odds for six common roulette bets. Their meaning and use is explained in the following table.

		0	
PASSÉ	1	2	3
	4	5	6
	7	8	9
PAIR	10	11	12
	13	14	15
	16	17	18
	19	20	21
MANQUE	22	23	24
	25	26	27
	28	29	30
	31	32	33
IMPAIR	34	35	36
	P ¹²	M ¹²	D ¹²
		M ¹¹	P ¹¹

Figure 3: French roulette numbers playing chart

Table 1: Gauge marks on the ALRO Roulette slide rule ranked by the pay-out odds [3]

FRENCH TERM ²	ENGLISH TERM	PAY-OUT ODDS ³	TYPE OF FRENCH ROULETTE BET
(En) Plein	Straight Up Bet	36-1	A single number
Cheval	Split Bet	18-1	Any two adjacent numbers
Trans (versale)	Street Bet	12-1	Any row of three numbers
Carré	Corner Bet	9-1	Any "square" of four numbers
Tr-Si (Sixaine)	Six Line Bet	6-1	Any two adjacent rows of three numbers
Simple	Outside 2 to 1 Bet	2-1	Any dozen/block of numbers (1-12, 13-24 or 25-36) or one of the three vertical columns (1-34, 2-25 and 3-36)

The inner overlay opposite the D scale is labelled "INZET" - which is Dutch for the amount being wagered. Following the standard slide rule steps for doing multiplication with C and D scales, the potential winnings for a given wager are speedily calculated. First set the index line on the C scale (1 inside an upside-down black triangle in Figure 2) against the value of the proposed wager on the D scale. Now opposite each of the six gauge marks the respective potential pay-out winnings can be found on the D scale. For example, after setting the index line for a 5 chip wager, the potential split bet winnings of 90 chips can be found opposite the "CHEVAL" gauge mark.

A second example for calculating potential gambling winnings was spotted on eBay in 2022 [2]. Perhaps not unsurprisingly, this time it was a slide rule for the ever-popular "Sport of Kings": horse racing.

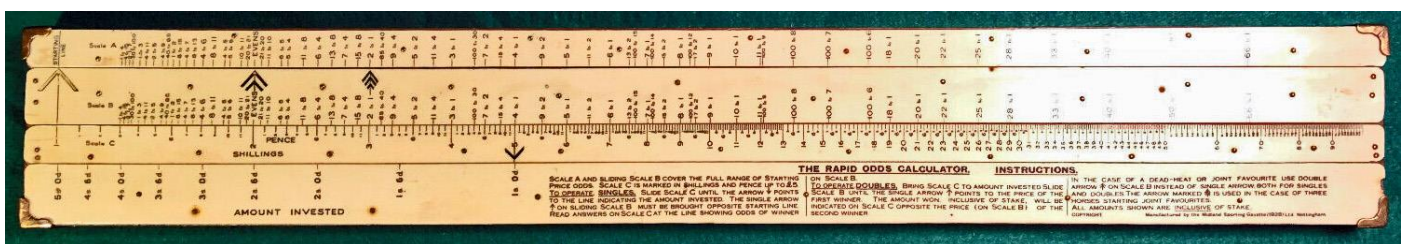


Figure 4: Wooden with celluloid veneers and metal-capped corners Rapid Odds Calculator⁴

This 21 inch desktop linear poly-slide (2) slide rule was not an artisan-made model but was professionally manufactured for the now defunct UK regional daily newspaper: *Midland Sporting Gazette*. With the monetary scales in pre-decimalisation £ s d it is pre 1971 – probably made around 1953. Like the ALRO example, the **Rapid Odds Calculator** for horse racing makes calculating the potential winnings for a given wager quick and easy. The calculator is calibrated for fixed-odds betting where a bookmaker offers odds on a chosen horse winning when the wager is placed. For

² Shown in **bold** are the "short-hand" French terms used to label the gauge marks.

³ Some casino's now offer slightly lower pay-out odds – e.g. 11-1 rather than 12-1 for a Street Bet.

⁴ Image shown was taken off www.eBay.com .

example, the odds offered could be 4-5, 13-8 or 100-1. When offering short or negative odds like 4-5 the bookmaker considers the horse the favourite to win the race⁵. With long odds, like 100-1, the potential pay-out is high because the horse is considered a rank outsider and extremely unlikely to win. Bookmakers do not like odds-on favourites winning as many gamblers opt for such safe "almost certain" bets. However, odds can dramatically shorten before a race starts when bookmakers' spot that an unfancied horse has attracted many unexpected bets or several inexplicable high-value wagers have been placed.

Being poly-slide means the calculator supports both single and double bets [4]. For single bets first align the arrowhead on "Scale C" (the bottom slide) to the amount wagered on the fixed "AMOUNT INVESTED" scale at the bottom of the stock. Next align the left-most arrowhead with the single chevron on "Scale B" (the upper slide) with the aptly named "STARTING LINE" index line at the top part of the stock. The scale of the winnings (including the wager) can now be found on "Scale C" opposite the odds given on "Scale B". Figure 4 happens to show that for a single bet of 1s 0d on a horse winning at odds of 5-2, the punter gets back 3s 6d from the bookmaker.

A double bet, better known as an accumulator, is where the winnings from the first horse are automatically carried over and wagered against the odds given for a second horse in another race also winning. This time, after the same initial setting for a single bet, the arrowhead with the single chevron on "Scale B" is set against the odds given on the first horse on the fixed "Scale A" at the top part of the stock. Now as a chained calculation, the total accumulated winnings (including the wager) can be read off "Scale C" below the odds given for the second horse winning on "Scale B". Obviously with a double bet any pay out only happens if both horses win.

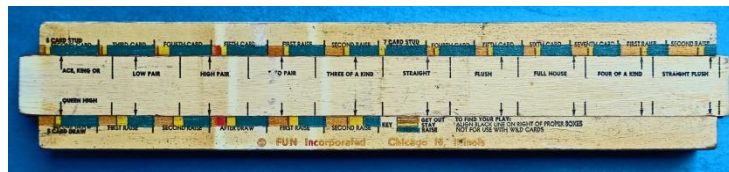
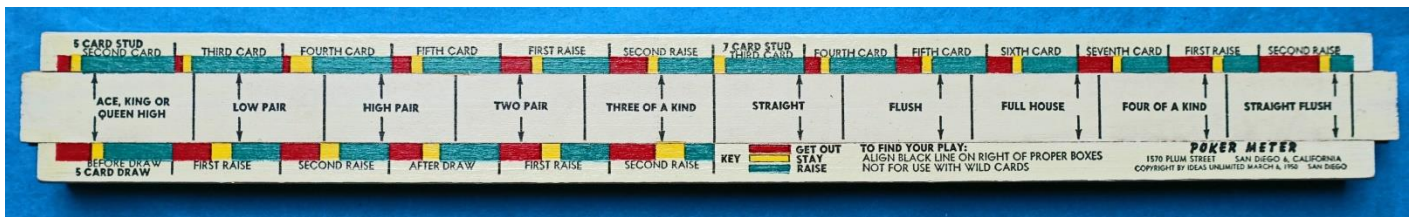
What is the "best" advantage play?

Players gamble against the house in roulette but against other players when playing board or card games. Assuming players play honestly and the house runs a fair game, skilful players can increase their chances of winning by exploiting the innate characteristics of the game they are playing. Such a strategy is known as *Advantage Play*. For example, when playing the card game *Gin Rummy* there is no point or any advantage in waiting for a particular card to come up when it has already been picked up by another player. Equally in board games, like *Backgammon* or *Monopoly*, by throwing two dice each player, in turn, introduces a random element for progressing around the board. However, an advantage play in such games is to exploit that with two die you are most likely to throw a 7 and least likely to throw a 2 or a 12.

Models from US maker **Lawrence**, the ubiquitous and much maligned originator of the "25¢ slide rule", are often unfairly shunned by collectors [5]. All Lawrence slide rules were cheaply made when compared with K&E, Pickett & Eckel, Faber-Castell, Nestler, etc. However, Lawrence developed an unsurpassed portfolio of surprisingly innovative and inventive slide rules. They produced four series' of branded slide rules

⁵ For every 5 pounds wagered you can only win 4 pounds.

and a 5th series of specially commissioned themed and usually unbranded models. The non-conventional scale layouts on these models were often so innovative that most of the designs were copyrighted – like the one for playing poker.



Figures 5 & 6: Two wood and painted versions of the Lawrence Poker Meter

The larger Lawrence linear **Poker Meter** has a scale length of 10 inches and was specially commissioned by *Statham Laboratories* in California. The smaller pocket model has a scale length of 6 inches and was specially commissioned by *Fun Incorporated* in Chicago. Neither needed a cursor and both are based on a design copyrighted in 1950 by the San Diego based *Ideas Unlimited*. Being different sizes and commissioned by different companies they are telling examples of Lawrence’s entrepreneurialism and ability to (re)sell the same design many times over.

The top half of Poker Meter is for 5 or 7-card Stud poker and the bottom half is for 5-card Draw poker. When playing poker there are 3 main possible plays: (i) fold, (ii) see or (iii) raise. On the Poker Meter these plays are depicted as colour-coded bands on the top and the bottom of the stock: (i) bands of **red** are for fold or get out, (ii) bands of **yellow** are for see or stay in and (iii) bands of **green** are for raise or upping the ante. Depending on the cards a player is holding, the Poker Meter shows the most favourable advantage play for each round of betting.

For example, at the start of a simplified game of 5-card Stud poker the dealer deals each player two cards, one card face down and one card face up. After privately checking their face down card, each player opts for one of the three possible plays. Any player choosing to fold returns their two cards to the dealer and their joining bet or ante becomes part of the eventual winner’s pot. However, what is the advantage

play for the first round of betting for a player initially dealt a single high pair – e.g. a pair of Aces, a pair of Kings or a pair of Queens? Using the Poker Meter line up the right-hand boundary line of the block marked “HIGH PAIR” on the slide

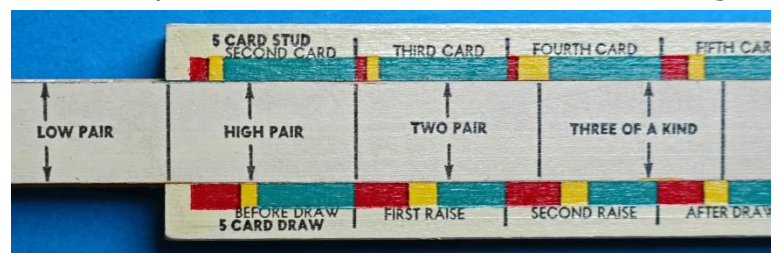


Figure 7: Advantage play for a High Pair with two cards

against the right-hand delimitation line of the block marked “SECOND CARD” on the top left-hand part of the stock. As shown in Figure 7 the upward pointing arrow in the centre of “HIGH PAIR” block shows the advantage play when playing 5-card Stud

poker is unquestionably **green** for raise. Whereas when playing 5-card Draw poker with the same cards, the downward pointing arrow shows the advantage play is **yellow** for see. Each player still in the example game is now dealt a third card face up and chooses their next play. Afterwards the dealer deals each of the remaining players in the game a fourth card face up and another round of betting takes place. However, what should the player with the initial single high pair do if the third and fourth cards dealt has not improved their hand – i.e. the two extra cards have not elevated their hand to say two sets of pairs or even three-of-a-kind? To find the

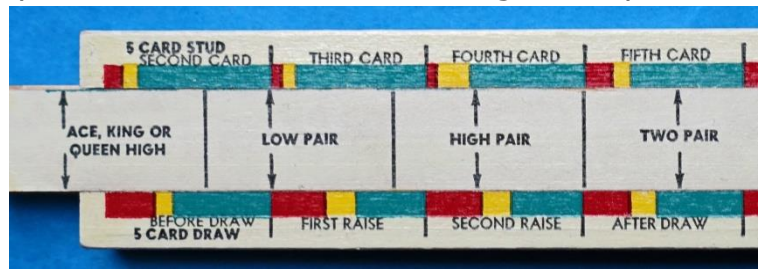


Figure 8: Advantage play for a High Pair with four cards

advantage play now, reposition right-hand boundary line of the block marked "HIGH PAIR" to the block marked "FOURTH CARD". As shown in Figure 8 when playing 5-card Stud poker the advantage play is now borderline **green** for raise. So a conservative gambler will more likely follow the **yellow** advantage play and opt for see. When playing 5-card Draw poker with the same hand, the advantage play has shifted into the **red** for get out. The example game would finish with the remaining players being dealt a fifth card face up and the highest ranked hand winning the pot.

When playing 7-card Stud poker the right half of the top colour-banded scale on the stock is used in the same way to find the advantage plays for this variant of poker.

Gamblers comeuppance

Significantly the sum total of the numbered slots on any roulette wheel is **666** – better known as the devil's number! But perhaps more telling is a gambling related quotation from legendary comedian Groucho Marx (1890-1977):

"If there was no action around, a gambler would play solitaire - and bet against them self!"

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