UNIQUE SLIDE RULES recommended for examples similar to those mentioned in this brochure are :

Code Symbol for Ordering

U1 **10″ UNIVERSAL I RULE.** *Nine Scales : A, B, C and D, Log-Log, Reciprocal, Sin and Tangent. The rule for universal use.* **11s. 6d.**

U1/2 **5″ UNIVERSAL I RULE.** *Nine scales as 10 U1.* **8s. 4d.**

10L/L **10″ LOG-LOG RULE.** *Scales: A, B, C and D, Log-Log. The Students' popular rule for ordinary purposes.* **8s. 4d.**

5L/L **5″ LOG-LOG RULE.** *Scales as in 10″ above. The pocket rule for ordinary purposes.* **6s. 0d.**

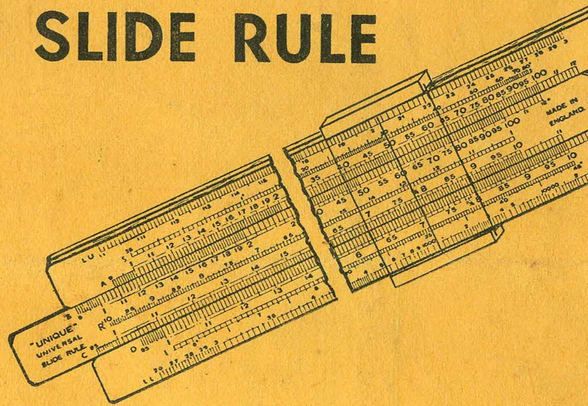
M1 **10″ MONETARY RULE.** *Equipped with scales graduated in British money values. An excellent rule for any user since it incorporates the C and D scales for ordinary calculations and special scales for monetary calculations.* **12s. 6d.**

5″ THIN POCKET RULES.
T1 *scaled as 5″ Log/Log and* **T4** *scaled as U1/2. Thin pocket rules made in plastic materials. Imitation leather cases.* *Each* **11s. 0d.**

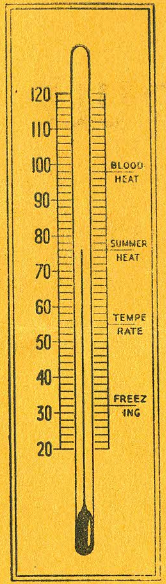
Full price list of Unique Slide Rules (over 20 models) available on request

Introducing . . .

THE SLIDE RULE



TO THE MAN IN THE STREET



ANYONE who is able to see that the thermometer illustrated on the opposite page is reading 76° will be able to use a slide rule after a very few minutes of study or instruction. These notes have been written to explain in simple language the use of a slide rule for multiplication and division. Later, some examples of everyday calculations have been included.

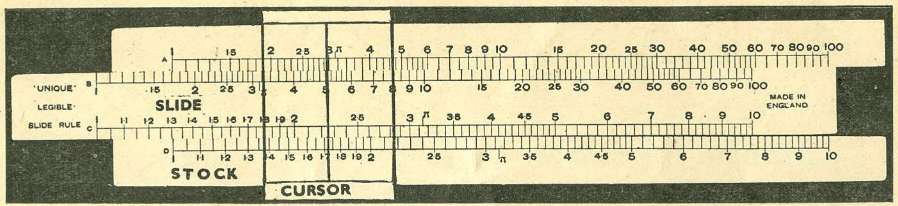


FIG. 2

COMPONENT PARTS. There are only three main parts in a slide rule:

The Stock —the body of the rule.
The Slide —the moveable centre portion.
The Cursor—the sliding device carrying an index line.

Figure 2 illustrates the most common type of slide rule. There are many different kinds of slide rule, but the A B C D scales which are seen in Figure 2 will be recognised on most makes. As we are only considering multiplication and division, we shall ignore everything except the C and D scales illustrated in Figure 3.

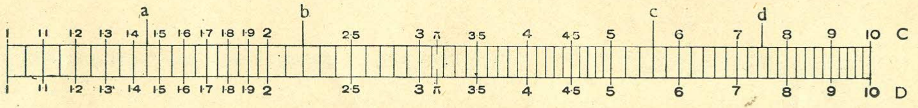


FIG. 3

READING THE SCALES. To return for one moment to our illustration of the thermometer, we see that the scale is an even one, that is, the distances between readings 0 and 10, 10 and 20, 30 and 40, etc. are all the same. This is not so in our slide rule scale and therefore the degrees of subdivision between readings 1 and 2, 2 and 3, and 5 and 6, for instance, are not the same. This causes no difficulty. The reader will note that the first division to the right of 1 is 105 but, owing to the "closing" of the scale, the first division to the right of 7 is not 705 but 720.

In Figure 3 there are four lines marked *a*, *b*, *c*, *d*; let us attempt to read their values. Line *a* exactly coincides with a division of the scale and appears to be about midway between 1·4 and 1·5. The position of the line *a*, therefore, is 1·45. Line *b* also coincides with a division o the scale and lies between main numbers 2 and 3. A glance shows that there are ten subdivisions between 2 and 3 and the position of *b* is seen to correspond to 2·2. Line *c* lies between numbers 5 and 6 and now we find there are only 5 subdivisions in this space. We will write down fully the readings of the lines at this part of the scale; they are 5·0, 5·2, 5·4, 5·6, 5·8 and 6·0. Line *c* clearly stands at 5·6. Line *d* does not coincide with any graduation in the scale and now our ability to estimate fractions must be exercised. Line *d* lies between 7·4 and 7·6. Let us try to visualize the small distance between these two lines being further subdivided into five smaller spaces. There would now be four lines very close to one another in between the lines at 7·4 and 7·6 and the readings of these four lines would be 7·44, 7·48, 7·52, and 7·56; and we estimate that line *d* is very near to 7·48.

THE CURSOR. The line on this will serve to mark any position on the D scale and the cursor will be held stationary by its spring on the stock whilst the slide is moved about. It may be used to set any two factors in scales C and D opposite each other.

MULTIPLICATION AND DIVISION. In Figure 3 the line *a* is standing at 1·45. This value could also be considered as 145, 14500, ·0145 or 14·5. A slide rule will not determine the position of the decimal point for us.

Sometimes the position of the decimal point will be obvious; sometimes simple mental arithmetic must be used.

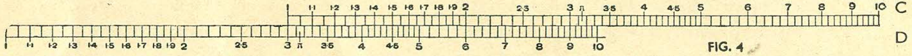


FIG. 4

Figure 4 illustrates the same two scales set so that we can multiply 3 by various numbers. Notice that directly under any number in the upper scale, three times that number appears in the lower scale: e.g. $3 \times 11 = 33$, $3 \times 12 = 36$, $3 \times 2 = 6$ and so on. This same setting of the scales shows how we can divide 9 by 3, or 6 by 2, etc., the result being read from the bottom scale opposite the number 1 in scale C. Now, in Figure 4, the upper scale projects to the right beyond the lower, and we cannot read results directly under the projecting part. This difficulty is surmounted by sliding the upper scale to the left a distance equal to its own length. Figure 5 shows these new positions of the scales and now we can perform multiplications such as $3 \times 4 = 12$, $3 \times 6 = 18$, and $3 \times 9 = 27$; and we can also divide 18 by 6 or 15 by 5 etc.

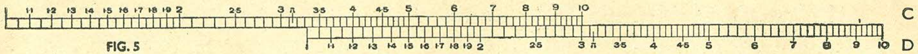


FIG. 5

We are now in a position to practice on our slide rule.

EXAMPLE A—MULTIPLICATION. *The Eiffel Tower in Paris is 300 metres high. How high is it in feet? (1 metre = 3·281 ft.).* Set 1 in scale C against 3 (300) in scale D and against 3281 in scale C read answer 985 in scale D.

EXAMPLE B—DIVISION. *A cyclist covers $73\frac{1}{2}$ miles in $3\frac{1}{2}$ hours. What is his average speed?* We must divide 73·5 by 3·5. Set 3·5 in C against 73·5 in D. Read answer 21 in D opposite 1 in C.

Note.—In example A the decimal point is determined by mental arithmetic. The calculation is roughly $3 \times 300 = 900$, so the answer is not 98·5 or 9850, but 985 feet. In example B, the answer is obviously neither 210 m.p.h. or more nor 2·1 m.p.h. or less; therefore it must be 21 m.p.h.

In every multiplication or division the method is the same and the following examples can all be worked out quickly on a slide rule:—

PETROL CONSUMPTION. *A motor-cyclist has used 17 gallons of petrol and covered 1197 miles in a certain month. What is the mileage per gallon?*

Calculation: $\frac{1197}{17} = 70{\cdot}5$ m.p.g.

PERCENTAGE. *A schoolboy has obtained a total of 607 marks out of a possible 1250. What is the percentage?*

Calculation: $\frac{607}{1250} = {\cdot}486$ or $48{\cdot}6\%$.

RATE OF EXCHANGE. *How many Dutch guilders will be obtained for £31 if the rate of exchange is 10·56?*

Calculation: $10{\cdot}56 \times 31 = 327{\cdot}5$ guilders.

ELECTRICITY ACCOUNT. *317 units of electricity have been used in a certain quarter, what is the cost of this at $1\frac{3}{4}$d. per unit?*

Calculation: $\frac{317 \times 1{\cdot}75}{12} = 46{\cdot}2$ shillings. In this problem, involving both multiplication and division, the numeral 1 in scale C is moved opposite 317 in the bottom scale. The cursor is then shifted to 175 in scale C, so completing the multiplication. Leaving the cursor there, the slide is moved until 12 in scale C appears directly under the index line. Our answer, 462, or 46·2 shillings, can now be read in scale D immediately below the 1 in scale C.

BUILDING. *Imported softwood costs £31 per standard. What is the cost in shillings per ft. cube? (1 standard = 165 ft. cube).*

Calculation: $\frac{31 \times 20}{165} = 3{\cdot}76$ shillings or 3/9.

DISCOUNT. *An invoice amounting to £81 is subject to a $3\frac{3}{4}\%$ discount deduction for cash in 7 days. What is this worth?*

Calculation: $81 \times {\cdot}0375 \times 20 = 60{\cdot}7$ shillings = £3 0s. $8\frac{1}{2}$d.

CATERING. *Tea and cakes at a meeting cost 22/-. Thirty-seven persons attended, so what was the cost per person, in pence?*

Calculation: $\frac{22 \times 12}{37} = 7{\cdot}14$ pence.

There is obviously a limit to the accuracy with which we can read the scales of our slide rule. For instance we can easily read 214 on our 10in. long slide rule, and even 2145, but we cannot take into consideration the last 3 figures in such an expression as 1411716. If we had to use this figure, we would take it as 1412000. There is this limit to the accuracy of any slide rule although the errors to be expected should not exceed two or three parts in a thousand. For instance, in the example regarding Rate of Exchange the correct answer by arithmetical methods is 327·36 guilders and our slide rule has given us an error of 14 cents or less than one part in 2000. Similarly, in the Discount example the error was a halfpenny.

In accordance with the title of these notes, elementary examples have been chosen. More elaborate computations, however, can be done on a slide rule many times more quickly and easily than by pen and paper methods. For example, computing the value of the following:

$\frac{86{\cdot}2 \times {\cdot}049 \times 18 \times 1{\cdot}7}{22{\cdot}5 \times 11{\cdot}45 \times {\cdot}8} = {\cdot}627$ by ordinary methods, there are six stages involved. We may start by evaluating $86{\cdot}2 \times {\cdot}049$, but we are not really interested in the product 4·2238 except to use it for the next stage. By slide rule method we do not have to consider these intermediate stages.

There is a popular fallacy that it is necessary to give several pounds for a slide rule. The "UNIQUE" range of over 20 models includes well made full size slide rules at under 10/-.

Published by the Unique Slide Rule Co. of Brighton Ltd.,
Brighton 6, England