

*Standard*

**DIETZGEN**

SLIDE RULES



**EUGENE DIETZGEN CO.**

523 Market St., San Francisco

Chicago      New York  
New Orleans      Pittsburgh  
San Francisco



Philadelphia      Washington  
Milwaukee      Los Angeles  
Factory at Chicago

*Manufacturers of Drafting and Surveying Supplies*

THE Slide Rule, an instrument for facilitating calculations, is an indispensable aid, not only to the engineer and scientist with their involved problems, but also to the accountant, statistician, manufacturer, merchant, importer, freight agent, or anyone who has calculations to solve.

The theory of the Slide Rule is simple, and with little practice proficiency in its operation may be readily attained. A knowledge of the principles which underlie the workings of the Slide Rule is not necessary for its successful operation.

We have, however, published and furnish gratis with each rule, in booklet form, an exhaustive though brief explanation of this subject specifically applicable to each of our rules. These booklets, "Mannheim Slide Rules," "Phillips Slide Rule," and the "Maniphase Slide Rule" are listed under Nos. 1786M, 1786P, 1786S respectively.

Dietzgen's Slide Rules are made of carefully selected well-seasoned mahogany, and accurately engine divided on white celluloid. The long seasoning process, excellent workmanship, scientific methods, and specially designed machines used in their manufacture account for the high quality and accuracy of our rules.

You will find Dietzgen Slide Rules used universally. Engineers, scientists, and students appreciate their accuracy; their sharp, legible graduations; their durable, sturdy construction; and their smooth, even operation.

That these qualities are so necessary in such an instrument as the Slide Rule, causes us to exercise diligent control over every detail in their construction to make them a perfect Slide Rule.







## Mannheim Style Slide Rule

The Mannheim type Rule shown on Page 6 was perfected by Lieut. Mannheim, a French Artillery Officer, and is the basic type rule from which the Phillips and Maniphase styles have been perfected. It has single logarithmic scales on the lower face of the slide and rule, known as the "C" and "D" scales and double scales on the upper known as the "A" and "B" scales. A sliding indicator, used for finding coinciding points on the scales, permits working out extensive calculations without taking intermediate readings.

Scales of Sines, Tangents, and of Equal Parts are on the under face of the slide. Index marks on the under face of the rule permit these scales to be used in conjunction with the scales on the upper face of the rule, giving a number of ratios and settings.

## Maniphase Style Slide Rule

The Maniphase Rule is of a design and scale arrangement similar to the Mannheim but has in addition, a cube scale "K" above the double scale "A" on the face of the rule, and an inverted single reciprocal scale "CI" on the face of the slide which, is in reverse relation to the single scales "C" and "D."

With the Maniphase Rule, problems involving three factors, or fractional powers and roots and reciprocals can be solved with one setting of the slide.

## Phillips Style Slide Rule

The Phillips Rule is like the Maniphase Rule except that it has an inverted double reciprocal scale "R" instead of the single scale on the face of the slide, which is in reverse relation to the double scales "A" and "B."

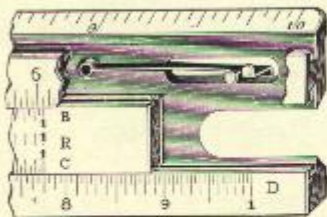
The Phillips Rule has the same advantages as the Maniphase. Its difference, a matter of individual preference, is the scales to which the reciprocal scale "R" is related.

## Dividing and Numbering of Slide Rules

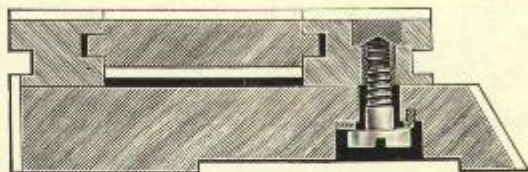
The subdivisions of the 5 inch rule range from 50 down to 10 between the prime numbers. The 8 inch rule is divided twice as close as the 5 inch, having subdivisions ranging from 100 down to 20 between the prime numbers. The 10 inch rule, considered standard, is subdivided the same as the 8 inch. The 20 inch rule is divided more closely than the 8 and 10 inch rules, having subdivisions ranging from 200 down to 50 between the prime numbers.

Great care is used in graduating and numbering our rules to make them as clear, distinct, legible and permanent as possible.

## Dietzgen's Slide Adjustment



Automatic Adjustment.



Screw Adjustment.

Climatic and atmospheric changes affect the materials of which the Slide Rule is made, notwithstanding the previous seasoning of the wood or treatment of the celluloid. To prevent the slide from binding or becoming loose, thus impairing the operation of the rule, the upper grooved guide is made adjustable for varying the friction of the slide.

The Automatic Slide Adjustment makes use of springs set in the upper guide which keeps a constant pressure against the slide, automatically insuring uniform friction in spite of climatic changes.

In the Screw Slide Adjustment, set screws are placed in the guide which extend through oblong slots in the body of the rule. These screws hold the guide rigidly when the screws are tight; yet quick and accurate adjustments can be made, according to the friction desired when the screws are loosened.



## Phillips Slide Rule

The Phillips Slide Rule, of the Mannheim type, has in addition to the regular scales A, B, C, and D of the Mannheim, a cube scale "E" on the face of the rule above the "A" scale, and an inverted reciprocal scale "R" on the face of the slide.

The cube scale "E" consists of three consecutive logarithmic scales of one-third unit length of the "C-D" scales to which it is referred. Cubes and cube roots can be read directly on these scales.

The reciprocal scale "R" is an inverted, double logarithmic scale of the same unit length as the "A-B" scales to which it is referred. This scale permits rapid reading of divisions and inverse proportions, and enables three factors, such as  $97 \times 98 \times 99$ , to be taken without resetting the slide. It is a unique scale found only on the Phillips rule.

The back of the slide has a scale of sines, tangents and of equal parts which are indexed to be used with other scales. These scales, together with the sliding indicator, permit almost any combination of three factors involving cubes, squares, roots, and fractional powers or roots, together with trigonometrical or logarithmical functions to be solved without resetting the slide.

The beveled side is divided into inches and  $\frac{1}{16}$  inches; the vertical side is divided into centimeters, thus permitting the rule to be used for measuring and ruling lines which is a material aid in calculations involving the construction of figures.

A table of settings for converting the English system of weights and measures to the Metric system, and also the conversion of many physical constants to other equivalent units is printed on the back of the rule.



No. 1740P.

### 8 inch Rule.

- No. 1738P. Phillips Slide Rule, 8 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$ 5.15
  - 1738L. Like No. 1738P but in sewed leather case, . . . . . Each, 6.95
- The 8 in. rule is as closely divided as the ordinary 10 in. rule.

### 10 inch Rule.

- 1740P. Phillips Slide Rule, 10 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$ 6.25
- 1740L. Like No. 1740P but in sewed leather case, . . . . . Each, 7.10
- 1740M. Like No. 1740L in sewed leather case, with magnifier, . . . . . Each, 11.35

### 20 inch Rule.

- 1742P. Phillips Slide Rule, 20 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$16.00
- 1742L. Like No. 1742P but in sewed leather case, . . . . . Each, 17.50

Rules Nos. 1742P and 1742L are divided more closely than the ordinary 10 in. rules. The subdivisions range from 200 down to 50 between prime numbers, whereas the 10 in. rules range from 100 down to 20. This permits closer reading on 20 in. rule than on 10 in. rule, to the extent often of one additional significant figure.





## Maniphase Slide Rule

The Maniphase Slide Rule, of the Mannheim type, has in addition to the regular scales A, B, C, and D of the Mannheim, a cube scale "K" on the face of the rule above the "A" scale, and an inverted single reciprocal scale "CI" on the face of the slide.

The cube scale "K" consists of three consecutive logarithmic scales of one-third unit length of the "C-D" scales to which it is referred. Cubes and cube roots can be read directly on these scales.

The reciprocal scale "CI" is an inverted, single logarithmic scale of the same unit length as the "C-D" scale to which it is referred. This scale permits closer reading, and being referred to the basic reference scale "D", minimizes setting in involved problems. It also enables three factors to be taken with one setting of the slide. Divisions can be rapidly executed and reciprocals read by means of the indicator.

The back of the slide has a scale of sines, tangents, and of equal parts which are indexed to be used with the other scales. These scales, together with the sliding indicator, permit almost any combination of three factors involving cubes, squares, roots, and fractional powers or roots, together with trigonometrical or logarithmical functions to be solved without resetting the slide.

The beveled side is divided into inches and  $\frac{1}{16}$  inches; the vertical side is divided into centimeters, thus permitting the rule to be used for measuring and ruling lines which is a material aid in calculations involving the construction of figures.

A table of settings for converting the English system of weights and measures to the Metric system, and also the conversion of many physical constants to other equivalent units is printed on the back of the rule.

### 8 inch Rule.

- No. 1748P. Maniphase Slide Rule, 8 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$ 5.15
- 1748L. Like No. 1748P but in sewed leather case, . . . . . Each, 6.95

The 8 in. rule is as closely divided as the ordinary 10 in. rule.

### 10 inch Rule.

- No. 1750P. Maniphase Slide Rule, 10 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$ 6.25
- 1750L. Like No. 1750P but in sewed leather case, . . . . . Each, 7.10
- 1750M. Like No. 1750L in sewed leather case, with magnifier, . . . . . Each, 11.35

### 20 inch Rule.

- No. 1752P. Maniphase Slide Rule, 20 in., screw adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$16.00
- 1752L. Like No. 1752P but in sewed leather case, . . . . . Each, 17.50

Rules Nos. 1752P and 1752L are divided more closely than the ordinary 10 in. rules. The subdivisions range from 200 down to 50 between prime numbers, whereas the 10 in. rules range from 100 down to 20. This permits closer reading on 20 in. rule than on 10 in. rule to the extent often of one additional significant figure.



No. 1750P.

## Mannheim Slide Rule



No. 1760P.

The Mannheim Slide Rule is sturdily designed, having a range of use sufficient for all ordinary commercial and engineering work.

These rules are made of thoroughly seasoned mahogany, and accurately engine divided on white celluloid. The face of the rule and slide has four scales, referred to as A, B, C, and D. The A and B scales are double logarithmic scales. The C and D scales are single logarithmic.

The back of the slide has a sine, a logarithm and a tangent scale, which are indexed to be used with the scales on the face of the rule.

By means of these various scales and the use of the sliding indicator, problems involving squares and square roots and many higher powers and roots and also problems containing trigonometrical functions, or logarithms, can readily be solved.

The rule has a clear, open face, making it easy to read the graduations. The beveled side is divided into inches and  $\frac{1}{8}$  inches; the vertical side is divided into centimeters, thus permitting the rule to be used for measuring and ruling lines which is a material aid in calculations involving the construction of figures.

A table of settings for converting the English system of weights and measures to the Metric system, and also the conversion of many physical constants to other equivalent units is printed on the back of the rule.

### 5 inch Rule.

- No. 1755P. Mannheim Slide Rule, 5 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions, Each, \$ 4.35
- 1755L. Like No. 1755P but in sewed leather case, Each, 5.50

The 5 in. rule divisions range from 50 down to 10 subdivisions between prime numbers, whereas ordinary 10 in. rules range from 100 down to 20.

### 8 inch Rule.

- No. 1758P. Mannheim Slide Rule, 8 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions, Each, \$ 4.75
- 1758L. Like No. 1758P but in sewed leather case, Each, 6.20

The 8 in. rule is as closely divided as the ordinary 10 in. rule.

### 10 inch Rule.

- No. 1760P. Mannheim Slide Rule, 10 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions, Each, \$ 5.50
- 1760L. Like No. 1760P but in sewed leather case, Each, 6.35
- 1760M. Like No. 1760L but in sewed leather case with magnifier, Each, 10.35

### 20 inch Rule.

- No. 1762P. Mannheim Slide Rule, 20 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions, Each, \$14.00
- 1762L. Like No. 1762P but in sewed leather case, Each, 15.50

Rules Nos. 1762P and 1762L are divided more closely than the ordinary 10 in. rules. The subdivisions range from 200 down to 50 between prime numbers, whereas the 10 in. rules range from 100 down to 20. This permits closer reading on 20 in. rule than on 10 in. rule to the extent often of one additional significant figure.





## Phillips Slide Rule

This Phillips Slide Rule is similar to that described on page 4 with the exception that its cube scale "E" is on the vertical side of the rule instead of on the face. This arrangement of the cube scale "E" gives a more open and legible appearance to the face of the scale.

The index on the side of the indicator coincides with the hair line index and enables this scale to be used in conjunction with the other scales.

The Phillips Slide Rule is devised for rapid calculations. Its accuracy and scale arrangement is especially advantageous in engineering, scientific and commercial work.

Problems involving a combination of three factors, and problems containing trigonometrical functions can be solved in one setting of the slide.

The reciprocal scale "R" consisting of two inverted logarithmic scales is identical to that of the other Phillips Rule, and has the same advantages enabling the solution of problems containing three factors, and also permits the reading of reciprocals, and of making rapid divisions.

Such expressions as:

$$99 \times 98 \times 97; \quad \sqrt{\quad}; \quad \sqrt[3]{a^3}; \quad \sqrt[3]{a^4};$$

$$\frac{1}{a^3}; \quad \sqrt[3]{a^2}; \quad \sqrt{\frac{a^2}{b^2}}; \quad \sqrt[3]{\frac{a^2}{b^2}};$$

$$a^3 \sqrt{b^3}; \quad \sqrt{c^3}; \quad \sqrt{\frac{a^3}{b^3 c^3}}; \quad \sqrt{as \text{ in } \alpha}$$

may be read with one setting. The characteristic advantages of the Phillips Slide Rule may be summed up as follows:

1. Multiplication of three numbers in one setting.
2. Division of one number by two numbers in one setting.
3. More convenient solution of inverse proportion.
4. Direct solution in a single setting of a series of divisions with a constant dividend.
5. Direct reading of cubes and cube roots.
6. Direct reading of three-halves and two-thirds powers.
7. Direct solution in a single setting of many combined operations which require the slide to be shifted with the Mannheim rule.

### 10 inch Rule.

- No. 1772P. Phillips Slide Rule, 10 in., automatic adjustment, engine divided on white celluloid, with cube and reciprocal scale. Glass "frameless" indicator. In plain case, with book of instructions, . . . . . Each, \$ 6.25
- 1772L. Like No. 1772P but in sewed leather case, . . . . . Each, \$ 7.10
- 1772M. Like No. 1772L in sewed leather case, with magnifier, . . . . . Each, \$11.35



No. 1772P.

## Union Pocket Slide Rule



No. 1765P.

- No. 1765P.** Union Pocket Slide Rule, (Mannheim) 5 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions . . . Each, \$ 3.50
- 1765L.** Like No. 1765P but in sewed leather sheath . . . Each, \$ 3.90
- 1770P.** Union Slide Rule, (Mannheim) 10 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions . . . Each, \$ 4.00

The Union Pocket Slide Rule No. 1765P is especially adapted for carrying in the pocket; it is both compact in size and light in weight. It is approximately  $\frac{1}{8}$  in. thick, one inch wide and possesses the same logarithmic scales and range of use as the Mannheim.

These rules, both the 5 and 10 inch, have the "A" and "D" scales attached to a flexible back, substantially of the same white celluloid material as the face of the slide and scale. This construction permits a uniform expansion and contraction under atmospheric changes; the slide remains true and works smoothly at all times.

It is recommended to those who desire the convenience of a light compact rule having the accuracy and range of the heavier types.

## Scholar Slide Rule



No. 1775P.

- No. 1775P.** Scholar Slide Rule, (Mannheim) 5 in., legible divisions on white, compressed cardboard, metal indicator; in sheath with instructions . . . Each, \$ 0.60
- 1780P.** Like No. 1775P but 10 in. long, subdivided more closely; in sheath with instructions . . . Each, \$ 0.75

The Scholar Slide Rules are especially adapted for use of beginners, as they permit a knowledge of the slide rule to be gained at a small cost.

They are made of heavy compressed cardboard with a hard surface. The rule has four scales, A, B, C, and D, corresponding to those of the Mannheim. With a little care, these rules will give satisfactory service over a number of years.



No. 1780-1.



No. 1780-4.

## Glass Indicators for Slide Rules

- No. 1780-1.** Glass Frameless Indicator, all figures always visible, one hair line, for rules with  $1\frac{1}{2}$  in. face—Phillips, Maniphase, and Mannheim . . . Each, \$ 1.20
- 1780-2.** Like No. 1780-1 but for rules with 1 in. face—Union, and former Mannheim, Nos. 1768, 1768L and 1769 and Multiplex 1760A, 1760B and 1761B . . . Each, \$ 1.00
- 1780-4.** Glass Frameless Indicator, all figures always visible, one hair line, for rules with  $1\frac{1}{2}$  in. face, with lip on side for cube index—Phillips Automatic Adjustment, Nos. 1772P, and former Nos. 1759A, 1759B, and 1759C . . . Each, \$ 1.20
- 1780-5.** Like No. 1780-4 but for rules with 1 in. face . . . Each, \$ 1.00

When ordering glass indicators, always specify our catalog numbers stamped on end of rule on which the indicator is to be used. For a rule with the cube scale on the side, or for any rule which you cannot identify, either of our or any other manufacture, it is advisable to send us the Slide Rule so that the frameless indicator can be fitted properly.



## Union Pocket Slide Rule



No. 1765P.

- No. 1765P.** Union Pocket Slide Rule, (Mannheim) 5 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions . . . Each, \$ 3.50
- 1765L.** Like No. 1765P but in sewed leather sheath . . . Each, \$ 3.90
- 1770P.** Union Slide Rule, (Mannheim) 10 in., engine divided on white celluloid. Glass "frameless" indicator. In plain case, with book of instructions . . . Each, \$ 4.00

The Union Pocket Slide Rule No. 1765P is especially adapted for carrying in the pocket; it is both compact in size and light in weight. It is approximately  $\frac{1}{8}$  in. thick, one inch wide and possesses the same logarithmic scales and range of use as the Mannheim.

These rules, both the 5 and 10 inch, have the "A" and "D" scales attached to a flexible back, substantially of the same white celluloid material as the face of the slide and scale. This construction permits a uniform expansion and contraction under atmospheric changes; the slide remains true and works smoothly at all times.

It is recommended to those who desire the convenience of a light compact rule having the accuracy and range of the heavier types.

## Scholar Slide Rule



No. 1775P.

- No. 1775P.** Scholar Slide Rule, (Mannheim) 5 in., legible divisions on white, compressed cardboard, metal indicator; in sheath with instructions . . . Each, \$ 0.60
- 1780P.** Like No. 1775P but 10 in. long, subdivided more closely; in sheath with instructions . . . Each, \$ 0.75

The Scholar Slide Rules are especially adapted for use of beginners, as they permit a knowledge of the slide rule to be gained at a small cost.

They are made of heavy compressed cardboard with a hard surface. The rule has four scales, A, B, C, and D, corresponding to those of the Mannheim. With a little care, these rules will give satisfactory service over a number of years.



No. 1780-1.



No. 1780-4.

## Glass Indicators for Slide Rules

- No. 1780-1.** Glass Frameless Indicator, all figures always visible, one hair line, for rules with  $1\frac{1}{2}$  in. face—Phillips, Maniphase, and Mannheim . . . Each, \$ 1.20
- 1780-2.** Like No. 1780-1 but for rules with 1 in. face—Union, and former Mannheim, Nos. 1768, 1768L and 1769 and Multiplex 1760A, 1760B and 1761B . . . Each, \$ 1.00
- 1780-4.** Glass Frameless Indicator, all figures always visible, one hair line, for rules with  $1\frac{1}{2}$  in. face, with lip on side for cube index—Phillips Automatic Adjustment, Nos. 1772P, and former Nos. 1759A, 1759B, and 1759C . . . Each, \$ 1.20
- 1780-5.** Like No. 1780-4 but for rules with 1 in. face . . . Each, \$ 1.00

When ordering glass indicators, always specify our catalog numbers stamped on end of rule on which the indicator is to be used. For a rule with the cube scale on the side, or for any rule which you cannot identify, either of our or any other manufacture, it is advisable to send us the Slide Rule so that the frameless indicator can be fitted properly.



## Magnifiers for Slide Rules



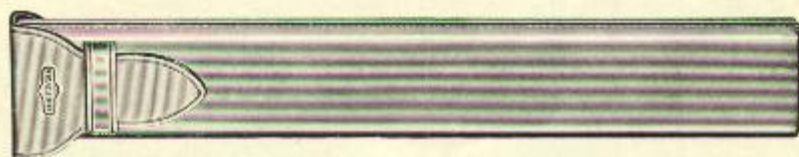
No. 1781-1.

- No. 1781-1. Magnifiers complete with special glass "frameless" indicator for rules with  $1\frac{1}{8}$  in. face—Phillips, Maniphase, and Mannheim, . . . . . Each, \$ 2.75
- 1781-2. Like No. 1781-1 but for rules with 1 in. face, . . . . . Each, \$ 2.50

The magnifiers and the glass indicators are both securely held between two white ivory guides causing the hair line to be in focus at all times. There is no frame around the magnifier of the indicator to obstruct the full view of all graduations beneath the indicator. The full area of the indicator is in focus and the magnification such as to permit easy reading of the finest graduations.

When ordering magnifiers, always specify our catalog numbers stamped on end of the rule, on which the magnifier is to be used. For any rule which you cannot identify, either of our or any other manufacture, it is advisable to send us the Slide Rule so that the special glass frameless indicators can be fitted properly.

## Sewed Leather Cases for Slide Rules



No. 1782-1.

					Each
No. 1782-1.	Sewed Leather Case	for	5 in.	Mannheim,	\$ 1.15
1782-2.	" "	" "	8 "	Phillips, Maniphase, Mannheim,	\$ 1.35
1782-3.	" "	" "	10 "	" " "	\$ 1.50
1782-4.	" "	" "	20 "	" " "	\$ 2.75
1782-5.	" "	Sheath	5 "	Union	\$ 0.75

## Sewed Leather Cases with Space for Magnifier

No. 1783-2.	Sewed Leather Case; magnifier space, for 8 in. Phillips, Maniphase, and Mannheim,	Each,	\$ 2.75
1783-3.	Sewed Leather Case; magnifier space, for 10 in. Phillips, Maniphase, and Mannheim,	Each,	\$ 3.00
1783-4.	Sewed Leather Case; magnifier space, for 20 in. Phillips, Maniphase, and Mannheim,	Each,	\$ 4.25

## Books of Instructions for Slide Rules

No. 1786M.	"The Mannheim Slide Rule." A self teaching practical manual with numerous illustrations and problems,	Each,	\$ 0.75
1786P.	"The Phillips Slide Rule." A self teaching practical manual with numerous illustrations and problems,	Each,	\$ 0.75
1786S.	"The Maniphase Slide Rule." A self-teaching, practical manual with numerous illustrations and problems,	Each,	\$ 0.75



## Engineers' Slide Rule



No. 1792.

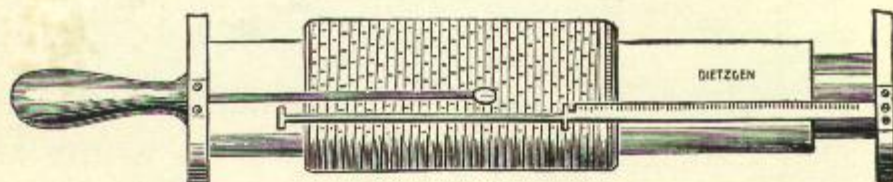
No. 1792. Engineers' Slide Rule, 24 in., Hardwood, with directions, . . . Each, \$ 7.00

This is an improved Slide Rule, arranged by Edwin Thacher and E. M. Scofield, Bridge Engineers, in order to combine a maximum of speed with a maximum of accuracy. It is 24 inches long and comprises two complete rules upon one stick.

It multiplies three numbers at one setting, gives powers and roots and has an accuracy equal to a 48 inch rule for ordinary work. No runner is required. Directions for using are engraved on each rule.

## Fuller Slide Rule

Length of Scale—500 inches, 7,250 divisions



No. 1794.

No. 1794. Fuller Spiral Slide Rule, in mahogany box, with directions, . . . Each, \$38.00

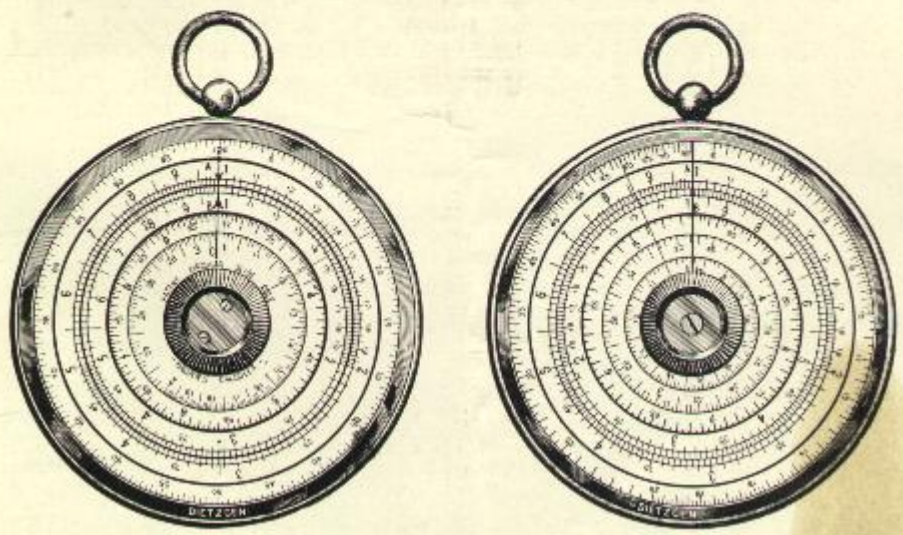
This form of Calculating Machine, which is the simplest yet made, greatly facilitates solving the numerous arithmetical calculations required in the office of the Engineer and Architect.

Its range is greater than that of most arithmetical machines. In addition to the operations of multiplication and division, which many instruments only can perform, results requiring the reciprocals, powers, roots, or logarithms of numbers, can be quickly and easily obtained by its use.

The Rule consists of a cylinder that can be moved up and down upon, and turned round, an axis. This axis is provided with a handle, so that the rule may be held in the hand or, if desired, the handle can be attached to the case and rule operated in this position. Upon the cylinder is wound in a spiral a single logarithmic scale. Fixed to the handle is an index. Two other indices, whose distance apart is the axial length of the complete spiral, are fixed to an inner cylinder. This inner cylinder slides inside the axis like a telescope tube, and thus enables the operator to place these indices in any required position relative to the logarithmic scale. Two stops are so fixed that when they are brought in contact the index points to the commencement of the scale.

The use of Slide Rules has been confined to roughly approximate calculations, as the length of scale hitherto made was sufficient only for about 160 divisions. On this rule the length of scale is 500 inches and the number of divisions 7,250, consequently the approximation obtained by its use is sufficient for most of the calculations required by Engineers and Architects.

## Halden Calculex



No. 1795A. Improved Halden Calculex, Watch Pattern, diameter  $2\frac{3}{8}$  in., in leather wallet case, with leather bound instruction booklet, Each, \$ 9.00

The Improved Halden Calculex is as convenient and handy as a Watch and is the most practical and durable circular slide rule manufactured.

The Calculex provides all the advantages of a slide rule and pocket calculator. It is  $2\frac{3}{8}$  in. in diameter and about  $\frac{5}{16}$  in. thick, fitting conveniently into the vest pocket. It consists of two concentric metal discs, graduated in a manner similar to the slide rule, having glass covers or cursors on both sides.

On one side there are two logarithmic scales, A and B, for multiplication, division, proportion, etc., which correspond to the A and B scales of an ordinary slide rule. Around the outer edge is a scale of logarithms, which is read with a cursor in the usual manner. The two inner circles contain a scale of square roots, which is likewise read by the cursor.

The other side contains scales A and B, but for inverse proportion, and since they are adjacent to each other, they may be set and read without the cursor, giving a great range of proportions for each setting. Around the outer edge is a scale of angles and the three inner circles contain a cube root scale which may be read directly from scale B on that side by the use of the cursor.

The simple construction makes it easy to use the instrument. The graduated metal discs cannot warp or shrink, nor lose the accuracy of the graduations. Atmospheric changes do not affect the smooth and easy working of the scales, because they are made of metal.

The back cursor is amber colored, distinguishing it from the front cursor which is made of clear glass. Errors in reading are thereby minimized, and the rapidity with which the instrument can be used is increased.

The Calculex comes packed in a handsome limp leather case with a leather covered booklet (vest pocket size) containing rules, tables, and formulae for its use.