

From Blagrave, Mathematical jewel, 1585

### H.B.

Observations on an essay to ascertain the value of leases and annuities for years and lives, by Weyman Lee, Esq; wherein Dr. Halley's method is particularly consider'd, and rules laid down for estimating the chances of the duration of lives, and the value of annuities for years and lives. In a letter to a friend

b/w: **Moivre, Abraham de**; *Annuities upon lives*, 1725 b/w: **Richards, John**; *A gentlemen's steward and* 

tenants of manors instructed

b/w: **Richards, John**; Annuities on lives, and for a limited terms of years, considered

Year: 1739 Place: London

Publisher: printed for C. Bathhurst

Edition: 1st Language: English

Binding: contemporary panelled leather

Pagination: pp. [4], 48 Collation: A<sup>2</sup>B–G<sup>4</sup> Size: 193x123 mm

This work compares computations for annuities. It uses tables from Breslau (present-day Wroclaw in Poland) and compares them to English Bills of Mortality.

Illustrations available: Title page

### Н2

### Hagar, Daniel Barnard (1820–1896)

An elementary arithmetic

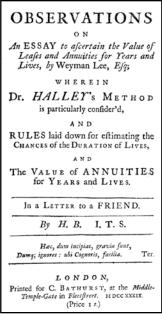
Year: 1871 Place: Philadelphia

Publisher: Cowperthwait & Company

Edition: 1st Language: English

Binding: original printed paper boards with leather spine

Pagination: pp. 208 Collation: 1–17<sup>6</sup> 18<sup>2</sup> Size: 172x107 mm

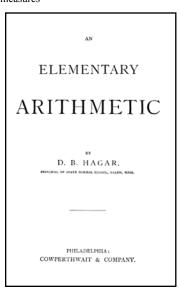


H 1

Hagar was the principal of the state normal school in Salem, MA. At the time this was published, he had two other school arithmetic texts in use and a volume on elementary algebra in preparation. A note indicates that he intended to follow these with several others and thus form a *complete series*.

This is a typical elementary arithmetic book of the era. Its main distinguishing feature is the illustrations used at the head of each new topic.

Illustrations available: Title page Fractions Linear measures





Fractions, H 2



Linear measure, H 2

### Н3

### Hagemann, E. C.

Precision resistance networks for computer circuits. In Bell Laboratories Record, Vol. XXIV, No. 12, December 1946.

Year: 1946 Place: New York

Publisher: Bell Telephone Laboratories

Edition: 1st Language: English

Binding: original paper wrappers Pagination: pp. 445–449

Size: 254x180 mm

Hagemann earned a BSEE from Bucknell University in 1916. He joined AT&T in 1917 and worked mainly on the development of electronic components operating at radio frequencies.

The resistance networks described in this paper found use in gun directors and other analog computers.

Illustrations available: First page



H 4

# H 4 [**Hager, Guiseppe** (1757–1819)]

Memoria sulle cifre arabiche attribuite fino a' giorni nostri agl'indiani, ma inventate in un paese più rimoto dell'India.

Year: 1813 Place: Milan

Publisher: Giovani Pirotta

Edition: 1st Language: Italian

Binding: original paper wrappers; endpapers from text

Pagination: pp. 75, [1] Collation: 1–9<sup>4</sup>10<sup>2</sup> Size: 320x228 mm Reference: Not in Rcdi *BMI* 

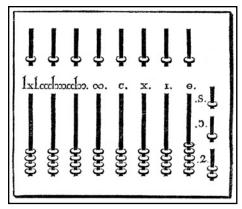
The author's name does not appear in the book.

This work examines and compares Chinese, Indian, Arabic and European numerals. There is also a small section describing the various forms of the abacus, with illustrations of the Chinese swan pan and Roman abacus. In 1801, J. Hagar published *An explanation of the elementary character of the Chinese*, in London, which may well be related to this work, but it has not been possible to examine it.

A second copy of this work is available in the collection. It has a different binding and size: contemporary half leather over marbled boards; corners worn; 309x228 mm.

Illustrations available:

Title page Roman abacus



Roman abacus, H 4

### Halle, Johann Samuel See Chaulnes, Michel Ferdinand d'Albert

d'Ailly, Duc de; Neue art, Mathematische und astronomische Instrumente abzutheilen. Aus dem Französischen übersetzt, und herausgegeben.

### H 5

### Halliwell, James Orchard (1820–1889)

Rara mathematica; or, a collection of treatises on the mathematics and subjects connected with them, from ancient inedited manuscripts.

Year: 1839 Place: London

Publisher: John William Parker

Edition: 1st Language: English

Figures: 1 engraved plate (follows p. 106) Binding: original paper boards; untrimmed

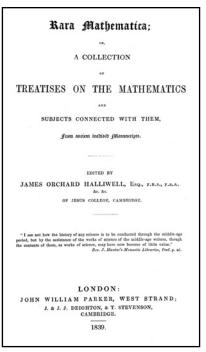
Pagination: pp. iii–viii, 120, [4] Collation: [A]<sup>3</sup>B–G<sup>8</sup>H<sup>4</sup>I<sup>10</sup> Size: 224x142 mm

James Halliwell (Halliwell-Phillipps) was born in London into a prosperous business family. When only fifteen, he began to collect books and manuscripts and wrote a number of biographies of mathematicians that were published in *The Parthenon* in 1836 and 1837. At Cambridge he is said to have taken little interest in coursework and to have spent the majority of his time in libraries. He wrote a biography of Sir Samuel Morland in 1838. He has the distinction of having been elected Fellow of the Royal Society just prior to his nineteenth birthday. In 1840, he sold a number of manuscripts that had been stolen from Trinity College Library. Although Halliwell stated that he had purchased them from a shop in London, he was barred from the British Museum and other libraries for the next six years. After several threatened lawsuits, the matter was dropped, and he was again allowed to apply for a reader's card. He is best known for publishing many works on early manuscripts, and he made Shakespeare a particular interest of his studies. In 1872, after his wife (nee Henrietta Phillipps) became incapacitated due to a riding accident, he changed his name to Halliwell-Phillipps in order to better manage property she had inherited.

This work reprints thirteen manuscripts on mathematical topics. There is also an appendix on the numeral forms found in **Boethius** and of remarks on ancient almanacs. Among the manuscript works included are **Johannes de Sacrobosco**, *Tractatus de Arte Numerandi*; and Alexandri de Villa Dei, *Carmen de Algorismo*.

A note in the second edition of this work indicates that this first edition was printed in three separate parts: the first (pp. 1–48) appeared on the first of June 1838; the second (pp. 49–96) on the first of October 1838; and the remainder on the first of June 1839. No explanation is given for the three-part printing, a situation that seems unusual as the page numbers given fall in the middle of the individual items. This is a presentation copy from the author to the Sussex Archeological Society.

Illustrations available: Title page



H 5

### H 6 Halliwell, James Orchard (1820–1889)

Rara mathematica; or, a collection of treatises on the mathematics and subjects connected with them, from ancient inedited manuscripts.

Year: 1841 Place: London

Publisher: Samuel Maynard

Edition: 2nd Language: English

Binding: original cloth boards; spine gilt

Pagination: pp. viii, [2], 120 Collation: [A]<sup>5</sup>B–G<sup>8</sup>H<sup>4</sup>I<sup>8</sup> Size: 222x140 mm

This second edition is unchanged from the first except for some minor changes in Halliwell's notes and the inclusion of a list of errata.

Illustrations available: Title page

OUTLINES OF
THE EVOLUTION OF
WEIGHTS AND MEASURES
AND
THE METRIC SYSTEM

BY
WILLIAM HALLOCK, PR.D.
PROFESSOR OF PHYSICS IN COLUMBE INVESSORY OF THE CITY OF NEW YORK
AND
HERBERT T. WADE
SERIOR FOR PHYSICS AND APPLIED SCIENCE, "THE NEW INTERNATIONAL ENCYCLOPACIA.

Reb Both
THE MACMILLAN COMPANY
LONDON: MACMILLAN AND CO. LTD.
1906

H 7

н 7

# Hallock, William (1857–1913) and Herbert Treadwell Wade (1872–1955)

Outlines of the evolution of weights and measures and the metric system

Year: 1906 Place: New York Publisher: Macmillan Edition: 1st Language: English

Binding: original cloth boards; gilt spine

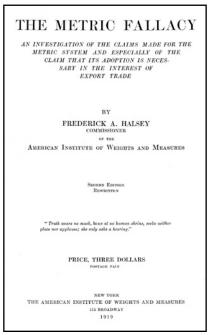
Pagination: pp. xii, 304 Collation:  $\pi^6A-T^8$ Size: 218x10 mm

William Hallock studied physics at Columbia University and at the University of Würzburg. After serving as head of the Smithsonian Astrophysical Observatory, he returned in 1892 to Columbia University as a professor of physics. In 1906, he was named dean of the Faculty of Pure Science.

Hebert Treadwell Wade was the author of six books and numerous journal articles in popular magazines. He was editor for physics and applied science with *The new international encyclopedia*.

This is a book on the metric system. It contains a short history section, but it is primarily a discussion of the metric system as used in medicine and engineering.

Illustrations available: Title page



H 8

H 8

### Halsey, Frederick Arthur (1856–1935)

The metric fallacy

Year: 1919 Place: New York

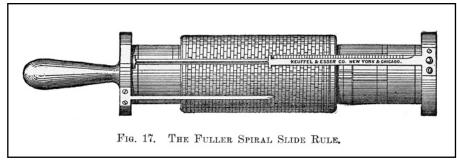
Publisher: American Institute of Weights and Measures

Edition: 2nd Language: English

Binding: original cloth boards; gilt spine

Pagination: [2] x, 229, [1] Collation:  $\pi^61-14^815^3$  Size: 230x150mm

Halsey was the commissioner of the American Institute of Weights and Measures. Prior to this position, he had been an associate editor of *American machinist* magazine.



Fuller's rule, H 9

Halsey sent questionnaires to people all around the world asking about their experience in using the metric system. He then used their responses to support his position against its adoption in the United States. He begins the work with a warning that:

Experience has shown ... that any general threat of arbitrary regulation of private lives goes unheeded until too late.

Illustrations available: Title page

### Н9

### Halsey, Frederick Arthur (1856–1935)

The use of the slide rule.

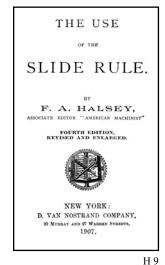
Year: 1907 Place: New York

Publisher: D. Van Nostrand

Edition: 4th Language: English Figures: 7 folding plates Binding: original paper wrappers Pagination: pp. 94, [6]

Size: 152x95 mm

This is an instruction manual on the use of the Mannheim type of slide rule. It consists of elementary instructions



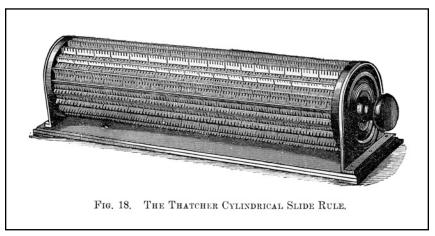


Circular slide rules, H 9

followed by reprints of articles that had previously appeared in the *American machinist*. It presents a brief description of two circular slide rules and both the Fuller and Thacher slide rules.

Illustrations available:

Title page Circular slide rules Fuller's rule Thacher's rule



Thacher's rule, H 9

### Ham, John, editor

See Coggeshall, Henry; The art of practical measuring.

 $H_{10}$ 

### Hamming, Richard Wesley (1915–1998)

Error detecting and error correcting codes. In Bell System Technical Journal, Vol. XXIX, No. 2, April 1950.

Year: 1950 Place: New York Publisher: AT&T Edition: 1st Language: English

Binding: original paper wrappers Pagination: pp. 147–160 Size: 230x153 mm

Hamming had studied mathematics at the Universities of Chicago and Nebraska before obtaining his Ph.D. from the University of Illinois in 1937. He worked at Los Alamos, where he was introduced to the use of digital computing machines. When he joined Bell Laboratories in 1946, he continued with his work in computers and also began to study the transmission of data from one machine to another.

This is a famous paper in which Hamming introduces a number of concepts fundamental to modern information theory. He proposed the Hamming code and defines the differences between one code and another in relation to error checking and correction.

Illustrations available:

# THE Practical Surveyor: Shewing, Ready and Certain Magnesos for Measuring, Mapping and Adorming All Sours of LANDS and WATERS, By the Several INSTRUMENTS Now in Use: PARTICULARLY, OF A NEW THEODOLITE; Very convenient to be used by those who are resolved to be Accurate, as well as Expriptious. TOGETHER WHO THEODOLITE; Were to be accurate, as well as Expriptious. With its Use in drawing the Passive type Affance of a Genetical State. With its Use in drawing the Passive type Affance of a Genetical State. With its Use in drawing the Passive type Affance of a Genetical State. Likewise, The Description and Use of an Universal Diat, whereby the Hour of the Dy, Sou's Adminsh, Assimal, &c. with the Variation of the Constant, is readily observed, to the greater Esscheed. By JOHN HAMM OND. The SECOND EDITION, Carafully Revejish, Corrected and Enderged; With the ADDITION of an APPENDIX, containing a New, Easy, and most Accurate Method of Surveying, Plating, and Coffine sys never till now made Public. By SAMUEL WARNER.

H 12

### H 11

### Hamming, Richard Wesley (1915–1998)

Some methods of solving hyperbolic and parabolic partial differential equations.

Year: 1951 Place: New York

Publisher: International Business Machines

Edition: 1st Language: English

Binding: original cloth boards; with dust jacket

Pagination: pp. [12], 13–148 Size: 280x213 mm

# See IBM-Hurd, Cuthbert C.; Proceedings-computation seminar-December 1949.

Illustrations available:

None

### H 12

### Hammond, John (fl.1731); Samuel Warner

The practical surveyor: Shewing, ready and certain methods for measuring, mapping and adorning all sorts of lands and waters, by the several instruments now in use: Particularly, of a new theodolite; very convenient to be used by those who are resolved to be accurate, as well as expeditious. Together... and by a sliding rule improved, all timbers, shrubs, &c.

Year: 1731 Place: London

Publisher: Printed for T. Heath

Edition: 2nd Language: English

Figures: engraved frontispiece, 12 engraved folding plates Binding: contemporary leather; brown leather label

Pagination: pp. viii, [8], 189, [3]

Collation: A–N<sup>4</sup> Size: 191x118 mm

Reference: Tay MP II, #264 p. 178

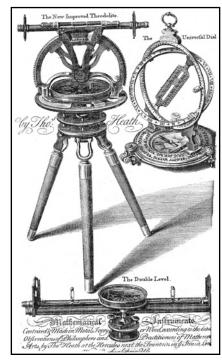
Edmund Stone ascribes this work to Samuel Cunn rather than to John Hammond. Hammond evidently served as a clerk to Charles Brent, who was a pupil of Cunn. It is thought that Brent provided Cunn's teaching notes to Hammond, who used them in writing this work. Cunn, who was a butcher in Newmarket, was evidently a skilled mathematician. The first edition appeared in 1725.

The book describes a new theodolite (illustrated in the engraved frontispiece) designed by the instrument maker J. Sisson. Cunn also worked with the instrument maker Thomas Heath, one of the best in London at the time, who published this book, as was not uncommon practice.

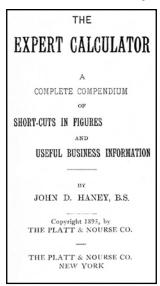
Unlike many of the earlier surveying books in this collection that concentrate on simple problems such as finding the heights of towers, this volume treats many

more difficult situations such as surveying shoals and sands, and creating colored perspective drawings of the results of the survey.

Illustrations available: Title page Frontispiece



Frontispiece, H 12



H 13

### H 13

### Haney, John D.

The expert calculator. A complete compendium of the short-cuts in figures and useful business information.

Year: 1893 Place: New York

Publisher: Platt & Nourse Company

Edition: 1st Language: English

Binding: original stamped cloth boards

Pagination: pp. 126 Size: 130x74 mm

This is a collection of arithmetic short cuts and formulae for simple calculations of business amounts, areas, etc.

Illustrations available:

Title page

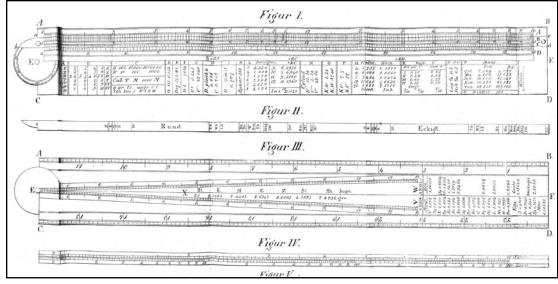


H 14

H 14

### **Harkort, Eduard** (1797–1835)

Plani-stereometrisches Scheiblineal. Beschreibung und Gebrauch eines Instrumentes, welches gewohnliche Rechnungen verrichtet, ferner den Flachen- und Cubicinhalt aller Arten Figuren un Korper berechnet, die absoluten Gewichte der letzern bestimmt, Masse und Gewichte verschiedener Lander in einander verwandelt u. s. w. und zugleich als Lineal, Dreieck, Maassstab, Transporteur, Proportionalzirkel und Logarithmentafel dient. Fur Kunstler und Handwerker des technischen Faches. Fur die Werkstatten der Artillerie, Ingenieure, Bau- Beamte, Mechaniker, Zimmermeister, Steinhauer, Kupfer und Blecharbeiter, Fabrikanten &c. Nach einer englischen Erfindung auf deutsche Maase angewandt, erlautert und mit neuen Bollkommenheiten versehen.



Coggeshall rule, H 14

Year: 1824 Place: Cologne

Publisher: Johann Peter Bachem

Edition: 1st Language: German Figures: 2 folding plates

Binding: half-bound marbled boards; red leather label

Pagination: pp. viii, 72 Collation:  $\pi^41-4^85^4$ Size: 214x125 mm

Reference: Pogg Vol. I, p. 1619

This book has been described as an early nineteenth-century work on the slide rule. While true, the device described would be better termed a *Coggeshall Rule* as it consists of a sector with a slide rule in one leg. The collection contains a number of descriptions of this instrument in English, but this is the only one in German.

Illustrations available:

Title page Instrument

### H 15

### Harmby, Richard

To mak a logarism. The invention of the logarithms is wholly given unto John Napper Baron of Merchiston in Scotland ... Mr. Edwrd Wright that famous mathematician translated them into English ... Mr. Stanley Brigge and Mr. Edmund Gunter went into Scotland to conferr with the worthy inventor ... How to reform them into an easier method ... Divers severall additions ... and the logarithms for sinds tangents secants ...

Year: [1676]

Edition: manuscript Language: English

Binding: contemporary leather

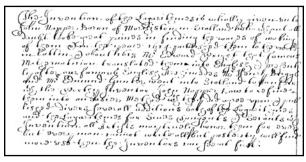
Pagination: pp. [102] Size: 300x192 mm

This manuscript begins with a discussion of logarithms and continues with all types of elementary mathematics, including geometry and gauging. At the start it appears to be a student's notebook; however, the later pages seem to be more of a workbook with tables copied from unknown sources. These are accompanied by brief explanations of their meanings. The manuscript appears to be in at least three different hands, and internal dates in problems can be found as early as 1615. The attribution of author and the date of 1676 come from an inscription reading:

To mak a logarithm - Richard Harmby - the order of the 28th of Novem: in ye 16 years of King Ch: 2:1 This order is wanting.

Illustrations available:

First page Inscription



First page, H 15

### Harris, Charles Overton (1909–)

Slide rule

b/w: **Bishop**; *Slide rule* 

Year: n/d Place: n/p Publisher: n/p Edition: 1st Language: Arabic

Binding: original printed paper wrappers

Pagination: pp. [4], 106 Size: 215x138 mm

This is an Arabic translation of a portion (?) of **C. C. Bishop**'s manual on the slide rule.

Illustrations available:

none

### H 17

### Harris, Charles Overton (1909–)

Slide rule simplified

Year: 1944 Place: Chicago

Publisher: American Technical Society

Edition: 1st Language: English

Binding: original cloth boards; with dust jacket

Pagination: pp. vii, [3], 250, 8

Size: 210x137 mm

Harris was an assistant professor of mechanics at the Illinois Institute of Technology.

This is a manual on the slide rule. To heighten its appeal to students, it is illustrated with cartoon drawings.

Illustrations available:

Title page

First page with cartoon



H 17



First page, H 17

### H 18

### Harris, Charles Overton (1909–)

Slide rule simplified

Year: 1946 Place: Chicago

Publisher: American Technical Society

Edition: 1st Language: English Binding: original cloth boards

Pagination: pp. vii, [3], 250, 8

Size: 210x136 mm.

This is another issue of Harris' 1944 work.

Illustrations available:

Title page

### H 19

### Harris, Charles Overton (1909–)

Slide rule simplified

Year: 1947 Place: Chicago

Publisher: American Technical Society

Edition: 2nd Language: English

Binding: original cloth boards; with dust jacket

Pagination: pp. vii, [3], 250, 8

Size: 210x136 mm.

This edition appears little changed from earlier ones.

Illustrations available:

Title page

### H 20

### Harris, John (1667–1719)

The description and uses of the celestial and terrestrial globes; and of Collins's pocket quadrant

Year: 1703 Place: London Publisher: printed by E. Midwinter for D. Midwinter and T. Leigh

Edition: 1st Language: English

Figures: engraved frontispiece; plate repeated Binding: modern leather; red leather label

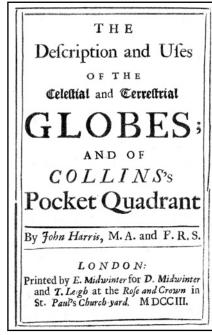
Pagination: pp. vi, 62, [4] Collation: A–D<sup>8</sup>E<sup>4</sup> Size: 167x86 mm Reference: H&L #9738

John Harris was a clergyman and mathematician who taught private pupils. He became a member of the Royal Society in 1696 and its secretary in 1709. He is known for producing the first technical encyclopedia (see the entry for **John Harris**, *Lexicon technicum*, 1704–1710). According to the Dictionary of National Biography, he was culpably improvident and was generally in distress. He died on 7 Sept. 1719 an absolute pauper.

About 1698, Harris began to give free public lectures. At the time of this publication, he was giving a *Course of my Publick Lectures at the Marine Coffee-House in Birchin-Lane*. He continued to give these free lectures until after 1704. Rather than attempting to explain the use of the globes and Collin's quadrant via any of the several books already on the market, he chose to produce a concise treatment of the subject suitable for:

Persons who would gladly know the best Uses of it, without being obliged to read over many Things which are little to their Purpose.

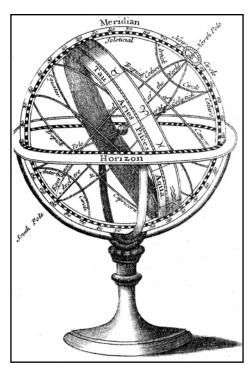
This volume proved to be popular and went through several editions.



H 20

The Globes described are the standard globe of the world and a, usually matching, celestial globe showing the constellations with their major stars. The globes are inscribed with a number of lines useful in solving problems in astronomy. These lines include of the horizon, the meridian, the zodiac, the tropics of Cancer and Capricorn, the equator, the equinoctial colure (the meridian passing through the equinoctial points) and often several others. When all sections of a celestial globe are removed except for these lines, one is left with a hollow device known as an Armillary Sphere (so called because the rings resemble bracelets). These lines are clearly marked on the Armillary sphere illustrated. This work discusses the use of these globes to solve elementary problems such as finding the sun's declination on a given day of the year.

Illustrations available: Title page Armillary sphere



Armillary sphere, H 20

H 21 **Harris, John** (1667–1719)

Lexicon technicum: or, an universal English dictionary of arts and sciences: Explaining not only the terms of art, but the arts themselves. (two volumes)

Year: 1704–1710 Place: London

Publisher: Dan Brown, Tim Goodwin, John Walthoe, Tho. Newborough, John Nicholson, Tho. Benskin, Benj. Tooke, Dan. Midwinter, Tho. Leigh and Francis Coggan Edition: 1st Language: English

Figures: v.1: engraved portrait frontispiece; title in red and black; 7 plates (2 folding) v.2: title in red and black; 7 plates (5 folding)

Binding: contemporary panelled inlaid leather; red leather label

Pagination: v.1: ff. [462]; v.2: ff [434]

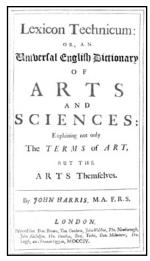
 $\begin{array}{l} Collation: v.1: \pi^1 a - c^4 B - 2 H^4 3 A - 3 Z^4 5 A - 7 N^4 7 O^1 (-702); v.2: \\ [a]^2 b^4 * = ***^2 B^4 C^1 \P a - \P t^2 C^3 D - P^4 Q^2 3 A - 3 X^4 3 Y^2 5 A - 5 Z^4 \\ 7 A - 7 G^4 7 H^2 A - N^2 O^1 A - 2 G^2 \Psi C - \Psi E^2 a - m^2 n^1 \end{array}$ 

Size: v.1: 320x200 mm; v.2: 317x205 mm Reference: Tay *MP II*, #58, p. 124; Horb *100*, #25

This is the first general scientific encyclopedia in any language. During its preparation, Harris consulted many of the leading figures of his day, including Newton on mathematics and astronomy (it includes an article by Newton on chemistry—his only published work on that subject), John Ray and Joseph Tournefort on botany, etc. It is arranged alphabetically, the first such English work to be so organized. Harris provided illustrations for many of his entries, and the book offers a wealth of knowledge about the technology of the day. The second volume contains tables of prime numbers (here called *Incomposit Numbers*), logarithms, logarithms of trigonometric functions and a listing of terms that appear in both volumes. This latter has no page numbers and so cannot properly be termed an index.

The first volume was originally published by subscription but proved so popular that copies were made generally available. The second volume was added in 1710. Five editions, with supplements, are known, the last being in 1744. The frontispiece (volume 1 only) is a fine portrait of Harris.

Illustrations available:
Title page Volume 1
Title page Volume 2
Frontispiece portrait of Harris



H 21



Frontispiece, H 21

H 22

### **Harris, Joseph** (1704–1764)

The description and use of the globes, and the Orrery. To which is prefixed, by way of introduction, a brief account of the solar system.

Year: 1731 Place: London

Publisher: Thomas Wright and Richard Cushee

Edition: 1st Language: English Figures: 7 folding plates

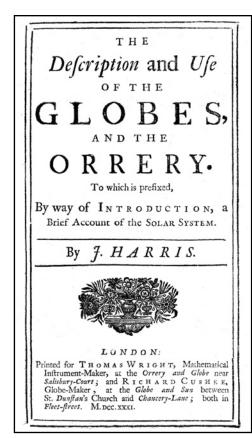
Binding: contemporary panelled inlaid leather

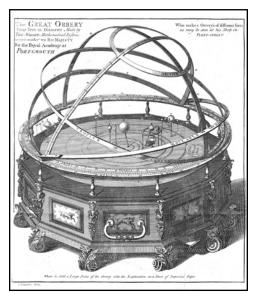
Pagination: pp. viii, 190 Collation: A<sup>4</sup>B–M<sup>8</sup>N<sup>7</sup> Size: 191x113 mm

Joseph Harris was the son of a Cornish blacksmith who also designed mathematical instruments. He moved to London and became a success as a teacher, author and mathematical instrument maker. He was appointed Assay-Master of the Mint at the Tower of London in 1748 (many have mistakenly called him Master of the Mint, which is a different position; nor was he ever elected to the Royal Society).

This is an expanded version of the small book on the Globes first written by **John Harris** (*The description and uses of the celestial and terrestrial globes*, 1703). Joseph Harris revised and extended that original book.

This work incorporates the original description of the globes by John Harris but is extended by the inclusion





Orrery, H 22

of a brief description of the solar system, and a long description of an Orrery. It does not include the Collins quadrant material from the original John Harris work.

Illustrations available: Title page

Orrery

H 23

### Harris, Joseph (1702–1764)

The description and use of the globes, and the orrery. To which is prefixed, by way of introduction, a brief account of the solar system.

Year: 1732 Place: London

Publisher: Thomas Wright and Richard Cushee

Edition: 2nd Language: English

Figures: folding engraved frontispiece; 6 folding plates

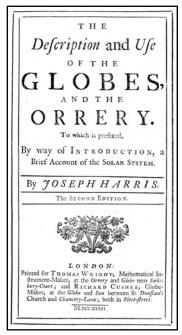
Binding: contemporary panelled leather

Pagination: pp. viii, 190 Collation: A<sup>4</sup>B–M<sup>8</sup>N<sup>7</sup> Size: 196x117 mm

This is the second edition of this popular work on the use of globes. See the entry for **Harris**, 1731, for more information. This is similar to the first edition with the exception that the plates are bound in different places.

Illustrations available:

Title page



H 23

H 24 Harrison, George R.

Improved design of the mechanical interval sorter and its application to the analysis of complex spectra. In The Review of Scientific Instruments with Physics News and Views, Vol. 4, No. 11, New series, November 1933.

Year: 1933

Place: Lancaster, PA

Publisher: American Institute of Physics

Edition: 1st Language: English

Figures: photo of machine in text Binding: original paper wrappers Pagination: pp. 581–586

Size: 268x201 mm

Harrison had previously (*Review of Scientific Instruments*, Vol. 3, 1932, p. 753) described an instrument for recording spectra on a punched paper tape. This earlier machine suffered several problems, not the least of which was the stretching of the friction-driven paper tape. In this new machine, he uses sprocket-driven paper tape and also introduces a number of other modifications to improve its performance. Photographs of the machine and diagrams of the tape drive mechanism are provided together with samples of the tape and machine output.

Illustrations available: First page

### H 25

### Harrison, Richard (1740–1781)

A new sett of logarithmic solar tables, calculated and constructed for determining the latitude at sea ...

b/w: **Haselden, Thomas**; The seaman's daily assistant, 1767

Year: 1768 Place: London

Publisher: Printed for J. Mount and T. Page

Edition: 2nd Language: English Binding: contempor:

Binding: contemporary leather Pagination: pp. 31, [1]

Collation:  $\pi^4$ B–D<sup>4</sup> Size: 202x154 mm

Reference: Win ESTC, #011128

Harrison, who was born in Whitehaven, was well known for these tables. It is unknown if he was related to John Harrison, who made the first accurate sea-going clocks, but he certainly mentions him in the preface to this work.

The problem of determining latitude at sea was much less difficult than determining longitude. Solving the latter would have to await the development of accurate sea-going clocks. Even the determination of latitude was difficult because it required (during the day) noting when the sun was at the highest point in the sky—at this time it is passing this position very slowly, and it is very difficult to determine its exact maximum altitude. These tables allowed seamen to take two observations and, knowing the exact time between the observations (which would not be as difficult as keeping accurate time over a period of many months), determine their latitude.

Harrison makes no claim of inventing these tables. The publisher has inserted a notice that Harrison *obtained them in Manuscript from an Hollander*. According to **Taylor** (*Practitioners*), they had been calculated by Cornelis Douwes of Amsterdam about 1740. The first edition of this work was published in 1759.

Illustrations available: Title page Sample table page

### A NEW SETT OF

## Logarithmic Solar Tables,

Calculated and constructed for determining the

# LATITUDE at SEA,

Taking two Altitudes either in the Forenoon or Afternoon, with the intermediate Time by a common Watch; and that with Ease and Accuracy, independent of the Sun's Meridional Altitude.

THIS MOST

Excellent and useful Performance, doth not only produce the true Latitude at any Time between Nine o'Clock in the Morning, and Three in the Afternoon; but also gives the true Time of the Day, when the greatest Altitude was taken to thirty Seconds by the Tables; and if a greater Degree of Accuracy is required, the same may be done by taking Proportional Parts.

W H E N C E T H E
S U N's true A Z I M U T H may be determined by One
fingle Proportion.

L O N D O N:
Printed for J. MOUNT, and T. PAGE on Tower-Hill, 1768.

H 25

-			Half		1	T			Half	(	
Н	M	ş	Elapfed Time	Middle Time	Rifing	Н	М	s	Elapfed Time	Middle Time	Rifin
0	0	30	2.66121	2.63982	9-37654 1 1	0	20	30	1 04901	4.25202	2.601
0	1	co	2.36018	2.94085	9.97860 } 8	0			1.03857		
0	1		2.18409						1.02838		
0	2	00	2.05916	3.24187	0.58066				1.01843		
0	2.	30	1.96225	3.33878	0-77445	0	22	30	1.00870	4.27233	2.682
0	3	00	1 88307	3.41796	0.93284	0	23	00	0.99918	4.30185	2.701
0	3	10	1.81613	3.48490	1.06673	0	23	30	0.98988	4.31115	2.720
0	4	00	1.75814	3.54289	1.18271				0.98077		
0	4	30	1.70700	3.59403	1.28502	0	24	30	0.97184	4-32919	2.756
0	5	QQ	1.66125	3.63978	1.37653	0	25	00	0.96310	4-33793	2.775
0	-5	30	1.61986	3.68117	1.45931				0.95454		

Sample table page, H 25

H 26

### Hart, Ivor Blashka (1889–)

Makers of science. Mathematics, physics, astronomy

Year: 1923 Place: London

Publisher: Oxford University Press

Edition: 1st Language: English

Figures: Photolith frontispiece Binding: original cloth boards

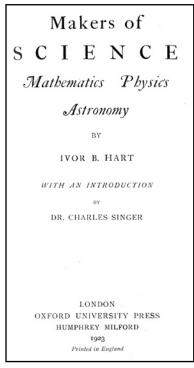
Pagination: pp. 320 Collation: A–V<sup>8</sup> Size: 192x124 mm



Frontispiece, H 26

This work contains a number of biographies of famous scientists. The reason for its inclusion in this collection is that it contains information on **Kepler**, **Gilbert** and **Galileo**. The frontispiece shows Gilbert demonstrating an experiment to Queen Elizabeth.

Illustrations available: Title page Frontispiece



Hartley, H. O., translator

See **Sabielny, H**; *Modern machine calculation with the Facit calculating machine Model Lx* 

### H 27

### Hartley-Smith, Sydney

Mechanical methods of calculation.

Year: 1946–1947 Place: London

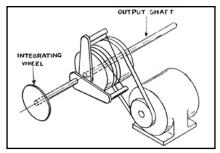
Publisher: Draughtsman Publishing

Edition: 1st Language: English

Binding: original printed paper wrappers

Pagination: pp. 48, [4] Size: 213x138 mm

This small pamphlet is an elementary introduction to methods of calculation ranging from finger reckoning to the differential analyzer. There are short descriptions, and a simple example, for Napier's bones, the Japanese abacus (soroban), a mechanical calculating machine of the **Leibniz** and Odhner design, the slide rule, devices



Torque amplifier, H 27

for differentiation and integration, and the differential analyzer. The work concludes with a short chapter on accuracy and error-checking schemes.

Illustrations available:
Title page
Differential analyzer diagrams



H 27

H 28

### Hartmuth, Maximilian

Vom Abakus zum Rechenschieber

Year: 1942 Place: Ingolstadt

Publisher: Boysen & Maasch

Edition: 1st Language: German

Binding: original paper wrappers Pagination: pp. [8], 138, [2]

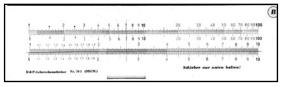
Collation:  $\pi^41-8^89^6$ Size: 236x152 mm

The first third of this book covers the history of calculating from the time of the Greeks and Romans to the work of Adam Riese and the European table abacus. The later sections are a manual on the use of a slide rule. The book comes with a small cardboard slide rule in a paper pouch inside the front cover and an answer book in a flap inside the rear cover.

Illustrations available:

Title page Slide rule

Illustration of Adam Reise's book



Cardboard slide rule, H 28



H 28

H 29

### Hartree, Douglas Rayner (1897–1958)

Automatic calculating machines. In The Mathematical Gazette, Volume XXXIV, No. 310, December 1950.

Year: 1950 Place: London

Publisher: G. Bell and Sons

Edition: 1st
Language: English
Figures: 2 photolith plates
Binding: contemporary buckram
Pagination: pp. 241–252
Size: 207x126 mm

Reference: Ran *ODC*, p. 421

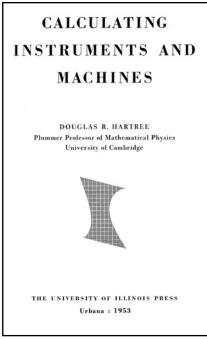
Douglas Hartree, although making no great advances in computers or computer science on his own, was the *eminence gris* behind the computer developments in Britain. His contacts and enthusiasm were the key ingredients in starting the computer project at the University of Manchester and later the continuation of the projects in Cambridge. He was educated at Cambridge but spent the early part of his career at the University of Manchester, where he was chairman of applied mathematics and later professor of theoretical physics. In 1946, he moved to Cambridge as the Plummer professor of mathematical physics. He is best known for his work in numerical analysis, particularly concerning the calculation of atomic wave functions of atoms with multiple electrons.

This is the text of a paper Hartree gave to the annual meeting of the Mathematical Association in January 1950. Starting with a short introduction mentioning

Babbage and contrasting how a manual computation differs from an automatic one, Hartree proceeds to describe the Harvard Mark I and the ENIAC. He then continues with an elementary example (the addition of a list of forty numbers) of programming for the Cambridge EDSAC. As the EDSAC had only become operational a few months earlier, this is a very early description of its operation.

Illustrations available:

Title page



H 30

H 30

### Hartree, Douglas Rayner (1897–1958)

Calculating instruments and machines

Year: 1953 Place: Urbana

Publisher: University of Illinois Press

Edition: 2nd Language: English

Figures: title in brown and black, figures in text

Binding: original cloth boards Pagination: pp. x, 138 Size: 254x169 mm Reference: Ran *ODC*, p. 421

This is a series of lectures Hartree gave at the University of Illinois in the fall of 1948. Hartree was known for the clarity of both his writing and lecturing. This presentation is no exception. The material covers both analog instruments (mainly various differential analyzers) and digital machines. Not only does he describe the famous machines such as Bush's differential analyzers, ENIAC

and Harvard Mark I, but he also deals with little known devices such as the **Mallock** machine for finding solutions to simultaneous linear equations. He also includes a short lecture on the history of each major development. The work ends with a discussion of the impact that electronic computation may have on numerical analysis.

Illustrations available:

Title page

Explanation of differential equations

Mallock machine diagram

### H 31

### Hartree, Douglas Rayner (1897–1958)

Calculating machines Recent and prospective developments and their impact on mathematical physics

Year: 1947 Place: Cambridge

Publisher: Cambridge University Press

Edition: 1st Language: English Figures: 2 half-tone plates Binding: original paper wrappers

Pagination: pp. 40 Size: 181x122 mm

Reference: Ran ODC, p. 421

This volume is the inaugural lecture of Douglas Hartree as Plummer Professor of mathematical physics at Cambridge University. It reports on information he acquired while on a research trip to the United States earlier in the year. During his visit he was able to use the new ENIAC to

# CALCULATING MACHINES Recent and Prospective Developments and their impact on Mathematical Physics

INAUGURAL LECTURE

BY

### D. R. HARTREE, F.R.S.

Plummer Professor of Mathematical Physics in the University of Cambridge

CAMBRIDGE AT THE UNIVERSITY PRESS 1947

H 31

solve a problem of integrating differential equations. He points out that the entire computation and punching of the result took less than four minutes, and it would have taken a human at least two days to simply write down the output produced during that time, let alone do any calculations. Such computing power must have seemed like a dream come true to his audience, but Hartree went on to describe the new machines under development that would be much easier to set up, be more flexible to use and, more importantly, have more storage for data than the ENIAC. The two photographs included are the usual publicity photographs of the ENIAC that were available from the U.S. Army at the time.

This lecture marks the introduction of the knowledge about electronic digital computing into Britain in much the same way as the Moore School Lectures, held in the summer of 1946, marked the introduction into the U.S. See Campbell-Kelly, M. and Williams, M. R.; *Moore School lectures. Theory and techniques for design of electronic digital computers*, Tomash Publishers, 1985.

Illustrations available: Title page



Manchester differential analyzer, H 32

### H 32

### Hartree, Douglas Raynor (1897-1958) and A. K. Nuttall

The differential analyser and its applications in electrical engineering. In Journal of the Institution of Electrical Engineers, Vol. 83, July–December, 1938.

Year: 1938 Place: London

Publisher: E. and F. N. Spon

Edition: extract Language: English

Figures: two large photos of the Manchester differential

analyzer Binding: disbound Pagination: pp. 648–656 Size: 268x 215 mm Modeled on the Bush Differential Analyzer at MIT, the construction of the University of Manchester Differential Analyser, the first in England, was supervised by Hartree. In this paper Hartree describes the basic elements of a differential analyzer and discusses its use in electrical engineering problems involving lightning arresters.

Illustrations available:

Title page

The Manchester University differential analyzer

The input table and integrators of the Manchester machine

### $H_{33}$

# Hartree, Douglas Raynor (1897–1958) and Arthur Porter (1910–)

The application of the differential analyser to transients on a distortionless transmission line. In Journal of the Institution of Electrical Engineers, Vol. 83, July–December, 1938.

b/w: **Hartree & Nuttall**; *The differential analyser and its applications in electrical engineering* 

Year: 1938 Place: London

Publisher: E. and F. N. Spon

Edition: extract Language: English Binding: disbound Pagination: pp. 643–647 Size: 268x 215 mm

Hartree and Porter report on an application of the Manchester University Differential Analyzer. This paper was intended to show the capabilities of the machine and is thus highly technical. Hartree makes a point of thanking the Department of Scientific and Industrial Research for a grant to hire a research assistant for the development of the differential analyzer. That assistant was Arthur Porter.

Illustrations available: Title page

### H 34

### Hartree, Douglas Rayner (1897–1958)

The ENIAC, an electronic calculating machine. In Nature, Vol. 157, No. 3990, April 20, 1946.

Year: 1946 Place: London

Publisher: Macmillan & Co.

Edition: 1st Language: English

Binding: three-quarter bound buckram

Pagination: p. 527–527 Size: 250x160 mm Reference: Ran *ODC*, p. 421 After the wartime secrecy had been removed from ENIAC, Hartree was the first to get news of it into a scientific journal. This short note simply announced ENIAC's existence. Hartree immediately set off for the U.S. and managed to not only see the ENIAC but also use it to run a problem. On his return, he wrote a much longer paper for *Nature* (see entry for **Hartree**, The ENIAC, an electronic calculating machine, October 1946).

Illustrations available: None

H 35

### Hartree, Douglas Rayner (1897–1958)

The ENIAC, an electronic computing machine. In Nature, Vol. 158, No. 4015, October 12, 1946.

> Year: 1946 Place: London

Publisher: Macmillan & Co.

Edition: 1st Language: English Binding: buckram Pagination: pp. 500-506 Size: 248x165 mm Reference: Ran ODC, p. 421

See the previous Hartree entry for the history of this paper. When Hartree visited the U.S., he was permitted to thoroughly examine ENIAC and also to use it for integration of differential equations. This paper is a description of ENIAC and its capabilities. It is one of the earliest descriptions of the full machine and ranks with the Goldstine and Goldstine paper (Mathematical Tables and Other Aids to Computation, Vol. 2, pp. 97– 110) as a major early source of information about the ENIAC.

Illustrations available: None

H 36

### Hartree, Douglas Rayner (1897–1958)

A great calculating machine: The Bush differential analyser and its application in science and industry. In Royal Institution of Great Britain, Weekly Evening Meeting.

> Year: 1940 Place: London

Publisher: Royal Institution of Great Britain

Edition: 1st Language: English

Figures: 8 figures in text, 5 photolith plates

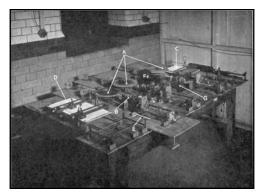
Binding: self-wrappers Pagination: pp. 28, [2], [2] Collation: no collation Size: 216x140 mm

This is a description of the Bush Differential Analyzer and of the copy that was built at Manchester University. Typical of Hartree's work, this is a sophisticated treatment of a complex topic yet he manages to keep mathematics to a minimum so that it may be readily understood by a reader with only limited exposure to differential equations. He ends with an example of the running time of a train over a particular route—the times are, of course, dependent on the power produced by the engine, the load on the train and the gradient profile of the track. The example clearly shows the power of the differential analyzer while still being understandable by the interested layman.

Illustrations available:

Title page

Differential analyzer at Manchester University Integrators and torque amplifiers of the Manchester machine Input table of the Manchester machine The Meccano differential analyzer



Meccano (Erector Set) differential analyzer, H 36

### Hartree, Douglas Rayner (1897–1958)

A historical survey of digital computing machines. In A discussion on computing machines. In Proceedings of the Royal Society of London. Series A. Mathematical and physical sciences. Vol. 195.

> Year: 1949 Place: London

Publisher: Cambridge University Press

Edition: 1st Language: English Figures: 15 lithograph plates Binding: contemporary cloth boards

Pagination: pp. iv, 556

Collation:  $\pi^21-8^89^310-16^817^918-34^835^{10}$ 

Size: 245x160 mm Reference: Ran ODC, p. 421

This is part of a panel discussion on automatic computing machines held by the Royal Society on March 4, 1948.

The panel consisted of six people: **D. R. Hartree**, **M. H. A. Newman**, **M. Wilkes**, **F. C. Williams**, **J. H. Wilkinson** and **A. D. Booth**. All were computer pioneers. In his remarks, Hartree surveys the field and mentions Babbage, Aiken, Bell Laboratories machines and ENIAC.

Illustrations available:

None

H 38

### Hartree, Douglas Rayner (1897–1958)

Numerical analysis

Year: 1952 Place: Oxford

Publisher: Clarendon Press

Edition: 1st Language: English

Binding: original cloth boards; spine gilt

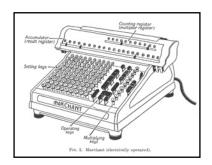
Pagination: pp. xiv, 288 Collation: A<sup>7</sup>B–T<sup>8</sup> Size: 236x150 mm

Hartree wrote this textbook at the beginning of the computer era. It is a traditional pre-computer text in that it includes the tools of desk calculators, tables, slide rules, etc. However, it does rank as a turning point text in that Hartree also included a final chapter on the organization of calculations for an automatic machine.

Illustrations available:

Title page

Illustrations of 3 desk calculators





H 38

H 39

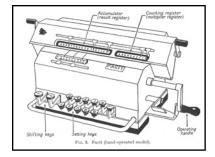
### Hartree, Douglas Rayner (1897–1958)

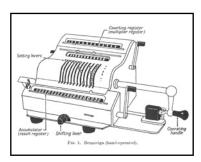
Recent developments in calculating machines. In Journal of Scientific Instruments, Vol. 24, No. 7, July 1947.

Year: 1947 Place: London

Publisher: The Institute of Physics

Edition: 1st Language: English Binding: library buckram Pagination: pp. 172–176 Size: 264x190 mm





Marchant, Facit and Brunsviga calculators, H 38

This paper represents the content of a lecture Hartree delivered to the Manchester branch of the Institute of Physics on January 10, 1947. During the summer of 1946, Hartree had visited the latest computing machine developments in the United States. He describes the new differential analyzer at the Massachusetts Institute of Technology, the IBM Automatic Sequence-Controlled Calculator at Harvard University and the ENIAC at the University of Pennsylvania. The latter was the only machine completed and operating at the time of Hartree's visit. In addition to these major projects, Hartree mentions in passing other analog and digital computer developments then underway in the U.S.A.

Illustrations available:

None

H 40

### Hartung, Maurice Leslie (1902-)

How to use dual base log log slide rules

Year: 1947

Place: Santa Barbara, CA Publisher: Pickett Edition: unknown Language: English

Binding: original paper wrappers

Pagination: pp. 93, [3] Size: 214x135 mm

Hartung was a professor of the teaching of mathematics at the University of Chicago. This is a standard manual on the use of the slide rule. It was written for the Pickett company.

Illustrations available:

Title page

H 41

### Hartung, Maurice Leslie (1902–)

How to use log log slide rules

Year: 1953

Place: Santa Barbara, CA Publisher: Pickett Edition: 1st Language: English

Binding: original paper wrappers

Pagination: pp. 95, [1] Size: 216x140 mm

This has the identical title as the sixty-two-page version (H 42). It also contains an eight-page supplement, printed on light green paper, on the use of the Pickett Model 803 Log Log Dual Base Speed Rule.

Illustrations available: Title page (color) H 42

### Hartung, Maurice Leslie (1902–)

How to use log log slide rules

Year: 1953 Place: Chicago

Publisher: Pickett & Eckel

Edition: 1st Language: English

Binding: original paper wrappers

Pagination: pp. 62, [2] Size: 216x140 mm

This is a modification of Hartung's 1947 slide rule manual.

Illustrations available:

Title page

H 43

### Hartung, Maurice Leslie (1902-)

How to use Pickett trig slide rules

Year: 1953 Place: Chicago

Publisher: Pickett & Eckel

Edition: 1st Language: English

Binding: original paper wrappers

Pagination: pp. 40 Size: 216x140 mm

The first part of this instruction manual is the same as that of Hartung's other manuals. The last part deals with the trigonometric scales, complex numbers and vector methods.

Illustrations available: Title page (color)



H 43

### **Harvard University Computation Laboratory**

A manual of operation for the Automatic Sequence Controlled Calculator, vol.1 of Annals of the Computation Laboratory of Harvard University

Year: 1946

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English

Figures: 17 photographic plates Binding: original boards; with dust jacket

Pagination: pp. [xiv], 561 Collation: no collation Size: 267x197 mm

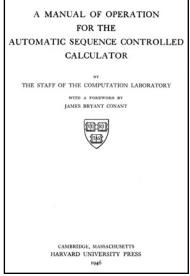
Howard H. Aiken (1900–1973), a professor at Harvard, initially wanted to have an automatic calculating machine to help with problems in his research area, atomic physics. After several unsuccessful attempts, he managed to gain the interest of Thomas J. Watson, Sr., president of IBM, in the project. Watson viewed the project as an opportunity to showcase the engineering skill of IBM rather than as a potential product development. Work began on the machine at IBM's Endicott factory in 1939. The design called for building the machine with standard IBM components, but several items were eventually specially created for this project. When the machine was working at IBM in January of 1943 (it was moved to Harvard, in May of 1944), it was 50 feet long and contained 500



Harvard Mark I, H 44



Harvard Mark I, H 44



H 44

miles of wire and 750,000 individual components. It could store 72 numbers, each of 24 digits plus sign, and had a set of 60 constant registers set by rotating switches. The machine was controlled by a punched paper tape reader that could read and execute instructions at the rate of three additive operations per second (multiplication and other operations took longer). Multiplication and division were done by a special unit that was essentially a set of Napier's bones implemented in relay technology. The machine was known as the Automatic Sequence Controlled Calculator, or the Mark I for short. It was the second automatically controlled calculating device ever constructed—the first being the Z3 created by **Konrad Zuse** in 1941. The Mark I was, by far, the larger and more influential of these two machines.

This volume, the first in a series of reports from the Harvard Computational Laboratory (the forty-first, and last, of which appeared in 1967), is a detailed description of the machine and its operation. It begins with a brief history of attempts at automatic control of calculation and notes that Harvard owned a set of gears that had been produced for Babbage's Difference Engine. The work then provides details of the Mark I hardware and gives examples of coding for non-trivial problems and an extensive bibliography. Although authorship of all the Harvard Reports was credited as by the staff of the Computation Laboratory, this particular volume was written mainly by Lt. Grace M. Hopper with parts authored by Howard Aiken, Robert Campbell and Richard Bloch—all people who were to become well known as computer pioneers.

The other volumes in this series are mainly (with the exception of volumes 16, 24–27, 29, 30) tables of

functions that had been calculated by the Mark I. As many of these were tables of Bessel Functions, the machine became known affectionately as *Bessie*.

Illustrations available:

Title page

Babbage difference engine gears View of Mark I from left View of Mark I from right

H 45

### **Harvard University Computation Laboratory**

Tables of the modified Hankel functions of order onethird and of their derivatives, vol. 2 of Annals of the Computation Laboratory of Harvard University

Year: 1945

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st

Language: English

Binding: original boards; with dust jacket

Pagination: pp. xxxvi, 235 Size: 266x199 mm

Although this is noted as Volume 2, it actually appeared prior to Volume 1, which was still in preparation at the time.

Illustrations available:

None

H 46

### **Harvard University Computation Laboratory**

Tables of Bessel functions of the first kind of orders two and three, vol. 4 of Annals of the Computation Laboratory of Harvard University

Year: 1947

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [10], ? Size: 268x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 47

### **Harvard University Computation Laboratory**

Tables of Bessel functions of the first kind of orders four, five, and six, vol. 5 of Annals of the Computation Laboratory of Harvard University

Year: 1947

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. xii, ? Size: 269x198 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 48

### Harvard University Computation Laboratory

Tables of Bessel functions of the first kind of orders seven, eight and nine, vol. 6 of Annals of the Computation Laboratory of Harvard University

Year: 1947

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st

Language: English Binding: original boards Pagination: pp. [x], ? Size: 268x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 49

### Harvard University Computation Laboratory

Tables of Bessel functions of the first kind of orders ten, eleven, and twelve, vol. 7 of Annals of the Computation Laboratory of Harvard University

Year: 1947

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [x], ? Size: 268x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 50

### Harvard University Computation Laboratory

Tables of Bessel functions of the first kind of orders thirteen, fourteen, and fifteen, vol. 8 of Annals of the Computation Laboratory of Harvard University

Year: 1947

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [x], ? Size: 268x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 51

### Harvard University Computation Laboratory

Tables of Bessel functions of the first kind of orders sixteen through twenty-seven, vol. 9 of Annals of the Computation Laboratory of Harvard University

Year: 1948

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [xii], ? Size: 267x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 52

### **Harvard University Computation Laboratory**

Tables of Bessel functions of the first kind of orders twenty- eight through thirty-nine, vol. 10 of Annals of the Computation Laboratory of Harvard University

Year: 1948

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [xii], 694 Size: 267x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 53

### Harvard University Computation Laboratory

Tables of Bessel functions of the first kind of orders forty through fifty-one, vol. 11 of Annals of the Computation Laboratory of Harvard University

Year: 1948

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [xii], 620 Size: 267x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 54

### **Harvard University Computation Laboratory**

Tables of Bessel functions of the first kind of orders fifty-two through sixty-three, vol. 12 of Annals of the Computation Laboratory of Harvard University

Year: 1949

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [xii], 544 Size: 266x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 55

### **Harvard University Computation Laboratory**

Tables of Bessel functions of the first kind of orders sixty-four through seventy-eight, vol. 13 of Annals of the Computation Laboratory of Harvard University

Year: 1949

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. [x], 566 Size: 266x197 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 56

### **Harvard University Computation Laboratory**

Proceedings of a symposium on large-scale digital calculating machinery, vol.16 of Annals of the Computation Laboratory of Harvard University

Year: 1948

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Figures: 1 plate

Binding: original boards; with dust jacket

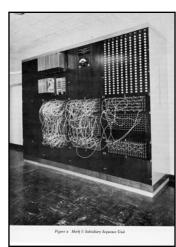
Pagination: pp. xxx; 302 Size: 267x197 mm

Reference: Ran ODC, p. 408, 410

This volume is the proceedings of a conference held at Harvard 7–10 January, 1947. It was certainly one of the earliest computer conferences on record and gives a very clear indication of the state of the art just prior to the creation of the stored program computer. The conference began with the usual speeches by dignitaries, but the first technical session was a presentation on the work of Charles Babbage by one of his descendents, Richard H. Babbage. After presentations on the Harvard Mark I and II, the ENIAC and the Bell Laboratories relay computer, there were presentations on subjects critical to the stored program, particularly storage devices such as delay lines, CRT storage and the Selectron. The final sessions were devoted to topics in numerical analysis, magnetic recording and coding techniques for the expected machines.

Illustrations available:

Mark I subsidiary sequence unit Bell Labs relay computer Mark II relay bays Mark II control station



Mark I subsidiary sequence control, H 56

H 57

### **Harvard University Computation Laboratory**

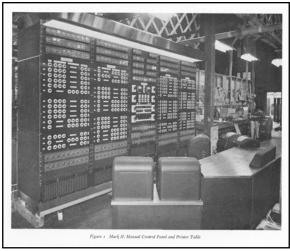
Tables of inverse hyperbolic functions, vol. 20 of Annals of the Computation Laboratory of Harvard University

Year: 1949

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English



Mark II control, H 56

Binding: original boards Pagination: pp. [xx], 290 Size: 267x194 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

H 58

### **Harvard University Computation Laboratory**

Description of a relay calculator, vol. 24 of Annals of the Computation Laboratory of Harvard University

Year: 1949

Place: Cambridge, MA

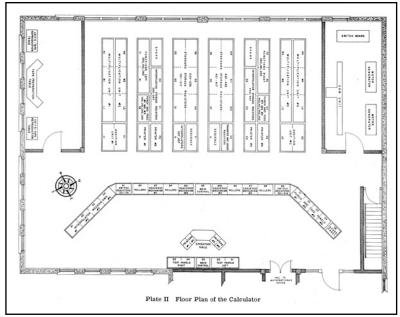
Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. xvi, 366 Size: 267x200 mm

Volume 1 of this series was a description of the original Mark I, and similarly this volume is a description of the Mark II calculator designed and built for the Naval Proving Ground in Dahlgren, Virginia. Grace Hopper started to author this volume, but it was completed by other staff members.

This machine became famous for a moth that disrupted its operations after being trapped in the contacts of a relay. Grace Hopper, in a humorous mood, noted in the log book that it was *the first actual bug found in the machine*. However, the term *bug* was actually in use long before this time, so the attribution of its origin to Grace Hopper is unwarranted.

Illustrations available: A view of the Mark II A diagram of Mark II



Harvard Mark II, H 58

### Harvard University Computation Laboratory

Description of a magnetic drum calculator, vol. 25 of Annals of the Computation Laboratory of Harvard University

Year: 1952

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English

Figures: Frontispiece photograph of the Mark III Binding: original boards; with dust jacket

Pagination: pp. [xiv], 318 Size: 266x191 mm

Volumes 1 and 24 of this series are the descriptions of the Harvard Mark I and Mark II calculators, and this volume is the description of the Mark III (magnetic drum) calculator.

The Mark III, like the Mark II, was designed and built for the Bureau of Ordnance of the U.S. Navy. Unlike the Mark II, which was based on relay technology, the Mark III utilized electronic components. The machine, which was completed in March 1950, was operational at Dahlgren Proving Ground about a year later. It remained in use for several years and ended its days by being scrapped and buried in a farmer's field (see *IEEE Annals of the History of Computing*, Vol. 22, Number 2, 2000).

The illustration on the dust jacket (a cartoon of the machine by Artzybasheff—see illustrations) also appeared on the cover of *Time Magazine*.

Illustrations available:
Dust jacket cover cartoon
Photo of Mark III



Harvard Mark III, H 59



Artzybasheff cartoon, H 59

### **Harvard University Computation Laboratory**

Proceedings of a second symposium on large-scale digital calculating machinery, vol.26 of Annals of the Computation Laboratory of Harvard University

Year: 1951

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. xl, 393, [1] Size: 267x200 mm Reference: Ran *ODC*, p. 440

This volume is the proceedings of a conference held at Harvard 13–16 February, 1949. Notable are the papers presented on memory systems (both magnetic delay lines and electrostatic systems), the beginnings of semi-automatic coding systems and descriptions of machines from MIT (Whirlwind), Bell Labs (Model VI), Raytheon and General Electric.

Illustrations available:

None

H 61

### Harvard University Computation Laboratory

Synthesis of electronic computing and control circuits, vol. 27 of Annals of the Computation Laboratory of Harvard University

Year: 1951

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. viii, 278 Size: 267x193 mm

This volume contains material related to the mathematical methods for the investigation of the behavior of electronic circuits. It stemmed from a course of lectures, given by Howard Aiken at Harvard in the spring of 1948.

Illustrations available:

None

H 62

### **Harvard University Computation Laboratory**

Proceedings of an international symposium on the theory of switching, Part I. Vol. 29 of Annals of the Computation Laboratory of Harvard University

Year: 1959

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. xl; 305 Size: 266x194 mm

This volume and volume 30, which forms part II of the material, are the proceedings of a conference held at Harvard April 2–5, 1957. While there are many interesting papers and reports from different parts of the world, including the Soviet Union (which was unusual at the time), none of them can be identified as fundamental advances in the technology of computing.

A second copy of this volume is also in the collection.

Illustrations available:

None

H 63

### **Harvard University Computation Laboratory**

Proceedings of an international symposium on the theory of switching, Part II. Vol. 30 of Annals of the Computation Laboratory of Harvard University

Year: 1959

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. x, 345 Size: 267x193 mm

See the entry for Volume 29 of this series.

Illustrations available:

None

H 64

### **Harvard University Computation Laboratory**

Tables of the cumulative binomial probability distribution, vol. 35 of Annals of the Computation Laboratory of Harvard University

Year: 1955

Place: Cambridge, MA

Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. lxii, 503 Size: 266x193 mm

See the entry for Volume 1 of this series.

Illustrations available:

None

### Harvard University Computation Laboratory

Tables of the function arc sin z, vol. 40 of Annals of the Computation Laboratory of Harvard University

Year: 1956

Place: Cambridge, MA

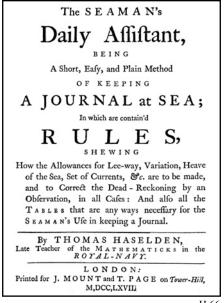
Publisher: Harvard University Press

Edition: 1st Language: English Binding: original boards Pagination: pp. xxxviii, 586 Size: 266x193 mm

See the entry for Volume 1 of this series.

Illustrations available:

None



H 66

H 66

### Haselden, Thomas (fl.1702–1740)

The seaman's daily assistant, being a short, easy, and plain method of keeping a journal at sea; In which are contain'd rules shewing how the allowances for leeway, variation, heave of the sea, set of currents, &c. are to be made, and to correct the dead-reckoning by an observation, in all cases: and also all the tables that are any ways necessary for the seaman's use in keeping a journal.

b/w: **Harrison, Richard**; A new sett of logarithmic solar tables, calculated and constructed for determining the latitude at sea ..., 1768.

Year: 1768 Place: London

Publisher: Printed for J. Mount and T. Page

Edition: 2nd Language: English

Binding: contemporary leather Pagination: pp. [8], 160 Collation: A–X<sup>4</sup> Size: 202x154 mm

Haselden was a schoolmaster, first in Wapping, then as headmaster of the Royal Academy at Portsmouth. In 1722, he describes himself as *Teacher of mathematics to His Majesty's Volunteers in the Royal Navy*.

This is an instruction book for keeping a journal at sea. It contains all the tables necessary for navigation plus others for determining times of high water, etc. According to **Taylor** (*Practitioners*), the Board of Longitude provided a copy of this book for Captain James Cook.

Illustrations available: Title page

H 67

### Hassler, Ferdinand Rudolph (1770–1843)

Logarithmic and trigonometric tables; to seven places of decimals, in a pocket form. In which the errors of former tables are corrected.

Year: 1830 Place: New York

Publisher: C. & G. & H. Carvill

Edition: 1st Language: English

Binding: contemporary leather Pagination: pp. 12, [312] Collation: 1–27<sup>6</sup> Size: 168x104 mm

Reference: Karp *MWPA*, p. 316; Hend *BTM*, #137 p. 112; May *BRM*, p. 187

Hassler was a Swiss geodesist who emigrated to the United States. He was considered a skillful experimenter and was employed to construct the first federal measurement standards. He later became the first superintendent of the U.S. Coast and Geodetic Survey. Cajori (Slide rule) indicates that he had a homemade slide rule with the logarithmic scales broken into many separate lines so that a two-foot rule could contain a logarithmic scale of an effective length of twenty feet. May (Bibliography and research manual of the history of mathematics) lists a work by F. Cajori (The Chequered Career of F. R. Hassler, Boston, 1928), but we have been unable to consult this volume.

This is a set of seven-place logarithm and trigonometric tables. They were produced in five different versions: Latin, English, French, German and Spanish. This is the English version. A short introduction is followed by a table of useful formulae. The title pages for the tables are

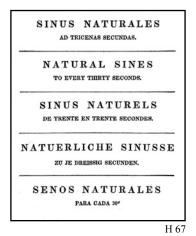
### Erwin Tomash Library

given in each of the five languages, with the exception that, at least in this copy, there is no title page for the table of logarithms. Henderson (Bibliotheca) reports that Gauss reviewed these tables and considered that the type was too small for frequent use but that they reached a high standard of accuracy. Glaisher (Report on mathematical tables) points out that they still retain two of the known errors inherited from Vlacq (Arithmetica logarithmica, 1628).

Illustrations available: Title page Title page for sines Sample log page table.



H 67



H 68

### Hastings, Cecil Jr. (1920–)

Approximations for digital computers

Year: 1955 Place: Princeton

Publisher: Princeton University Press

Edition: 1st

Language: English

Binding: original cloth over boards

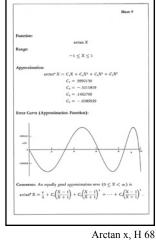
Pagination: pp. viii, 204 Size: 235x150 mm

Hastings was an English mathematician employed by Rand Corporation.

As part of the computer work Rand did for the U.S. Air Force, he developed a series of mathematical approximations for various functions. His work was first described at meetings of the Digital Computer Users Association, an informal Southern California organization (incorrectly named in the preface as Digital Computers Association) in 1953. Hastings lectured, using a filmstrip, about these approximations and also had made available a series of loose sheets containing the formulae and error curves. This publication is an extended version of that lecture. The first part, still illustrated like a filmstrip, discusses the Chebyshev approximations, and the last half essentially reproduces the sheets, one for each function. This was a very useful tool in the late 1950s and early 1960s, when computers did not have a large library of built-in numerical functions.

Illustrations available: Title page Approximation sheet for arctan x

# APPROXIMATIONS FOR DIGITAL COMPUTERS BY CECIL HASTINGS, JR. ASSISTED BY IEANNE T. HAYWARD JAMES P. WONG, JR. PRINCETON, NEW JERSEY



APPROXIMATIONS FOR DIGITAL COMPUTERS

H 68

H 69 **Hatton, Edward** (ca.1664–1729)

PRINCETON UNIVERSITY PRESS

1955

Arithmetick; or, the ground of arts: teaching that science, both in whole numbers and fractions. *Theor[et]ically and practically applied in the operation* and solution of questions in numeration, addition,

subtraction, multiplication, division, the rules of proportion, fellowship, barter, rules of practice, exchange of coin, loss and gain, tare, trett, and other questions relating to weights and measures, lengths and breadths, equation of payments, commission to factors, rules of alligation, and of false position, &c. Originally composed by Dr. Record, and others, and now perused, corrected, new methodized, much improved; and thereto added, I. A new treastise of decimals, with the demonstration of each rule. and the relation it has to vulgar fractions; also why decimals are wrought as whole numbers &c. II. Tables of simple and compound interest, with the manner of calculation, and use thereof in resolving all the most necessary questions, concerning interest and discount of money; the purchasing or selling of estates, in land or houses, in present, or reversion, in fee or for time limited, and for fining off rent, &c. III. The easiest method of extracting the square and cube-roots of numbers, whole or broken, and the use thereof in many material instances.

Year: 1699 Place: London

Publisher: J.H. for Charles Harper and William Freeman

Edition: 1st Language: English

Figures: engraved portrait frontispiece

Binding: later half-bound mottled leather marbled boards; red leather label; from the Kenney collection

Pagination: in 2 parts: 1: pp. [14], 204; 2: pp. [2], 82 Collation: in 2 parts: 1:  $\pi^3A$ –2C<sup>4</sup>2D<sup>2</sup>; 2:  $A^2B$ – $L^4$ 

Size: 223x161 mm

Reference: Win ESTC, R. 649

Edward Hatton operated a mathematical school in Stourbridge, Worcestershire. He is best known for several other publications on arithmetic as well as the production of various tables relating to commerce and



Frontispiece, H 69

taxes. He notes in the preface to *A mathematical manual*, 1718, that his other publications had sold more than 40,000 copies as well as several thousand copies of four other books that he edited. He also notes that he has been dissatisfied with the regard in which he was held by his peers for these commercial-oriented works. He indicates that

...the Author of a Play or whimsical Novel shall sooner meet with the Reward of considerable Business, or an Employment of Profit than he who has spent more than half an Age of Sixtythree Years in Studies which tend very greatly to the Knowledge and Increase of Trade and Merchandizing, the principle Instruments of the Nation's Grandeur and Riches.

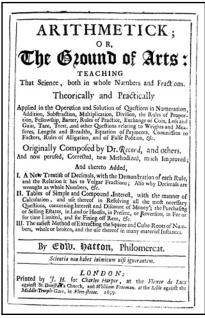
While we often find this sentiment in older individuals (e.g., Charles Babbage also held this view in later life), there is some truth to the statement.

This is the last edition of **Recorde**'s *The ground of arts*. It contains only that portion dealing with arithmetic using the Hindu-Arabic numerals and omits any mention of the table abacus, merchant's numerals, finger reckoning, etc. This volume contains a portrait of Edward Hatton as a frontispiece.

See also the entry for **Hatton**, *Decimals made easie*, 1699, which is bound with this work.

Illustrations available:

Title page frontispiece





H 70 **Hatton, Edward** (ca.1664–1729)

Comes commercii, or the trader's companion.
Containing, I. An exact and useful table, shewing the value of any quantity of goods or wares ... II. A table calculated for universal use, which use is shewn ...
III. The manner of casting up dimensions in general ... IV. The several customs used by surveyors and measurers ... V. Instructions for entering goods at the custom-house ... VI. Concerning water-side business, and the constitution of keys, wharfs ... VII. Rules concerning freight ... VIII. Concerning insuring ships, merchandizes ... To which is added a supplement concerning simple and compound interest ...

Year: 1754 Place: London

Publisher: W. Innys et al.

Edition: 9th Language: English Figures: 1 folded plate

Binding: contemporary panelled calf; repaired; spine worn Pagination: pp. [8], [229], 230–318, [2], [72], 73–90, [2]

Collation: A–3F<sup>4</sup>3G<sup>2</sup> Size: 177x72 mm This is a ready reckoner that has been augmented by descriptions of commercial activity and its proper conduct. Subjects covered range from the measurement of brick work and the fines to be paid by various traders not keeping standard measures available, to the clearing of goods through customs houses. A supplement gives a table of simple and compound interest for all values from 1 shilling to 1,000 pounds and from one day to a year from 3 to 5 percent.

Illustrations available:
Title page
Ready reckoner interest table

181	M	P	LE IN	T	E	REST							
101	at 3 per Cent.												
	at 3 per cent.												
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cipal :		_	- Dave	12 Days.									
Mo-	11 Days.			12 Days.									
ney.	١,		1 - 7	1.		d. q. Parts.							
	7.	5.	d. q. Parts.	1	5.								
5. 1	٥	C	0 0.04339	0	0	0 0.04734							
2	0	0	0 0.08678	0	0								
3	0	0	0 0.13017	0	0	0 0.14202							
4	0	0	0 0.17356	0	0	0 0.23670							
5 6	0	0	0.0.21695	9	0								
	0	0	0 0.26634	.0	0								
7 8	0	0	0 0.30373	0	0	o c.33138							
	0	0	0 0.34712	0	٥	0 0.42606							
9	0	0	0 0.39051	0	0								
10	۰	0	0 0.43390	0	٥	0 0.47340							
11	0	0	0 0.47729	0	٥	0 0.52074							
12	٥	0	0 0.52068	0	0	0 0.50000							
13	0	0	0 0.56407	0	0	0 0.61542							
14	0	0	0 0.60746	0	0								
15	0	0	0 0.65085	O	0	0 0.71010							
16	0	0	0 0.69424	0	0	0 0.75744							
17	0	0	0 0.73763	0	0	0 0.80478							
18	0	0	0 0.78102	0	0	0 0.85212							
19	0	0	0 0.82441	0	.0	0 0.89946							
lib. I	0	,0	0 0.86780	0	0	0 0.94680							
2	0	0	0 1.7356	0	0	0 1.8936							

Sample table, H 70

H 71 **Hatton, Edward** (ca.1664–1729)

Decimals made easie: containing. I. an explanation of fractions in general, more especially decimals, and how to read or write any fraction whatsoever. II. reduction, addition, subtraction, multiplication, division, and the rules of proportion in decimals, with the demonstration of each, and its relation to the rules for working vulgar fractions. III. the reason why decimals are wrought as whole numbers. IV. the excellency of decimal fractions above any other fraction that can possibly be invented, proved by several instances. V. the particular use thereof in computing the interest (simple or compound, or discompt) of money, and rules for purchasing or selling an estate, whether in fee, or for lives or years, demonstrated in the solution of the most useful cases, with proper tables relating thereto. VI. The most easie method of extracting the square and cube-roots of numbers, whole or broken, and the use thereof in solving several geometrical questions. Wherein are many things never before made publick. Useful for

masters and scholars; also for lawyers and scriveners, or as a foundation for any one that intends to acquire considerable knowledge in the mathematics by his own industry.

b/w: [Recorde] – Hatton; Arithmetick; or, the ground of arts, 1699

Year: 1699 Place: London

Publisher: J.H. for Charles Harper

Edition: 1st Language: English

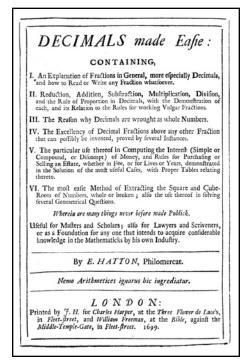
Binding: later half-bound mottled leather marbled boards; red

leather label; from the Kenney collection

Pagination: pp. [2], 82 Collation: A<sup>2</sup>B–L<sup>4</sup> Size: 223x161 mm

This is the second part of this volume (see b/w note above) with separate title page and pagination. It appears here for the first time and is recorded separately by other bibliographers (e.g., Wing H.1145). This was a useful addition to **Recorde**'s *The ground of arts* in that it explained decimal fractions and their use. Hatton continues his emphasis on commercial arithmetic by including a chapter on interest (with a table of simple interest at 6 percent and one of compound interest at 10 percent), although he concludes with a chapter on square and cube roots.

Illustrations available: Title page



H 72

### Hatton, Edward (ca.1664–1729)

The Gauger's guide. Or, Excise-Officer instructed. Containing, I. A copius and ample treatise of decimal arithmetic, where-in are many things not commonly known, and adapted to the business of gauging. ...

Year: 1729 Place: London Publisher: D. Midwinter

Edition: 1st Language: Italian

Figures: engraved frontispiece

Binding: modern leather; red leather label

Pagination: pp. xii, 196 Collation: A<sup>6</sup>B–2B<sup>4</sup>C<sup>2</sup> Size: 158x192 mm

This is a complete work on gauging containing all the requisite tables of areas and volumes. Hatton also provides a number of rules of thumb (e.g., to find the area of an ellipse, multiply the length by the breadth, and the product is the square of the diameter of a circle with the same area) and illustrates each with examples.

Illustrations available: Title page



H 72

H 73

### Hatton, Edward (ca.1664–1729)

The gauger's guide; or, excise-officer instructed ...

b/w: Hill, Thomas; Practical gauging improved, by the help of a new portable sliding rule, which performs all the operations of Mr. Everard's rule in a more exact manner, the single radius being eight foot long, 1734 Year: 1729 Place: London

Publisher: Printed for D. Midwinter

Edition: 1st Language: English

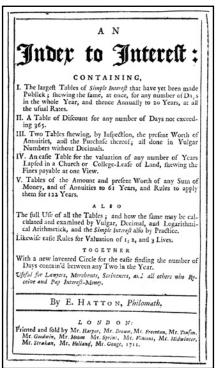
Figures: 1 engraved folding plate of instrument Binding: contemporary leather; red leather label

Pagination: pp. xii, 196 Collation: A<sup>4</sup>a<sup>2</sup>B–2B<sup>4</sup>2C<sup>2</sup> Size: 160x95 mm

This copy is identical to the other in the collection.

Illustrations available:

None



H 74

# H 74 **Hatton, Edward** (ca.1664–1729)

An index to interest: Containing, I. The largest tables of simple interest that have yet been made publick; shewing the same, at once, for any number of days in the whole year, and thence annually to 20 years, at all the usual rates. II. A table of discount for any number of days not exceeding 365. III. Two tables shewing, by inspection, the present worth of annuities, and the purchase thereof; all done in vulgar numbers without decimals. IV. An easie table for the valuation of any number of years lapsed in a church or college lease of land, shewing the fines payable at one view. V. Tables of the amount and present worth of any sum of money, and of annuities to 61 years, and rules to apply them for 122 years. Also the full use of all tables, and how the same

may be calculated and examined by vulgar, decimal, and logarithmical arithmetick, and the simple interest also by practice. Likewise easie rules for valuation of 1, 2, and 3 lives. Together with a new invented circle for the easie finding the number of days contain'd between any two in the year. Useful for lawyers, merchants, scriveners and all others who receive and pay interestmoney.

Year: 1711 Place: London

Publisher: Printed and sold by Mr. Harper, Mr. Brown, Mr. Freeman, Mr. Tonson, Mr. Goodwin, Mr. Mount, Mr. Sprint, Mr. Vincent, Mr. Midwinter, Mr. Strahan, Mr.

Holland, Mr. Gouge

Edition: 1st Language: English

Figures: engraved frontispiece; volvelle on final leaf Binding: contemporary leather; rebacked; red leather label

Pagination: pp. [104], 91–118 Collation:  $\pi^3$  A–H<sup>4</sup> \* <sup>4</sup> I–O<sup>4</sup> P<sup>3</sup>

Size: 189x 115 mm

The major portion of this book is a table of interest at 5 to 8 percent for any time from one day to nineteen years and any amount from 1 to 1,000 pounds. Smaller tables give the present worth of annuities and compound interest. A volvelle on the final leaf can be used to determine the number of days between any two days in a year. The book has a fine portrait frontispiece of Hatton.

Illustrations available:

Title page Volvelle Sample table page Frontispiece portrait



Frontispiece, H 74

### Hatton, Edward (ca.1664–1729)

An intire system of arithmetic: or arithmetic in all its parts. Containing I. vulgar. II. decimal. III. duodecimal. IV. sexagesimal. V. political. VI. logarithmical. VII. lineal. VIII. instrumental. IX. algebraical. With the arithmetic of negatives, and approximation or converging series.

Year: 1721 Place: London Publisher: Mount et al. Edition: 1st Language: English

Figures: engraved portrait frontispiece; 3 folding engraved plates

Binding: contemporary panelled leather; rebacked Pagination: pp. xxiv, 280, [64], 269–379, [1], 16 Collation: A<sup>4</sup>a–b<sup>4</sup>B–Y<sup>4</sup>Z–2N<sup>2</sup>2O–2P<sup>4</sup>[2Q–2V]<sup>4</sup>2Q–3H<sup>2</sup>3I–3Y<sup>4</sup>A–B<sup>4</sup>

Size: 207x160 mm.

This work is claimed, by the author, to be the first complete textbook on the subject of basic arithmetic. The work certainly contains material found previously in arithmetic books, but never all in one place. The book was produced by subscription and the four-page subscription list contains such notable names as Edmund Halley and Isaac Newton.

Hatton begins with a set of definitions, in alphabetical order, for all the elementary terms used in the arithmetic section. He repeats this in Chapter X, where he lists

AN INTIRE SYSTEM

OF

Arithmetic:

OR

Arithmetic in all its Parts.

CONTAINING

I. Vulgar.

I. V. Sexagefinal.

VIII. Lineal.

III. Decimal.

V. Political.

VIII. Infirumental.

III. Duodecimal.

V. Political.

VIII. Infirumental.

III. Duodecimal.

V. Political.

ViIII. Infirumental.

VIII. Infirumental.

III. Duodecimal.

V. Political.

ViIII. Infirumental.

VIII. Infirumental.

III. Duodecimal.

V. Political.

VIII. Infirumental.

VIII. Infirumental.

VIII. Lineal.

III. Duodecimal.

ViII. Logarithmical.

VIII. Infirumental.

VIII. Infirumental.

VIII. Infirumental.

VIII. Lineal.

III. Duodecimal.

VIII. Lineal.

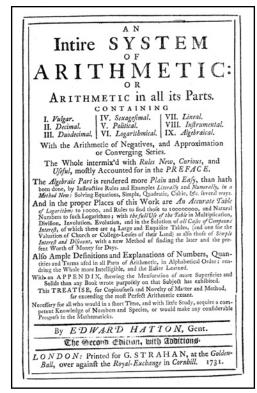
I

all the terms and symbols used in the algebra section. Foldout plates, at the end of the book, show diagrams of the instruments used in his chapter on instrumental arithmetic, including Gunter's line of numbers, Napier's bones and a circular instrument, invented by Hatton, for converting amounts of money, weight, or measure into decimals. The title page presents a full description of the content of the work, with the exception of an unmentioned appendix on areas and volumes useful in gauging. The frontispiece contains a nice portrait of Hatton.

A second copy of this work is available in the collection. It is identical with this copy except the binding has not been rebacked, and the dimensions are 201x160mm.

Illustrations available:

Title page Gunter's line and Napier's bones Circular instrument Frontispiece



H 76

H 76

### **Hatton, Edward** (ca.1664–1729)

An intire system of arithmetic: or arithmetic in all its parts. Containing I. vulgar. II. decimal. III. duodecimal. IV. sexagesimal. V. political. VI. logarithmical. VII. lineal. VIII. instrumental. IX. algebraical. With the arithmetic of negatives, and approximation or converging series.

Year: 1731 Place: London Publisher: G. Strahan Edition: 2nd Language: English

Figures: engraved portrait frontispiece; 3 folding plates

Binding: contemporary panelled leather Pagination: pp. [4], xvi, 280, [64], 345–476

Collation: A<sup>2</sup>a–b<sup>4</sup>B–3O<sup>4</sup>3P<sup>2</sup> Size: 224x168 mm Reference: DeM *AB*, p. 67

This second edition has, as the title page implies, a number of minor improvements. In the main, these consist of additional illustrations or tables. This edition has the same portrait preface as the first in 1721 (the sizes differ slightly among the Hatton books in the collection, but that difference is likely due to paper shrinkage rather than to re-engraving).

Illustrations available: Title page

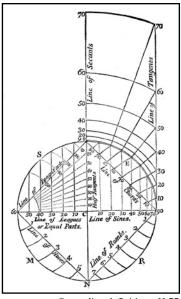
# A MATHEMATICAL MA A N UL A L: OR, Delightful Affociate. CONTAINING, I. A Description and Use of the CELESTIAL GLOSE: How to know the Sars in each Constitution, and their Magnitude; also their Latitude, Longitude, Right Afcension, Decination, Semi-durand Ark, Riling, Southing, Serting, Altitude, Azimuth, Dithances, & The Saris Place, his Riling and Setting, Length of the Dys and Night, & Alich Deling, With Globe, III. Way than has been given to find EASTER, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Night by the Molon Ghining on a Sun-Dial, & C. The Hour of the Latitude, Longitude and Staution of U. A full Description and Life of Night Bart and Staution of Natural Method. VI. How to make a Line of Numbers, or a described, with the full Use of the International Novel teleging, Depths, and Diffances, great or final, by several Ways and Instruments. In Twelve Propositions. The Whole very Use Full and Pleasant. By E. HATTON, Gent. LONDON, Printed for S. Illinos, under Sarle's Oate, Inscalin-law New-Square. Maccaxxiii.

H 77

### H 77

### Hatton, Edward (ca.1664–1729)

A mathematical manual: or, delightful associate.
Containing, I. A description and use of the celestial globe: ... II. Twelve problems relating chiefly to the moon: ... III. A description and use of the terrestial globe... IV. A full description and use of all kinds of maps: ... V. The original of the lines in a sector described; ... VI. How to make the line of numbers, ... VII. Mysterious curiosities in numbers: ... VIII. How to take heights, depths and distances... The whole very



Sector line definitions, H 77

useful and pleasant. Published for the contemplation and diversion of gentlemen, and others, who are mathematically inclined

> Year: 1728 Place: London Publisher: S. Illidge Edition: 1st Language: English

Binding: contemporary panelled calf; gilt spine

Pagination: pp. viii, 246, [2] Collation:  $\pi^4$ B–Q<sup>8</sup>R<sup>4</sup> Size: 196x119 mm

This work is not a sophisticated mathematical treatise but rather is aimed at those interested in learning how to use globes, maps, sectors and related devices. It also includes a section on unusual numbers arising from arithmetic operations, obtaining the date of Easter, etc. Today, this section would be described as a work on recreational mathematics.

Hatton's presentation of the material is clear. He also remarks that globes and maps are usually only marked in degrees (and not subdivided into minutes). Thus, users of instruments need not worry about the fine points—an approximate result will be all that is required for the amateur to solve most problems.

In his discussion of the sector, Hatton does not illustrate the instrument but instead describes the lines on a typical sector (occasionally noting that his sector does not have this or that scale). He provides a diagram, also used by earlier writers on the subject, that shows how to create sector lines (see illustration)—by drawing a circle (to the radius of the line of lines), the other lines may be created by measuring off various distances with a pair of dividers or a compass.

Illustrations available:
Title page
Definition of the sector lines

Haughton, Arthur, editor See Oughtred, William; *The circles of proportion.* See Oughtred, William; *Trigonometria.* 

H 78

### [Haüy, Réne-Juste (1743–1822)] La Commission Temporaire des Poids & Mesures Républicaines

Instruction abrégee sur les mesures déduites de la grandeur de la terre, uniformes pour toute la République, et sur les calculs relatifs à leur division décimale

> Year: 1794 Place: Paris

Publisher: Imprimerie Nationale Exécutive du Louvre

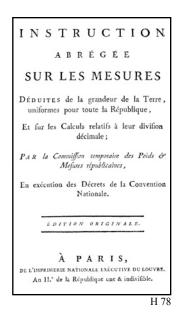
Edition: 1st Language: French Figures: 3 engraved plates

Binding: contemporary paper wrappers; uncut

Pagination: pp. xiv, 147, [1], [28]

Collation: a<sup>7</sup>A–L<sup>8</sup> Size: 210x136 mm

Haüy is best known for his work in mineralogy and crystallography. He held positions at many French institutes, the last being as professor of mineralogy at the Muséum d'Histoire Naturelle.

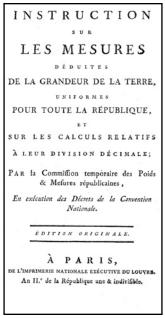


In 1790, the French National Assembly appointed a commission on weights and measures to define a set of national standards to replace the numerous regional systems then being used in France. Haüy was appointed secretary to the commission, which included **Lagrange** and **Laplace** among its members. Some members favored units of length based on the swing of a pendulum while others favored a standard based on one tenmillionth of the distance between the North Pole and the equator. Eventually, the commission agreed on the latter approach for the standard meter. The Commission was also charged with organizing and publishing the system.

This is the first edition of the most practical of the three official manuals issued by La Commission Temporaire des Poids & Mesures Républicaines. It introduced the new French metric system, which was officially adopted by the government and became compulsory the following year.

This work was reprinted and distributed widely in the French provinces. It is divided into three parts: the first discusses the theory, the second is a practical treatment of the system, and the third contains tables relating the old units to the new measures. The theoretical section is somewhat abridged of the full document (see Haüy, 1793), which was issued simultaneously. The tables cover linear, area and volume measurement and decimal equivalents of common fractions.

Illustrations available:
Title page
Engraved plate showing the measures



H 79

### [Haüy, Réne-Juste (1743–1822)] La Commission Temporaire des Poids & Mesures Républicaines

Instruction sur les mesures déduites de la grandeur de la terre, uniformes pour toute la République, et sur les calculs relatifs à leur division décimale; ...

Year: 1793 Place: Paris

Publisher: L'Imprimerie Nationale Exécutive du Louvre

Edition: 1st Language: French Figures: 1 engraved plate

Binding: early 19th-century leather backed marbled boards

Pagination: pp. xxxii, 224, [28] Collation: a-b<sup>8</sup>A-P<sup>8</sup>Q<sup>6</sup> Size: 201x122 mm

This is the unabridged version of the work introducing the metric system to France. A single engraved plate contains all three figures of the abridged version.

Illustrations available:

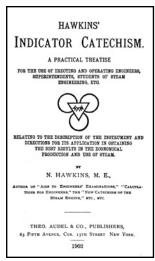
Title page Linear measures Fractions table

**Hawkins, John** (fl.1676–1692), editor See **Cocker, Edward**; *Cocker's decimal arithmetick*.

H 80

### Hawkins, N.

Hawkins' indicator catechism. A practical treatise for the use of erecting and operating engineers, superintendents, students of steam engineering, etc. Relating to the description of the instrument and directions for its application in obtaining the best results in the economical production and use of steam.



H 80

Year: 1902 Place: New York

Publisher: Theo. Audel & Co.

Edition: 2nd Language: English

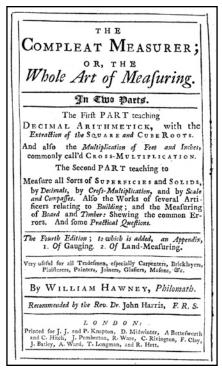
Binding: contemporary cloth boards; gold stamped spine and

cover Pagination: pp. 167 Size: 200x125 mm

A steam engine indicator is actually a small model of the engine by means of which it is possible to measure the pressures that are in the main cylinder during the stroke. These readings can be graphed and then instruments such as planimeters can be used to determine various factors concerning the operation of the engine. A section at the end of this book describes the use of both the Willis and the Coffin averaging planimeters

Illustrations available:

Title page



H 81

H 81 **Hawney, William** (ca.1710–1750)

The compleat measurer: or the whole art of measuring

•••

Year: n/d
Place: London
Publisher: J. J. and P. Knapton, D. Midwinter, A. Bettesworth
and C. Hitch, J. Pemberton, R. Ware, C. Rivington, F.
Clay, J. Batley, A. Ward, T. Longman, and R. Hett.

Edition: 6<sup>th</sup> Language: English Binding: contemporary panelled leather; gilt spine; red leather label

Pagination: pp. xii, 346, [2] Collation: A-2G<sup>6</sup> Size: 166x100 mm

See the entry for the 1748 edition of this work.

Illustrations available: Title page

H 82

# Hawney, William (ca.1710–1750)

The complete measurer; or the whole art of measuring. In two parts. The first part teaching decimal arithmetic, with the extraction of the square and cube roots. And also the multiplication of feet and inches, commonly called cross-multiplication. The second part teaching to measure all sorts of superficies and solids, by decimals, by cross-multiplication, and by scale and compasses. Also the works of several artificers relating to building, and the measuring of board and timber. Shewing the common errors. And some practical questions. The fifth edition. To which is added, an appendix, 1. of gauging 2. of land-measuring.

Year: 1743 Place: London

Publisher: Printed for R. Ware, A. Ward, J. and P. Knapton, T. Longman, R. Hett, C. Hitch, J. Hodges, S. Austen, J. and H. Pemberton, and J. Rivington

Edition: 5th Language: English

Binding: contemporary panelled leather

Pagination: pp. xii, 346, [2]

Collation: A-2G<sup>6</sup> Size: 165x95 mm



H 82

William Hawney was a teacher of practical mathematics (today known as *applied mathematics*). He also did simple survey work and made various types of sundials. His classroom notes formed the basis for the first edition of this popular work. First published in 1717, it went through many different editions until well into the nineteenth century. The appendix on gauging and land measuring was apparently added in 1729.

The material covers basic arithmetic methods up to finding square and cube roots. With this base established, Hawney then describes the practical arithmetic used by craftsmen (areas, volumes, etc.). The work concludes with a series of problems such as how many bricks it would take to make a chimney of a particular size. Occasionally Hawney deviates from the strictly practical to provide formulas for advanced topics such as the sum of various types of series.

In **Cajori**'s *A history of the logarithmic slide rule*, 1909, he mentions that Hawney describes the carpenter's rule as well as Verie's slide rule for gauging. Cajori was writing about an 1813 American edition printed in Baltimore. There is no mention of a slide rule in either this edition or in any of the later editions in this collection.

Illustrations available: Title page

H 83

# Hawney, William (ca.1710-1750)

The complete measurer: or the whole art of measuring. In two parts. The first part teaching decimal arithmetic, with the extraction of the square and cube roots. And also the multiplication of feet and inches, commonly called cross multiplication. The second part teaching to measure all sorts of superficies and solids by decimals, by cross multiplication, and by scale and compasses. Also the works of several artificers relating to building, and the measuring of board and timber. Shewing the common errors. And some practical questions. The sixth edition to which is added, an appendix 1. of gauging 2. of land-measuring. Very useful for all tradesmen, especially carpenters, bricklayers, plasterers, painters, joiners, glasiers, masons & c.

Year: 1748 Place: London Publisher: R. Ware, J. a

Publisher: R. Ware, J. and P. Knapton, T. Longman, C. Hitch, J. Hodges, S. Austen, H. Pemberton, J. and J. Rivington, and J. Ward

Edition: 6th
Language: English
Figures: in text

Binding: contemporary panelled leather; gilt spine repaired and rebacked

Pagination: pp. xii, 346, [2] Collation: A-2G<sup>6</sup> Size: 162x94 mm

See the entry for the 1743 edition of this work.

Illustrations available: Title page

H 84

# Hawney, William (ca.1710–1750)

The complete measurer: or the whole art of measuring. In two parts. The first part teaching decimal arithmetic, with the extraction of the square and cube roots. And also the multiplication of feet and inches, commonly called cross multiplication. The second part teaching to measure all sorts of superficies and solids by decimals, by cross multiplication, and by scale and compasses. Also the works of several artificers relating to building, and the measuring of board and timber. Shewing the common errors. And some practical questions. The eighth edition to which is added, an appendix 1. of gauging 2. of land-measuring. Very useful for all tradesmen, especially carpenters, bricklayers, plasterers, painters, joiners, glasiers, masons & c.

Year: 1751 Place: London

Publisher: J. Knapton, C. Hitch and L. Hawes, John Rivington, J. Rivington and J. Fletcher, J. Ward, P. Davey and B. Law, S. Crowder, T. Longman, M. Cooper, and C. Ware.

Edition: 8th Language: English

Binding: contemporary leather Pagination: pp. ix, [3], 346, [2]

Collation: A–2G<sup>6</sup> Size: 162x100 mm

This edition appears identical to that of 1748.

Illustrations available: Title page

H 85

# Hawney, William (ca.1710–1750)

The complete measurer: or the whole art of measuring. In two parts. The first part teaching decimal arithmetic, with the extraction of the square and cube roots. And also the multiplication of feet and inches, commonly called cross multiplication. The second part teaching to measure all sorts of superficies and solids by decimals, by cross multiplication, and by scale and compasses. Also the works of several artificers relating to building, and the measuring of board and timber. Shewing the common errors. And some practical questions. The tenth edition to which is added, an appendix

1. of gauging 2. of land-measuring. Very useful for all tradesmen, especially carpenters, bricklayers, plasterers, painters, joiners, glasiers, masons & c.

Year: 1759 Place: London

Publisher: J. Knapton, C. Hitch and L. Hawes, John Rivington, J. Rivington and J. Fletcher, J. Ward, P. Davey and B. Law, S. Crowder, T. Longman, M. Cooper, and C. Ware.

Edition: 10th Language: English

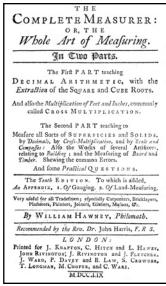
Binding: modern boards; printed label

Pagination: pp. xii, 346, [2]

Collation: A–2G<sup>6</sup> Size: 164x98 mm

See the entry for the 1743 edition of this work.

Illustrations available: Title page



H 85

H 86

# Hayes, Richard

Interest at one view, calculated to a farthing: at 2 1/2, 3, 3 1/2, 4, 5 6, 7, and 8 per cent. For 1000£. to 1£. for 1 day to 96 days; and for 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months. With rules and examples to call up interest at any rate, by the said tables. With a curious table, whereby standard gold and silver, in bars, is compared with the courses of exchange between Amsterdam and London. Also tables for reducing the most common gold coins to Pounds, and the contrary. Being very useful in receiving and paying monies.

Year: 1754 Place: London Publisher: W. Meadows Edition: 9th Language: English

Binding: contemporary leather; gilt spine; red leather label

Pagination: pp. iv, 5–347, [5] Collation: A–Y<sup>8</sup>

Size: 119X90 mm

This is a group of tables of interest at various rates, the conversion of gold and silver bullion to sterling currency and the exchange rates for gold and silver between Amsterdam and London.

Illustrations available:

Title page

# INTEREST

# At ONE VIEW,

Calculated to a FARTHING:

At 21, 3, 31, 4, 5, 6, 7, and 8 per Cent.

For 1000 f. to 1 f. for 1 Day to 96 Days; and for 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 Months. With Rules and Examples to cast up Interest at any Rate, by the said Tables.

With a curious TABLE, whereby Standard Gold and Silver, in Bars, is compared with the Courfes of Exchange between Ansterdam and London.

AlfoTABLES for reducing the most common Gold Coins to Pounds, and the Contrary: Being very useful in receiving and paying Menies.

The NINTH EDITION, with Additions.

Carefully calculated and examined from the PRESS,
By RICHARD HAYES.

To which is added,

A Concise TABLE, whereby to cast up Salaries and Wages speedily, and others of great Use in receiving and paying of Money.

LONDON:

Printed for W. MEADOWS, at the Angel in Cornbill.
MDCCLIV.

H 86

H 87

# Hazen, H. L. (1901–1980); J. J. Jaeger and Gordon Stanley Brown (1907–)

An automatic curve follower. In The Review of Scientific instruments Vol 7 No. 9 New Series, September 1936.

Year: 1936

Place: New York

Publisher: American Institute of Physics

Edition: 1st Language: English

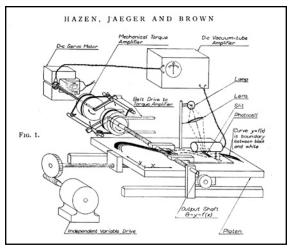
Binding: original paper wrappers Pagination: pp. 353–357.

Size: 267x200 mm

This paper describes an automatic device capable of following a curve drawn on paper. Such a device was needed to drive the input tables of differential analyzers. A diagram of the mechanics of the system is given, as well as the electronic circuits.

Illustrations available:

Diagram of the curve follower



Curve follower, H 87

H 88

# Heather, John Fry (-1886)

Mathematical instruments their construction, adjustment, testing, and use. Comprising drawing, measuring, optical, surveying and astronomical instruments.

Year: 1880 Place: London

Publisher: Crosby Lockwood & Co.

Edition: 10th
Language: English
Figures: 5 engraved plates

Binding: original paper boards; rebacked; spine repaired, label

laid down

Pagination: pp. xiv, 158, vi (misnumbered vi as viii), 142, viii

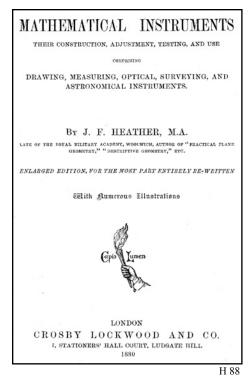
(misnumbered viii as xii),162, 16, 32 Collation:  $a^7B - G^{12}H^6I^4B - G^{12}A^3B - G^{12}H^6I^3A - C^8$ 

Size: 175x104 mm

See the entry for the 1849 edition of this work (A Treatise on mathematical instruments...). By the time this edition was published, the British Navy had required that a copy of this book be included in every midshipman's kit. Major advances, particularly in the area of optical instruments and photography, had been made since the early editions. This new edition was completely rewritten, new sections were added (particularly on the use of photography for copying maps and plans), and new illustrations engraved for many of the devices. The sections devoted to older devices, e.g., sundials, have been removed and replaced by a greatly expanded section on the slide rule. This edition is more than twice as large as the previous ones in this collection. A note in an advertisement indicates that the previous ninth edition had been stereotyped so that it remained available for the convenience of those schools still using it as a text.

Illustrations available:

Title page



H 89

# Heather, John Fry (-1886)

A treatise on mathematical instruments, including most of the instruments employed in drawing, for assisting the vision, in surveying and levelling, in practical astronomy, and for measuring the angles of crystals: in which their construction, and the methods of testing, adjusting, and using them, are concisely explained.

Year: 1849 Place: London Publisher: John Weale Edition: 1st

Edition: 1st
Language: English
Figures: 1 engraved plate

Binding: original paper boards with label on front cover

Pagination: pp. vi; 184 Collation:  $\pi^3$  B–H<sup>12</sup>I<sup>8</sup> Size: 178x104 mm

Reference: Hambly DI, p. 51

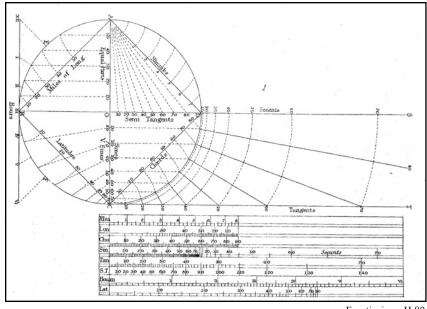
Heather's small book on instruments was very popular. It went through at least sixteen editions in the next fifty years. The intent was to list, as briefly as possible, the major mathematical instruments. It provides no history and almost no scientific basis for the functioning of each device. It does, however, provide a quick reference to instruments and occasionally a picture. Copies are often found bound with the catalog of an instrument maker (this particular edition was not). However, both the 1851 and 1853 editions have the catalog for William Elliott and Sons bound in.

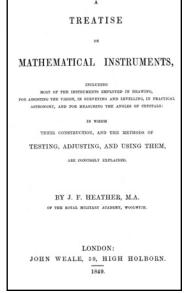
Illustrations available: Title page Frontispiece

H 90

# Heather, John Fry (-1886)

A treatise on mathematical instruments, including most of the instruments employed in drawing, for assisting the vision, in surveying and levelling, in practical astronomy, and for measuring the angles of crystals:





Frontispiece, H 89

H 89

in which their construction, and the methods of testing, adjusting, and using them, are concisely explained.

Year: 1851 Place: London Publisher: John Weale Edition: 2nd Language: English

Binding: original paper boards with label on front cover

Pagination: pp. vi, 170, 4 Collation:  $\pi^3$  B–H<sup>12</sup>c<sup>3</sup> Size: 177x108 mm

See the entry for the first (1849) edition of this work.

Illustrations available: Title page

H 91

# Heather, John Fry (-1886)

A treatise on mathematical instruments, including most of the instruments employed in drawing, for assisting the vision, in surveying and levelling, in practical astronomy, and for measuring the angles of crystals: in which their construction, and the methods of testing, adjusting, and using them, are concisely explained.

Year: 1853 Place: London Publisher: John Weale Edition: 3rd Language: English

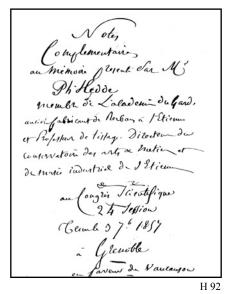
Binding: original paper boards with label on front cover

Pagination: pp. vi, 170, 4 Collation:  $\pi^3$  B–H<sup>12</sup>c<sup>3</sup> Size: 179x106 mm

See the entry for the first (1849) edition of this work.

Illustrations available:

Title page



H 92

# Hedde, Phillipe

Notes complémentaires au mémoire présenté par M. Ph. Hedde, membre de l'academi du Gard, ancien fabricant de rubans à St. Etienne et professeur de tissage, directeur du conservatoire des arts et metiers et du Musee industriel de St. Etienne au congrés scientifique (24th session) 3 Septembre 1857 à Grenoble en faveur de Vaucanson

Year: 1857 Edition: manuscript Language: French Binding: unbound Pagination: pp. 8 Size: 270x214 mm

Hedde was a textile manufacturer in St. Etienne, a member of the Academy of Science of Marseille and the Director of the Conservatoire des Arts et Metiers and of the Museum of Industry in St. Etienne. He had known Jacquard while a youth in Lyon between 1810 and 1815. Thus he had personally witnessed the introduction of automation to the weaving industry.

In this manuscript Hedde argues that Jacques Vaucanson of Grenoble deserves credit for the invention of the automatic weaving loom, rather than Joseph Marie Jacquard. Despite his assertion that Vaucanson first conceived of the basic approach, today Jacquard is generally acknowledged as the inventor of the automated loom. While it is true that Jacquard improved on earlier versions of automatic weaving equipment, many of these early versions, some of which were similar to Jacquard's, proved impractical. It was Jacquard's punched card version that was ultimately successful. Hedde provided these arguments some twenty years after Jacquard had died.

Illustrations available: First page

H 93

# Hedde, Phillipe

Revendication en faveur de Vaucanson de Grenoble de l'honneur de l'invention du mécanisme qui porte aujourd'hui le nom Jacquard de Lyon

> Year: 1857 Edition: manuscript Language: French Binding: unbound Pagination: pp. 10 Size: 265x206 mm

This is another manuscript in which Hedde argues that Vaucanson should be recognized as the inventor of the weaving mechanism usually attributed to Jacquard. See the above entry for **Hedde** also dated 1857.

Illustrations available: First page

Revendication on felveur de Vouceunson de spendh
De Shomman de Similation de Micanisme que parte aujensité
le 1000 de partire de le spon

Par Il D'édidademe in si de de la journe verté aujensité
De de Demondrand de Shomman avec for me verté au de de la journe de la festione
De partire de la contraction de la de la journe de la festione
De partire de la contraction de la festione de la festione
De partire de la partire qui de formation de la festione que la partire
Le vouceur les proposes de festiones de la festione de la journe
Journel frie paratte de des la domaine de la festione fortible
Le partire des autes de la domaine de festione, para factione
la partire des autes et la domaine de propositionement le procédir de
la partire des autes de la domaine de processo de de la foire
De la festione pour a ancière de seption le diverse fortible de
De la festione pour a ancière de surface de 1900 de mandal à la foire
De la feire de la la domaine au principe de la feire de la partire de de la partire de de la partire de la part

H 93

# H 94

# Hedraeus, Benedict (1608–1659)

Nova et accurata astrolabii geometrici structura, ubi gradus, horumque singula minuta prima, nec non, quadrantis astronomici azimuthalis, quo non solum prima, sed & singula minuta secunda distinctè observari possunt. Una cum utriusque usu, claris & perspicuis exemplis illustrato.

Year: 1643 Place: Leiden

Publisher: Wilhelm Christian Box

Edition: 1st Language: Latin

Figures: title in red and black; 5 folding engraved plates

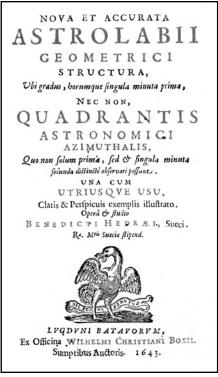
Binding: modern panelled leather Pagination: pp. [xvi], 104, [24], [8]

Collation: \*8A-H8I4 Size: 157x93 mm

Reference: H&L, #3309 p. 649

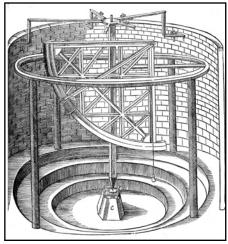
Hedraeus was a professor of mathematics at the University of Uppsala and an instrument maker. He is known to have constructed an observatory near Uppsala (evidently the first in Sweden). He is also reported to have given lessons in astronomy to Queen Christiana. He seems to have independently invented the Vernier scale to use on his instruments.

The first part of this work describes an *astrolabe* that did not actually have the complex astrolabic scales and is thus really only a sighting device. It was used in conventional

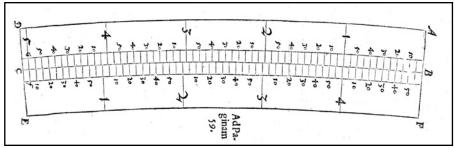


H 94

surveys: finding the heights of towers, depths of wells, etc. The second part of the work describes a large azimuth quadrant equipped with Vernier scales. It is illustrated in a series of woodcuts showing its construction and the scales. Although **Pierre Vernier** had published a description of his scale in 1631, it was unknown in most of Europe at the time, and Vernier's name only became associated with the scale about 100 years later. Helvelius saw this book and adapted the scale to his own very large instruments, further disseminating the technique.



Astronomical quadrant, H 94



Vernier-like scale, H 94

This book has, incorrectly, been described as containing an illustration of the quadrant of Pedro Nunez, who first suggested a method of subdividing an arc in 1542. The illustration of the astronomical quadrant is not that of Nunez. However, the technique of creating a Vernierlike scale on a quadrant was described by Nunez in his De Crepusculis of 1542 (see Taylor, Early scientific instruments, p. 135, for an illustration of the nonius quadrant created by Nunez).

Illustrations available:

Title page (color)

Surveying examples

Astronomical quadrant

Scale

H 95

# Heilbronner, Johann Christoph (1706–1747)

Versuch Einer Mathematischen Historie Erster Theil. Darinnen Eine Abhandlung von dem Nutzen der Mathematic überhaupt, und Die Historie der Rechen-Kunst enthalten sind.

Year: 1739

Place: Frankfurt & Leipzig Publisher: Samuel Wohler

Edition: 1st Language: German Figures: 2 plates

Binding: original wrappers; uncut

Pagination: pp. [4], 204 Collation: )(2A-M8N6 Size: 195x125 mm Reference: Van E CR, p. v

Heilbronner was born in Ulm and taught mathematics in Leipzig. He is best known for writing the first work containing the words history of mathematics in a title: Historia matheseos universae a..., Leipzig, 1742.

This work is his first contribution to the history of mathematics (without the title). The last two-thirds of the work consists of an extended discussion of books and manuscripts that mention arithmetic.

Illustrations available:

Title page

Sample page of books (Napier)



H 96

# Hele-Shaw, Henry Selby (1854–1941)

A new sphere planimeter. In Report of the Fifty-Eighth Meeting of the British Association for the Advancement of Science. Held at Bath in September 1888.

Year: 1889 Place: London Publisher: John Murray

Edition: 1st Language: English

Binding: contemporary buckram Pagination: pp. 616-617 Size: 215x138 mm

Hele-Shaw adopted his hyphenated name (by adding his mother's maiden name of *Hele*) in his early twenties. He was first apprenticed to the Mardyke engineering works, and, despite the fact that this required ten hours of practical work each day and was followed by evening classes, he performed so well that he was given a scholarship to University College in Bristol. Despite being so ill that he had to be carried into his final examination, he graduated first in his class. After obtaining his degree in 1880, he was immediately appointed as a lecturer there and one year later became its first professor of engineering at the age of twenty-seven. In 1885, he became the first professor of engineering at the University of Liverpool and, in 1904, he moved to South Africa to found the Transvaal Technical Institute and serve as its principal. In 1906, he returned to England and, although remaining interested in education, earned his living as a consulting engineer for the rest of his life. His biographer in the *Dictionary* of National Biography noted that it was unusual, even in the days of rapidly expanding engineering schools, to find someone who had founded three, all of which were well regarded. He began his inventing career in 1881 with instruments for measuring wind velocity and progressed to devices for integrating and a viscosity device, known as the Hele-Shaw cell, which is still in use. He published more than one hundred papers.

In 1886 Hele-Shaw had presented a paper to the Royal Society (Hele-Shaw; *The theory of continuous calculating machines*) describing an improved ball and cylinder integrating mechanism similar to the one first described by William Thomson (Lord Kelvin). This is a report that indicates the mechanism always gave a slight error but that a new application had been found in which it performed properly.

Illustrations available:

# H 97

# Hele-Shaw, Henry Selby (1854–1941)

The theory of continuous calculating machines and of a mechanism of this class on a new principle. In Philosophical Transactions of the Royal Society - Part II, 1885.

Year: 1886 Place: London

Publisher: Trübner and Co. for the Royal Society

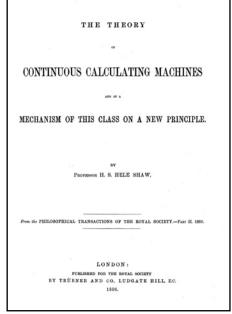
Edition: Extract Language: English Binding: paper wrappers Pagination: pp. [2], 367–402, [2]

Collation: 3B–3F<sup>4</sup> Size: 297x218 mm

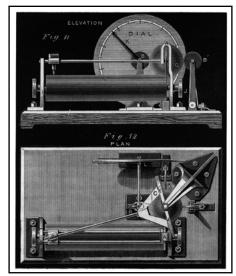
In this paper Hele-Shaw describes variations in a spheredisk-cylinder integrating device that can be used for several different types of calculation. He first describes the disk-sphere-cylinder of James Thomson that was later used by his brother Sir William Thomson (Lord Kelvin) as an integrator. Illustrations available:

Title page

One variation on his machine



H 97



Integrating mechanism, H 97

Hellins, John (-1827), editor See Agnesi, Donna Maria Gaetena; Analytical institutions.

# H 9

# Hemmi Bamboo Slide Rule Mfg. Co., Ltd.

Instructions for the use of "Hemmi" bamboo slide rules

Year: 1951 Place: Tokyo

Publisher: Hemmi Bamboo Slide Rule Mfg. Co.

Edition: unknown Language: English

Binding: original paper wrappers Pagination: pp. [2], vi, 48 Size: 182x128 mm

This is a standard instruction booklet for the slide rule.

Illustrations available: Title page

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# INSTRUCTIONS

FOR THE USE OF

"HEMMI" BAMBOO SLIDE RULES

Published by
HEMMI BAMBOO SLIDE RULE MFG. CO., LTD.
TOKIO, JAPAN
Printed in Japan

H 98

H 99

# Henderson, James (1900–)

Bibliotheca tabularum mathematicarum. Being a descriptive catalogue of mathematical tables. Part I Logarithmic Tables (A. Logarithms of Numbers)

Year: 1926 Place: Cambridge Publisher: University Press Edition: 1st

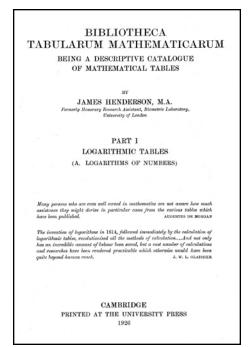
Language: English Figures: 2 plates

Binding: original cloth boards; spine gilt

Pagination: pp. iv, 208 Collation:  $\pi^2 1 - 3^8 4^{10} 5 - 12^8 13^6$ Size: 232x157 mm

James Henderson was a research assistant to Karl Pearson, a pioneer in statistics and the head of the Biometric Laboratory at the University of London. After the publication of this work, he obtained his own teaching position at that same institution.

This is the finest survey of logarithm tables extant. It updates the older **Glaisher** Report (*Report of the committee on mathematical tables*). The title page lists this as *part 1 Logarithmic Tables*, an obvious indication



H 99

that volumes covering other kinds of tables were planned. The necessary data collection was begun, but the project was never completed because Henderson left his research position to take a faculty position. This work was reviewed by **L. Comrie** (*Journal of the British Astronomical Association*, Vol. 36, No. 9, pp. 339–341), who credits the author with doing a service to the mathematical community but is critical of Henderson's use of long quotations in foreign languages without any translation. Comrie also remarked:

The thought is forced on one during the reading of the book that the author's point of view inclines to that of the pure mathematician and historian rather than to that of the constant practical user of tables.

It is in the introduction to this work that discovery of a logarithm table by the Dutch *reken-meester* and *Landt-Meter* Ezechiel de Decker (*Tweede deel vande nievwe...*) is first reported. The table was a preliminary version of the famous tables of Vlacq (see entry Vlacq, *Arithmetica logarithmica*, 1628).

This work remains a useful reference, and some tables listed here have escaped the notice of other bibliographers (e.g., **Fletcher** and **Glaisher**).

A second copy is available in the collection. It is identical except for the binding, which is original paper wrappers.

Illustrations available: Title page

# [Henderson, James]

See Comrie, Leslie John; Book review: Bibliotheca Tabularum Mathematicarum: Being a descriptive catalogue of mathematical tables by James Henderson, Part I: Logarithmic Tables (A. Logarithms of Numbers). London, Cambridge University Press, 1926. In Journal of the British Astronomical Association, Vol. 36, No. 9, 1926.

# Hendrickson, Arnold P.; Gerald L. Williams (1927–) and John L. Hill (1909-)

Message storage and processing with a magnetic drum system. In Proceedings of the Eastern Joint Computer Conference, December 1954.

Year: 1954 Place: New York

Publisher: American Institute of Electrical Engineers

Edition: offprint Language: English

Binding: original paper wrappers

Pagination: pp. 74-78 Size: 280x217 mm

The authors, all of whom were with ERA, describe a system of storing and forwarding messages on a magnetic drum-based computer system.

Illustrations available: None

# H 101

# Henisch, Georg (1549–1618)

Year: 1609

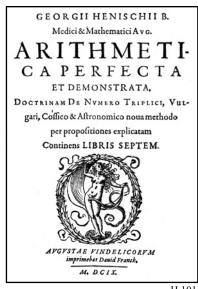
Arithmetica perfecta et demonstrata, Doctrinam De Numero Triplici, Vulgari, Cossico & Astronomico nova methodo per propositiones explicatam. Continens libris septem

Place: Augsburg Publisher: David Franck Edition: 1st Language: German Figures: 1 large folding table Binding: contemporary half-bound vellum over boards Pagination: pp. [12], 401, [3] Collation:  $(^{4})(^{2}A-3D^{4}3E^{2}$ Size: 194x149 mm

Reference: Can II, 651; De M AB, p. 33; Pogg Vol. I, p. 1064; Pul HA, p. 117

Henisch was a physician and professor of logic and mathematics at Augsburg.

**DeMorgan** (Arithmetical books) describes this arithmetic book as a laboured work in seven books. Nonetheless, it was evidently well thought of in its day. The work ranges



H 101

widely from numeration to the sexagesimal arithmetic used in astronomical calculations. In the introduction to numeration, it mentions the Greek alphabetic number system but only gives the alphabetic equivalents to the digits from 1 to 9—obviously only designed to illustrate another numerical system and not to give the reader any useful information in working with Greek texts. Henisch had already described the complete system in an earlier publication (see Henisch, De numerations multiplici, 1605). Two tables, one at the beginning and one at the end of the work, give squares and cubes of integers from 1 to 360 and a sexagesimal multiplication table.

Illustrations available: Title page Greek numeration

# **Henisch, Georg** (1549–1618)

De asse et partibus eius

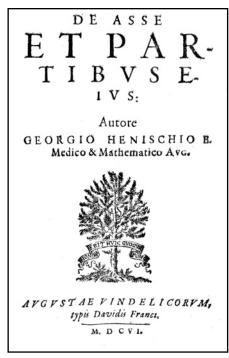
Year: 1606

Place: Augsburg Publisher: David Franck Edition: 1st Language: Latin Figures: 2 folding plates Binding: modern leather, gilt Pagination: pp. [6], 234, [24] Collation: A-Q8R4

Size: 143x88 mm

This work relates various systems of ancient weights and measures. It also includes historical information on monetary systems.

Illustrations available: Title page



H 102

H 103 **Henisch, Georg** (1549–1618)

Commentarius in sphaeram Procli Diadochi: cui adiunctus est computus ecclesiasticus, cum clandario triplici, & prognostico tempestatum ex ortu & occasu stellarum

Year: 1609 Place: Augsburg Publisher: David Franck Edition: 1st Language: Latin

Figures: 2 folding tables
Binding: contemporary olive green morocco; gilt edges

Pagination: pp. [8], 291, 293–367, [22]

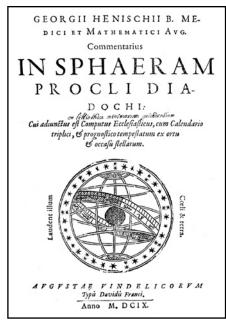
Collation: )(<sup>4</sup>A–3A<sup>4</sup>3B<sup>6</sup> Size: 193x150 mm

Georg Henisch taught mathematics and logic and practiced medicine in Augsberg.

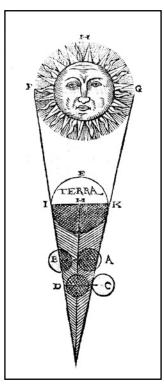
This Henisch commentary on Proclus' *Sphaera* is one of several published in the fifteenth and sixteenth centuries. Proclus (410–485 BC) was a leading Neoplatonic scholar whose work has been only partially preserved. As the Middle Ages waned, confidence in Aristotelian thought also waned. The Renaissance brought about an increased interest in Platonism and in the works of Proclus. While the *Sphaera* is essentially an introduction to the Ptolemaic system, Proclus carefully criticizes the system because of its complexity and its reliance on special cases and exceptions.

While the majority of this work is in Latin, extensive sections are in Greek and German. The work also contains several mentions of America, Columbus and Vespucci.

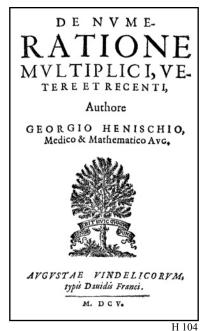
Illustrations available: Title page Eclipse diagram

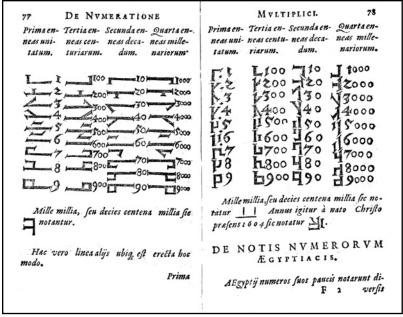


H 103



Eclipse diagram, H 103





Binding: original paper wrappers

curve may be represented by the sum:

Pagination: pp. 12

Numerical notation, H 104

H 104

**Henisch, Georg** (1549–1618)

De numeratione multiplici, vetere et recenti.

Year: 1605 Place: Augsburg Publisher: David Franck

Edition: 1st Language: Latin

Figures: 2 large folding tables Binding: later boards Pagination: pp. [5],107 Collation: A–G<sup>8</sup> Size: 145X92 mm Reference: DeM *AB*, p. 33

This is a book on number systems. It deals with the system used on a table abacus as well as the numerical systems of the Greeks, Romans, Hebrews and others.

Illustrations available:

Title page

De notis numerorum Chaldaicis (2)

H 105

# Henrici, Olaus Magnus Friedrich Erdmann (1840–1918)

Analyseur harmonique construit par G.Coradi à Zurich avec une théorie de Mr. le Professeur O. Henrici à Londres.

Year: 1915 Place: Zurich

Publisher: Aschmann & Scheller

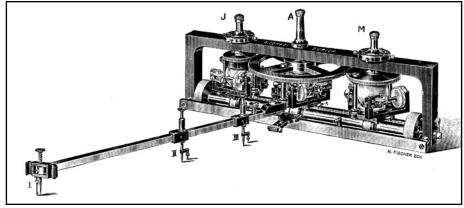
Edition: 2nd Language: French Size: 246x185 mm

A harmonic analyzer is a device able to take an arbitrary curve and determine a series of coefficients such that the

$$y = A_0 + A_1 \cos x + A_2 \cos 2x + \dots + A_n \cos nx$$

This permits the observer of natural phenomena, such as the complex movement of tides, to determine a mathematical formula that will allow for either interpolation between observed points or the calculation of past or future values.





Coradi integrator, H 105

The Swiss instrument firm of Coradi was one of the finest suppliers of sophisticated mathematical instruments in Europe. This booklet begins with an introduction, written by Henrici, on the science on which the device is based, followed by a description, by G. Coradi, of the instrument itself. The final two pages contain a description of an integraph built to the design of **Abdank-Abakanowicz**. The cover also illustrates an integrator and a planimeter.

Illustrations available:

Title page One-sphere Coradi harmonic analyzer Five-sphere Coradi harmonic analyzer Coradi integraph Coradi integrator

Coradi planimeter

H 106

# Henrici, Olaus Magnus Friedrich Erdmann (1840–1918)

Der Harmonische Analysator construirt von G. Coradi in Zürich mit einer Theorie desselben von Prof. O. Henrici in London.

Year: 1894 Place: Zürich

Publisher: C. Aschmann

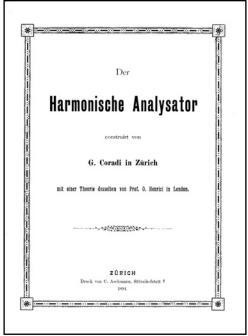
Edition: 1st Language: German

Binding: original paper wrappers

Pagination: pp. 8 Size: 239x182 mm

See the entry for **Henrici**; Analyseur harmonique construit par G.Coradi à Zurich avec une théorie de Mr. le Professeur O. Henrici à Londres, 1915. This is the earlier German edition of that same material. It uses the same illustrations but does not have the material about the **Abdank-Abakanowicz** integraph at the end.

Illustrations available: Title page



H 106

H 107

# Henrion, Denis (ca.1580–1632)

Logocanon, ou regle proportionelle: sur laquelle sont appliquées plusieurs lignes & figures, divisées selon diverses proportions & mesures, en faveur de ceux qui se delectent en la practique des divines mathematiques.

Year: 1626 Place: Paris

Publisher: F. Bourriquant pour l'autheur

Edition: 1st (Separate) Language: French

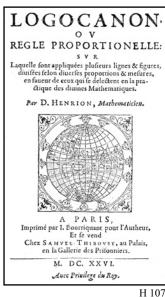
Figures: 1 double-folding plate Binding: modern vellum Pagination: pp. [4], 713–816 Collation:  $\pi^6$ 2 $z^8$ 3A–3 $E^8$  Size: 163x101 mm

Reference: DSB VI, p. 271; Hend BTM, #20.1, p. 48

D. (Denis?) Henrion, always indicted his first name only with the initial *D* except for one Latin publication in which he identified himself as *Desiderii* (Didier) (see entry for **Henrion**; *Sinuum...*, 1623). Henrion may possibly be a pseudonym for Clément Cyraique de Mangin, but we cannot be certain if these names are actually the same person. He was an engineer in the army of the Prince of Orange before taking up residence in Paris in 1607. Henrion is known to have given private lessons in mathematics and to have translated (or in some cases edited) Latin mathematical texts into French. He is remembered as the first French mathematician to write on logarithms (the first work on the subject in the French language was written by the Englishman **Edmund Wingate**).

This is an extract of material from Henrion's 1623 work, *Memoires mathematiques*. It discusses the construction and use of a number of different scales illustrated in a folding plate. These include a logarithmic scale, tangents, sines and several that are usually found on sectors: lines of polygons, metals, etc. There is also a complex chart of angular grids to be used with some of the problems.

Illustrations available: Title page Plate (2)



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H 108

# Henrion, Denis (ca.1580–1632)

Sinuum, tangentium, et secantium canon manualis, supputatus à B. Pitisco, & emendatus in hac editione, in qua addunter omnia præcipua ac pernecessaria, quæ ad trigonometriam spectant, deprompta ex tractatibus doctrinæ trianglorum tam rectilineorum, quá sphæricorum.



 $H_{108}$ 

Year: 1623 Place: Paris

Publisher: Melchior Mondiere

Edition: 1st Language: Latin

Binding: contemporary vellum

Pagination: ff. [162] Collation: A–V<sup>8</sup>X<sup>2</sup> Size: 114x57 mm

This is the only publication in which Henrion uses a first name (*Desiderii*) rather than his first initial, *D*.

This set of tables was evidently published simultaneously in French and Latin. The tables were those of **Bartholomaeus Pitiscus** (see entry for his *Canon triangulorum*, 1600, and the entry for his *Canon manual des sinus*, 1619). It begins with a short introduction of the trigonometric functions, followed by the tables, and ends with a description of plane and spherical trigonometry. There are also a few examples in which the method of prosthaphaeresis is demonstrated.

Illustrations available: Title page Sample table page

# H 109

# **Henrion, Denis** (ca.1580–1632)

Usage du compas de proportion

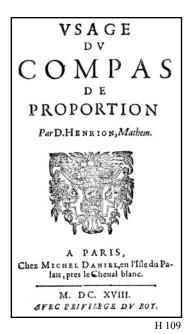
Year: 1618 Place: Paris

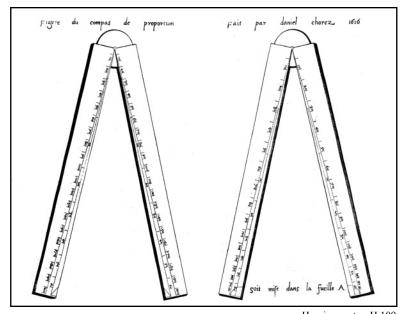
Publisher: Michel Daniel

Edition: 1st Language: French

Binding: contemporary vellum; front cover torn

Pagination: pp. [8], 90, [6] Collation: A<sup>4</sup>A–F<sup>8</sup> Size: 165x103 mm





Henrion sector, H 109

Henrion had seen a sector, made by Jacques Alleaume, in Paris. Seven years later, in 1623, Edmund Gunter published his work on the sector with no attribution of its invention to others (see Gunter, Edmund; The description and use of the sector). Henrion assumed that Alleaume had invented the sector and claimed any improvements as his own. It is obvious that Henrion was not aware of the earlier publications of Hood, Galileo and several others. He goes on to claim that an unnamed individual (Gunter) had stolen the idea for the sector from him. In this work, Henrion describes a very simple sector made in 1616 by Daniel Chorez (see the illustration), a major French instrument maker of the day. This sector had only four scales (line of lines, chords, planes and solids). He describes its usage in terms useful only to someone with his own military background. Only in later editions did he expand the description of applications.

This work, like **Gunter**'s in England, was the one that introduced the sector into France. It was well received and went through at least twenty different editions. One edition is erroneously dated 1564 (most likely 1664), an attribution that at one time instigated debate about the date of the instrument's invention.

Illustrations available: Title Page Sector

H 110

**Henrion, Denis** (ca.1580–1632)

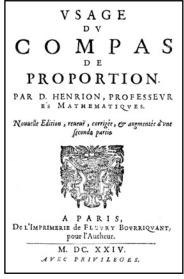
Usage du compas de proportion. Nouvelle edition, reveuë, corrigée, & augmentée d'une seconde partie

Year: 1624 Place: Paris Publisher: F. Bourriquant pou l'Autheur Edition: 2nd Language: French Binding: contemporary vellum; rear cover torn Pagination: pp. [2], 24, 33–86

Collation: πA–I<sup>4</sup>K<sup>3</sup>(C4 misnumbered A4)

Size: 175x109 mm

This new edition (*Nouvelle edition*), which should not be confused with the *second edition* published in the same year, contains additional material. In both the first and second editions, Henrion limits his descriptions to problems of a general nature. In this edition he indicates that there are two sets of sector users: those who are

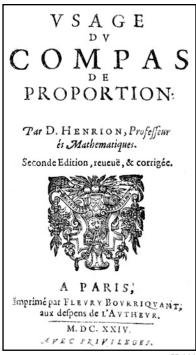


H 110

users and those who are interested in the theory behind the device. The added material is to satisfy the latter individuals.

Unlike the second edition of this same year, the first part of this edition has the illustration of Daniel Chorez's 1616 sector (it is obviously taken from the same engraved plates as the earlier edition, but because it is different in size to the other signatures its use here may be due to to the printer's having had a surplus). The inclusion of the new material would seem to indicate that this new edition was produced (by the same printer) after the second edition; however, the fact that the second edition does not contain an illustration of the Chorez sector would suggest the opposite.

Illustrations available: Title page



# H 111 Henrion, Denis (ca.1580–1632)

Usage du compas de proportion. Second edition, reveuë, & corrigée.

> Year: 1624 Place: Paris

Publisher: F. Bourriquant

Edition: 2nd Language: French

Binding: contemporary vellum; rear cover torn

Pagination: pp. [8], 90, [6] Collation: A4A-F8 Size: 175x109 mm

This second edition should not be confused with the Nouvelle edition, which was issued in the same year. Unlike both the first and the Nouvelle edition, this one does not use the illustration of the Chorez sector. nor does it contain the additional material found in the Nouvelle edition.

Illustrations available: Title page

H 112

# **Henrion, Denis** (ca.1580–1632)

L'usage du compas de proportion.

Year: 1626 Place: Paris

Publisher: Jean Bourriquant

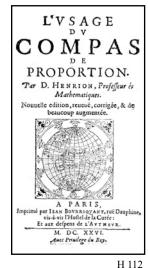
Edition: 3rd Language: French

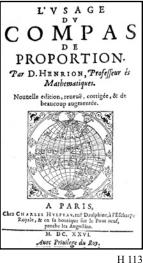
Figures: 2 plates by Daniel Chorez, 1616

Binding: contemporary vellum Pagination: pp. [8], 136 Collation: A4A-H8I4 Size: 172x109 mm

There were two editions produced in 1626, one published by Jean Bourriquant and another by Charles Hulpeau. Each has a slightly different title page, but they are otherwise identical. They both contain additional material not appearing in earlier editions. By this time the sector had become well enough known that Henrion felt he should include descriptions of the lines commonly found on the instrument. His prior descriptions were for a very simple set of scales—see the entry for the 1618 edition. The sector illustrated here contains a line of lines and lines for metals, polygons, solids and chords.

Illustrations available: Title page of Bourriquant printing





# Erwin Tomash Library

# H 113

# Henrion, Denis (ca.1580–c.1632)

L'usage du compas de proportion

Year: 1626 Place: Paris

Publisher: Charles Hulpeau Edition: 3rd (another issue) Language: French

Figures: 2 plates by Daniel Chorez, 1616

Binding: contemporary leather; gilt spine and dentelle edges;

rebacked; 22 blank leaves at end

Pagination: pp. [8], 136 Collation: A4A-H8I4 Size: 172x109 mm

See the entry for the 1626 edition printed by Jean Bourriquant.

Illustrations available:

Title page of Hulpeau printing

# H 114

# **Henrion, Denis** (ca.1580–1632)

L'usage du compas de proportion. Quatriesme edition, reveuë, corrigée, & de beaucoup augmentée

Year: 1631 Place: Paris Publisher: L'autheur Edition: 4th Language: French

Figures: 2 plates by Daniel Chorez, 1616

Binding: later vellum

Pagination: pp. [4], 147 (mis# 147 as 146), [1]

Collation: π<sup>2</sup>A–I<sup>8</sup>K<sup>2</sup> Size: 163x95 mm

While the title page promises an enlarged edition, the added material is not of great import. It would appear that by this time Henrion was responding to market imperatives in an effort to sell more copies.

Illustrations available:

Title page

# H 115

# **Henrion, Denis** (ca.1580–1632)

L'usage du compas de proportion. Nouvellement revû, corrigé, & augementé d'une seconde partie, enrichie de plusieurs figures en taille-douce

Year: 1564 (1664?) Place: Rouen

Publisher: Denis du Chesne

Edition: 5th Language: French Figures: 1 folding plate Binding: contemporary vellum Pagination: pp. 4, 196

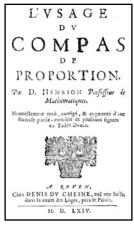
Collation:  $\pi^2 A - M^8 N^2$ Size: 160x103 mm

Reference: DSB VI, p. 271; Pogg Vol. I, p. 1068-1069

This edition contains a folding plate that illustrates a sector with a scale called a line of tangents, but is otherwise little changed from earlier editions.

The obvious error in the date on the title page one time became the basis for claiming that Henrion had invented the sector. The true date is unknown, but it presumably should have been 1664. It has been suggested that the error is due to a simple transposition for the date 1654. However, this explanation is unlikely as the date is given in Roman numerals. A more likely theory is that a C was simply omitted.

Illustrations available: Title page



H 115

# H 116

# [Henrion, Denis (ca.1580–1632)]; Jean Deshayes

L'usage du compas de proportion. De D. Henrion, mathematicien. Nouvellement revû, corrigé, & augementé en toutes ses parties de plusieurs propositions nouvelles & utiles ...

> Year: 1681 Place: Paris

Publisher: Chez l'Autheur et chez R. J. B. De La Caille

Edition: 6th (another issue)

Language: French

Figures: engraved frontispiece by De La Marqueterie; 2 folding

plates (identical)

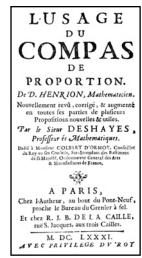
Binding: contemporary leather; gilt spine; dentelle edges

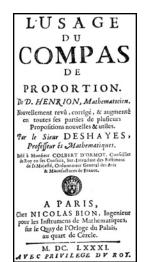
Pagination: pp. [28], 290, [10] Collation: π<sup>6</sup>a<sup>4</sup>e<sup>4</sup>A-2O<sup>4</sup>2P<sup>2</sup> Size: 185x118 mm

See the entry below for another 1681 issue of this work.

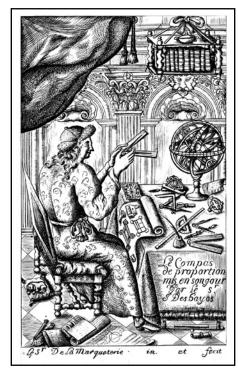
Illustrations available:

Title page Frontispiece Sector plate





H 116 H 117



Sector in use, H 117

# [Henrion, Denis (ca.1580–1632)] Jean Deshaves

L'usage du compas de proportion ... Nouvellement revu, corrigé, & augementé en toutes ses parties de plusieurs propositions nouvelles & utiles ...

> Year: 1681 Place: Paris

Publisher: Nicolas Bion

Edition: 6th Language: French

Figures: engraved frontispiece by De La Marqueterie; 1 folding

plate

Binding: contemporary leather; gilt spine; dentelle edges

Pagination: pp. [24], 290, [12] Collation:  $\pi^4 a^4 e^4 A - 2O^4 2P^3$ Size: 190x120 mm

This is a late edition of Henrion's work. There are two very similar issues, this one published by the famous instrument maker Bion and another shown as Chez l'Autheur et chez R. J. B. De La Caille. The differences are not confined to the title page; these issues also show different plates of the instrument. The Bion issue has an errata sheet that is not present in the other, although someone has entered most of the errata manually. The engraved frontispiece shows a man using a sector and illustrates a number of other mathematical and astronomical instruments.

Illustrations available:

Title page Frontispiece Plate of sector

# H 118

# Henrion, Denis (ca.1580–1632)

L'usage du mécomètre. Qui est un instrument géométrique avec lequel on peut tres facilement mesurer toutes sortes de longueurs & distances visibles; prendre & raporter au petit pied le plan de villes, chasteaux & autre places; trasser tant sur le papier que sur le terrain telles figures & fortifications qu'on voudra; faire toutes sortes de cartes tant geographiques que chorographiques; & pratiquer toutes les autres operations d'arithmetique & de geometrie, qui se practiquent avec le compas de proportion, la regle proportionelle, le graphometre & la boussole.

Year: 1677 Place: Paris

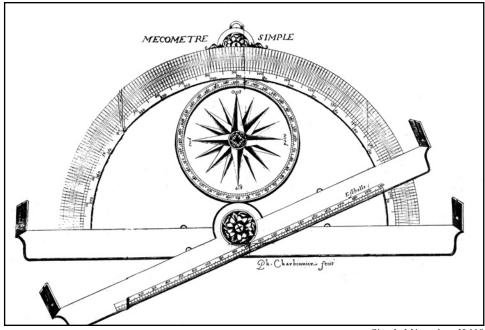
Publisher: Jean d'Houry

Edition: 2nd Language: French

Figures: 2 engraved folding plates Binding: contemporary leather; rebacked

Pagination: pp: [8] 192 Collation: a4 A-M8 Size: 170x109 mm

The Mécomètre is a combined sighting and calculating instrument that Henrion felt might replace the sector and graphometer. This work describes two instruments, one a pure sighting device to be used in surveys (simple Mécomètre) and another with additional scales that could be used for performing calculations. The additional scales, which required the use of a pair of dividers, were similar to those found on sectors: a line of lines, chords, planes, solids, metals, polygons, sines, tangents and a logarithmic scale. The text is divided into two books, the



Simple Mécomètre, H 118

first dealing with the geometric theory on which a survey is based and the second with practical survey problems.

Illustrations available:

Title page Simple Mécomètre Mécomètre with calculating scales (2) Sample survey problem

# L'USAGE

# MECOMETRE.

QUI EST UN INSTRUMENT
Geometrique, avec lequel on peut tresfacilement mesurer toutes sortes de longueurs & distances visibles; prendre &
raporter au petit pied le plan des Villes,
Chasteaux & autres places; trasser tant
sur le papier que sur le terrain telles figures & fortifications qu'on voudra;
faire toutes sortes de Cartes tant Geographiques que Chorographiques; &
pratiquer toutes les autres operations
d'Aritmetique & de Geometrie, qui se
pratiquent avec le Compas de proportion, la Regle proportionnelle, le Graphometre & la Boussole.

Par D. HENRION Mathematicien,

A PARIS, Chez Jean D'Houry, au bout du Pont-neuf, fur le Quay des Augustins, à l'Image S. Jean.

> M. DC. LXXVII. Avec Privilege du Roy.

See Pitiscus, Bartholomeo; Canon manual des sinus, touchantes, et couppantes.

H 119

Henrion, Denis, editor

# Hero of Alexandria (ca. 62) [Bernardino Baldi, translator]

De gli automati, overo machine se moventi, libri due, tradotti dal Greco da Bernardino Baldi Abbate di Guastalla

Year: 1589
Place: Venice
Publisher: Girolamo Porro
Edition: 1st (Italian)
Language: Italian
Binding: modern vellum
Pagination: ff. 47, [1]
Collation: A–M<sup>4</sup>
Size: 201x144 mm

Hero (or Heron) was a first-century Greek scientist and inventor. He is best known for mechanical devices that did simple tasks such as open temple doors or cause objects to rise and fall, apparently without human intervention. Thirteen works in Greek are attributed to him (the *Mechanics* is only known in an Arabic translation, and *Optics* is only known in Latin), but nothing at all is known about Hero himself.

Baldi made this translation in 1576 as a companion to the translation of another work done by his teacher, Federico Commandino. However, its publication was delayed for

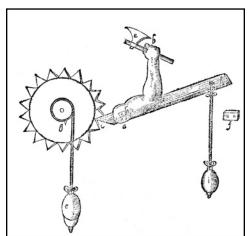
a number of years when Commandino died shortly after the translation was complete. Twelve pages of notes and commentary follow the translation.

Illustrations available:

Title page Colophon (of the translation only) Woodcut of chopping arm Engraving of temple door mechanism



H 119



Automata mechanism, H 119

Il fine delle Machine Se mouenti mobili, e Stabili di Herone Alessandrino Tradotto dal Greco dal Signor Bernardino Baldi. del 1576.

Colophon, H 119

H 120

# **Hero of Alexandria** (ca.62) [Bernardino Baldi, translator]

De gli automati, overo machine se moventi, libri due, tradotti dal Greco da Bernardino Baldi Abbate di Guastalla

> Year: 1601 Place: Venice

Publisher: Gio. Batista Bertoni

Edition: 2nd (Italian) Language: Italian

Figures: engraved title page

Binding: contemporary vellum (stained); ties lacking

Pagination: ff. 47, [1] Collation: A–M<sup>4</sup> Size: 190x143 mm

Reference: Soth/Zeit BCM, #1877

This second edition uses the engravings that were made for the first edition in 1589 but uses new woodcuts in a number of instances. The title page carries a new name for the printer and a new date in the small shield.

Illustrations available:

Title page

Colophon and registry

H 121

# Herr, Donald Lincoln (1916–) and Graham, R. Shiels

An electrical algebraic equation solver. In The Review of Scientific Instruments. Volume 9, new series, October 1938.

Year: 1938 Place: New York

Publisher: American Institute of Physics

Edition: 1st Language: English Binding: library buckram Pagination: pp. 310–315 Size: 259x192 mm

Herr was with the Moore School of Electrical Engineering at the University of Pennsylvania, and Graham was at Bell Telephone Laboratories.

This paper describes an electro-mechanical machine for finding roots of equations. It is of interest primarily because it documents the fact that members of the Moore School were developing aids to calculation prior to their work on differential analyzers, ENIAC and EDVAC.

Illustrations available:

None

# H 122

# Herr, Gottfried

Ein neues Arithmetisches Buch. Einfältig in auszgerechnete Tabellen verfertiget. Darinnen vornemlich Denen Ertzhertzoglichen Oesterreichischen und anderen Landen. Im kauffen und verkauffen durch das Addiren und Summiren. Wie ingleichen Mit denen auszgerechneten Interessen, Gewinn und Verlust-Raitungen. Als auch Verwechselung der Müntze. Zusambt Einem Anhang der Species in gantzen und gebrochenen Zahlen und unterschiedenen Regeln nach der Regula Detri extractisch beygefüget. Denen Ampts Personen Kauff und Handelsmannen in Eil nützlichen zu gebrauchen wolmeynend auszgefertiget.

Year: 1663 Place: Breslau

Publisher: For the author by Gottfried Gründer, successor to

George Baumann, the younger.

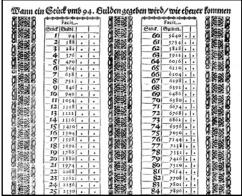
Edition: unknown Language: German

Binding: original stiff paper wrappers

Pagination: pp. [284] Collation: ):(<sup>4</sup>A–S<sup>6</sup>T–2B<sup>4</sup>2C<sup>4</sup> Size: 313x201 mm

See also the entry for **Herr**, 1653. This is an early ready reckoner containing a series of tables for use in commercial transactions (multiplication of various numbers of items by quantities ranging from 1 to 10,000; interest tables, etc.). A standard work on arithmetic at the end of the table section uses both gelosia and modern versions of division. The tables are framed and divided by bands of typographic ornaments. An earlier version was published in 1653. This edition has many of the same tables as the 1653 version. The arithmetic section, while similar, is not identical—words have been altered and examples modified.

Illustrations available: Title page Sample table page



Sample table, H 122



H 122

H 123

# Herr, Gottfried

Vermehrtes Arithmetisches Hand-Buch. Darinnen zum Anfang die Species in gantzen und gebrochenen Zahlen, zusampt 364. Tabellen zubefinden. Als: 1. In vier Theilen, das Marckt oder Kauff-Buch, welches nach der Regula Detri, auff allerhand Wahren und Sorten zugebrauchen, auff Thaler, Groschen, Heller und Theil der Heller in 147 Tabellen ausgerechnet. 2. In vier Theilen, die Zinss-Rechnung, sechs und fünff pro Cento, auff Jahr und Wochen in 136 Tabellen. 3. Vom Gewin und Verlust, von 1 biss 10. dann 20, 30, 40, 50, 60, 70, 80, 90. Wie auch 1/4, 1/2 und 3/4 Thaler pro Cento, in 21 Tabellen. 4. In zwey Theilen die angelegten Steuern, nach der Steur-Ansage, auff Geld und Getrende de in 38 Tabellen. 5. Die Verwechselung der gebräuchlichen Müntze in Schlesten, in 20 Tabellen. Wie ingleichen zwo Tabellen zur Regula Quadrata und Cubica dienlichen: Zusampt einer wenigen Anleitung, wie die Land, Wirthschaffts-Rechnungen, auff art des Buchhaltens disponiret werden können.

> Year: 1653 Place: Breslau

Publisher: For the author by Baumannischer Druckerey Gottfried Gründer

Edition: 2nd Language: German

Figures: title in red and black; tables in red and black Binding: contemporary blind-stamped leather with ties

Pagination: ff. 120

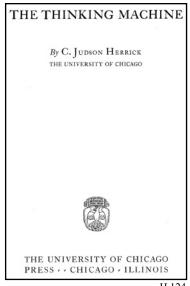
Collation:  $\pi^2 A - B^4 C^6 A - F^6 G^8 H^6 I^3 1 - 4^6 5^8 I^3 K - L^6 M^4$ 

Size: 314x230 mm

See also the entry for Herr, 1663. This version of the ready reckoner does not have the large typographic ornaments of the other edition, but the printing is skillfully done in red and black. In this edition the arithmetic precedes the tables rather than following them, and while most tables are identical, this version has a table of squares and one of cubes not found in the later version.

Illustrations available: Title page (color) Sample table page (color)





H 124

# Herrick, Charles Judson (1868–1960)

The thinking machine

Year: 1929 Place: Chicago

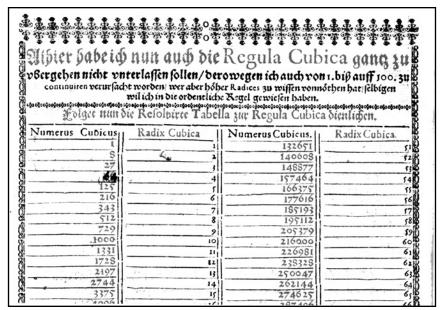
Publisher: University of Chicago Press

Edition: 1st Language: English

Binding: original cloth boards, spine faded

Pagination: pp. xii, 374 Size: 194x128 mm

Reference: DSB VI, pp. 320-322



Sample table, H 123

Herrick and his elder brother, Clarence Luther Herrick, were the creators of the field of comparative neurology and psychobiology. They were both professors at Dennison University. Clarence later moved to New Mexico for health reasons, and Charles eventually became a professor of neurology at Chicago.

This is a popular work that encapsulated the ideas about the nervous system that Herrick and his brother had pioneered over the previous forty years. It was meant to describe humans in such a way as to show, as the preface puts it: how we live, what the apparatus of life is and how it works, in order to make a better job of it. A second edition was produced in 1960.

Illustrations available: Title page

# H 125

# Herring, William Conyers (1914–)

Theory of transient phenomena in transport of holes in an excess semiconductor. In Some contributions to transistor electronics. Monograph 1726.

Year: 1949 Place: New York

Publisher: American Telephone & Telegraph Company

Edition: 1st Language: English

Binding: original paper wrappers

Pagination: pp. 67–93 Size: 277x213 mm

This paper, originally published in Bell System Technical Journal, Vol. 28, pp. 335–489, July, 1949, is one of the defining papers of semiconductor technology. See also the entry for **American Telephone & Telegraph Company**, *Some contributions to transistor electronics*. Monograph 1726, 1949.

Illustrations available: First page

# H 126

# Herschel, John Frederick William (1792–1871)

A collection of examples of the applications of the calculus of finite differences.

b/w: **Babbage**, **Charles**; *Examples of the solutions of functional equations, 1820* 

b/w: **Peacock, George**; A collection of examples of the applications of the differential and integral calculus.

Year: 1820 Place: Cambridge

Publisher: J. Smith for J. Deighton et al.

Edition: 1st Language: English

Binding: rehinged; original cloth over boards Pagination: pp. viii, 506, vi, 172, [iv], 42 Collation: \*4A-3Q<sup>4</sup>3R<sup>3</sup>3S<sup>2</sup>\*a<sup>3</sup>\*A-\*X<sup>4</sup>\*Y<sup>2</sup>\*2A-E<sup>4</sup>F<sup>1</sup>

Size: 220x130 mm

Reference: Van S *CBCP*, #70; Babb *CBLP*, #71, #73; Ran *ODC*, p. 405

Herschel, a friend of **Charles Babbage** since their undergraduate days, followed his famous father (the discoverer of Uranus) into the field of astronomy. He held a teaching appointment at Cambridge until 1816, when he left there to devote himself to private study. He was elected FRS in 1813 at the age of twenty-one. He is best remembered as the astronomer who mapped the southern stars from the Cape of Good Hope.

See entry for **Babbage**, *Examples of the solutions of functional equations*, 1820.

Illustrations available: None

# [Hertz, Heinrich Rudolf] (1857–1894)

See **Fitzgerald, G. F.**; Presidential address to Section A
- Mathematical and physical sciences. In Report of
the Fifty-Eighth Meeting of the British Association
for the Advancement of Science. Held at Bath in
September 1888.

# H 127

# Hervas, Lorenzo (1735–1809)

Aritmetica delle nazioni e divisione del tempo fra l'orientali.

Year: 1786 Place: Cesena

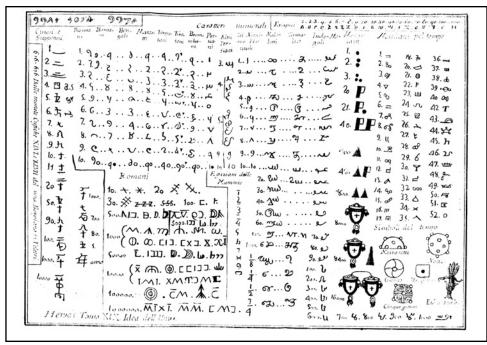
Publisher: Gregorio Biasini Edition: 1st (2nd issue) Language: Italian Figures: two folding tables

Binding: contemporary half-bound leather

Pagination: pp. 201, [1] Collation: A–E<sup>4</sup>E–I<sup>4</sup>I–Z<sup>4</sup>χ<sup>1</sup> Size: 238x172 mm Reference: Not in Redi *BMI* 

Hervas (or Lorenzo Hervas y Panduro) was a Spanish Jesuit who is often called the *father of comparative philology*. He began his studies at the Colegio de Alcalá in Spain, became a missionary in the Spanish colonies in America, and when the Jesuits were expelled from Spain, moved to Italy in 1767. In 1801, he was appointed as the librarian of the civil authorities in Rome.

This is a major work on the comparison of different numerical systems in different languages and cultures.



Numerical notation systems, H 127

Chapter VII alone gives a comparison of the names of numbers in almost 150 different languages. **George Peacock**, in his article on "Arithmetic" for the *Metropolitan encyclopedia*, 1826, probably used this source when he noted the similarity of the Mandingan number system to that used by the Nanticocks in America. The majority of this work is devoted to a study of numerical counting systems; however, the last section (pp. 163–200) considers the manner in which various societies have divided time into hours, days, weeks, etc. A folding plate illustrates a variety of different number symbols.

Illustrations available:

Title page

Mandingan system

Plate showing various number systems

# H 128

# Hervier, Jean; J. A. Henry and A. Roux

Livre de prières. Tissé, d'après les enluminures des manuscrits du XIVe au XVIe siécle, 1886–1887

Year: 1886–1887 Place: Lyon Publisher: A. Roux Edition: 1st Language: French

Binding: original grained maroon leather box and binding by Bevauchelle

Pagination: pp. [50] Collation: no collation Size: . 166x138 mm In 1875, J. A. Henry, a weaver in Lyon, began experimenting with weaving cloth containing text. In 1882, he successfully produced an example containing the text of a poem. Jean Hervier, a Marist priest, proposed to Henry the project of a book of prayers in honor of the fiftieth Jubilee of Pope Leo XIII. Roux edited the prayers from a book by Bossuet, and Hervier created the designs for each page in fifteenth-century Italian style.

This beautiful work was woven, not printed, on a Jacquard loom employing punched cards. In the Jacquard loom, the warp threads are selected by means of hooks controlled by the pattern of perforations in the cards. The book is thus an early example of art generated with the aid of automatic machinery. While some book dealers refer to this as computer art or the first book created on a computer, it can be described as such only in the sense that Charles Babbage used Jacquard cards for the control system of the Analytical Engine and that Herman Hollerith applied the same technique in his punch card machines designed for the U.S. census of 1890. There is, however, almost no connection between the use of punched cards for controlling a loom to produce a book and the multitude of cards once used to feed data to a computer.

The weaving is done in shades of black and gray with over ten threads to the millimeter. It evidently took over 106,000 punched cards to produce this work. While it is often stated that each copy took two years to weave, it is more likely that it took two years to design and produce

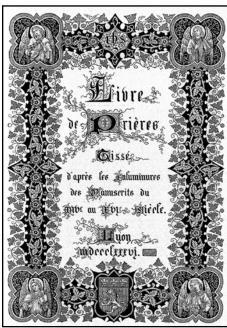
the cards to control the loom. Even in the late 1800s, the Jacquard looms were known to be fast and efficient machines. Once the cards were punched, the actual weaving would have proceeded quite quickly.

While only a limited number of copies were woven (estimates vary between thirty and sixty), the work is not exceedingly rare.

Illustrations available:

Title page

9 examples of pages of text and illustrations



H 128



Sample page, H 128

H 129

Hewitt, John (1705–a.1741)

Hewitt's tables for simple interest shewing in one view the interest of any sum of money, from one penny to 100,000 l. from one day to 365, from one month to 11, and from one year to 10, at 3, 4, 5, 6 per cent. II. A table of time, which shews the number of days between any two in the year. III. Nine tables of brokerage or commission: The stock or value of goods sold, from one Pound to 100,000 l. at ½, ½, ¾, 1, 1½, 1½, 1¾, 2, 2¼, 2½, 2¾, 3, 3¼, 3½, 3¾, 4, 4¼, 4½, 4¾ to 5 per cent. IV. Nine tables to reduce the most current pieces of gold, both foreign and domestick, into Pounds, &c. and on the contrary to reduce Pounds &c. into those different pieces of gold; shewing what each piece should properly weigh.

Year: 1747 Place: London

Publisher: Printed for John Clarke and C. Hitch

Edition: 2nd Language: English

Binding: contemporary leather; rebacked

Pagination: pp. [xv], vi-cvii, [iii], cix-cxvii, [iii], cxxi-cxxix, [i]

Collation: A<sup>11</sup>B<sup>6</sup>C<sup>12</sup>D<sup>6</sup>F<sup>12</sup>G<sup>6</sup>H<sup>12</sup>I<sup>6</sup>

Size: 115x73 mm

The majority of this ready reckoner is made up of interest tables for amounts ranging from 1 to 100,000 pounds. There are two additional small tables of brokerage rates and money exchange.

Illustrations available:

Title page

Sample interest table page

# Hewitt's Tables

# SIMPLE INTEREST.

Shewing at one View, the INTEREST of any Sum of Money, from one Penny to 100,000 f. from one Day to 365, from one Month to 11, and from one Year to 10, at 3, 4, 5, 6 per Cent.

II. A TABLE of TIME, which shews the

Number of Days between any two in the Year.

III. Nine T ABLES of BROKERAGE OF COMMISSION: The Stock or Value of Goods fold, from one Pound to 100,000 l. at \( \frac{1}{5}, \frac{1}{4}, \frac{1}{2}, \frac{1}{4}, \frac{1}{2}, \frac{1}{4}, \

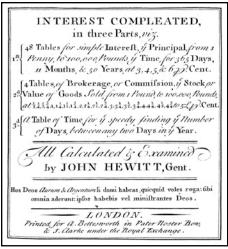
IV. Nine TABLES to reduce the most Current PIECES of Goln, both Foreign and Domeflick, into Pounds, &c. and on the contrary to reduce Pounds, &c. into those different PIECES of Gold; shewing what each Picce should properly weigh.

Calculated and Examined by JOHN HEWITT, Profes'd Accomptant.

Hos Deos, Aurum & Argentum, si Domi babeas, quicquid voles roga, tibi omnia aderunt: Ipsos babebis vel ministrantes Deos.

LONDON: Printed for JOHN CLARKE under the Royal Exchange, and C. HITCH in Pater-noster Row, 1747.

H 129



H 130

H 130

# Hewitt, John (1705–a.1741)

Interest compleated, in three parts, viz. 1. 48 tables for simple interest, ye principal, from 1 penny, to 100,000 pounds, ye time, for 365 days, 11 months, & 50 years, at 3,4,5, & 6 %. 2d., of brokerage, or commission, ye stock, or value of goods sold, from 1 pound, to 100,000 pounds, at 1/8 ... 3d. A table of time, for ye speedy finding ye number of days, between any two days in a year.

Year: 1723 Place: London

Publisher: Printed for A. Bettesworth & J. Clarke

Edition: 1st Language: English

Figures: engraved frontispiece of counting house

Binding: contemporary leather Pagination: Il. 32 engraved Size: 136x122 mm

This first edition of Hewitt's ready reckoner was engraved rather than typeset. It contains, besides the



Frontispiece, H 130

tables of interest, a short table of brokerage rates and one for determining the number of days between any two dates in the year. The frontispiece shows a few gentlemen engaged in trade.

Illustrations available: Title page Frontispiece Sample table page

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Sample table, H 130

H 131

# Hilbert, David (1862–1943)

Die Theorie der algebraischen Zahlkörper.

Year: 1897 Place: Berlin

Publisher: George Reimer Edition: 1st Language: German

Binding: half-bound leather; spine faded Pagination: pp. [2], xviii, 177–546 Collation:  $\pi^{1*8***1}2-34^835^1(-352)$ 

Size: 208x139 mm



H 131

This is Hilbert's famous work on algebraic number theory. At an 1893 meeting of the Deutsche Mathematiker-Vereinigung, Hilbert had presented a few results in number theory, and the meeting asked him and another mathematician, Hermann Minkowski, to prepare a report on the field. Minkowski soon withdrew from the project, but Hilbert's report became this book. It was the standard text on algebraic number theory for many years.

Illustrations available: Title page

H 132

# Hilbert, David (1862–1943) and Wilhelm Ackermann (1896-1962)

Principles of mathematical logic

Year: 1950 Place: New York

Publisher: University Press

Edition: 1st Language: English

Binding: original cloth boards Pagination: pp. xii, 172, [8]

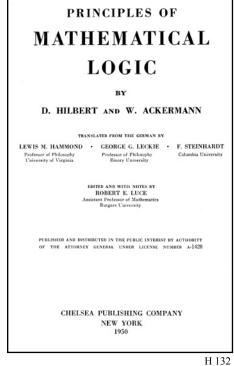
Size: 229x115 mm

Hilbert is regarded as one of the greatest mathematicians of the later nineteenth and early twentieth centuries. He was a professor at the University of Königsberg and, in 1895, moved to the University of Göttingen, where he remained until he retired in 1935. He is known for work in a number of different fields, but his name will always be associated with the twenty-three unsolved problems that he presented to the International Congress of Mathematicians in 1900. By enumerating these most important mathematical problems of the day, Hilbert can be said to have guided pure mathematics research for much of the rest of the twentieth century.

Wilhelm Ackermann, one of Hilbert's students, went on to become a well-respected mathematician in his own right. He is best remembered for the Ackermann's function—a multiply recursive function that is often used to illustrate the technique in courses dealing with programming of computers for scientific applications.

This is a highly technical work on logic that was translated from the German original, Grundzüge der theoretischen logik (second, 1937 edition). The first German edition, in 1928, was designed as an interim work until this much more ambitious book could be written. It proved so popular that it continued to be reissued for many years. It is based on Hilbert's lecture notes for his course in the foundations of mathematics.

Illustrations available: Title page



# Hill, George Francis, Sir (1867–1948)

The development of arabic numerals in Europe. Exhibited in sixty-four tables.

> Year: 1915 Place: Oxford

Publisher: Clarendon Press

Edition: 1st Language: English

Binding: original paper covered boards; embossed front cover

Pagination: pp. 125, [1] Collation: A-G8H7 Size: 248x165 mm Reference: Pul HA, p. 117

Hill was born in India of missionary parents. He was educated in England and attended University College, London, and Oxford. Graduating in classics, he failed to get a fellowship at Oxford and joined the British Museum as a curator in the Department of Coins and Medals in 1893. In 1931, he became the director and principal librarian at the British Museum.

Hill had begun the research leading to this work when he was asked to consider the authenticity of a date of 1481 on a medal. This led him to an understanding that similar questions could not be cleanly resolved without a study of the various forms the Arabic numerals had taken since their introduction into Europe. He first presented his results in 1910 in a paper given to the Society of Antiquaries of London (printed in Archaeologia, Vol.

LXII). That same material, now enlarged, formed the basis for this book.

Illustrations available: Title page Sample page of figures.

# THE DEVELOPMENT OF ARABIC NUMERALS IN EUROPE EXHIBITED IN SIXTY-FOUR TABLES BY G. F. HILL Corpore in exiguo res numerosa fui Entrafy OXFORD AT THE CLARENDON PRESS 1915

H 133

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Early numeral forms, H 133

H 134

Hill, John (1700–1752)

Arithmetick both in the theory and practice, made plain and easie, in all the common and useful rules, both in whole numbers and fractions, vulgar and decimal. Also interest {simple and compound} and annuities. Likewise extraction of the square and cube roots. As also the tables and construction of logarithms, with their use in arithmetick, and compound interest. Together with arithmetical and geometrical progression, and the combination and election, permutation and composition of numbers and quantities. The like not extant.

Year: 1713 Place: London

Publisher: J. M. for D. Midwinter

Edition: 1st Language: English

Binding: contemporary leather

Pagination: pp. [iv], 160, 159-182, 185-362, [102]

 $\begin{aligned} & \text{Collation: } A^2 \ B\text{--}3A^4 \ B\text{--}N^4 \\ & \text{Size: } 182x113 \ mm \end{aligned}$ 

See the entry for the 1733 edition of this work.

Illustrations available: Title page

H 135

Hill, John (1700–1752)

Arithmetick both in the theory and practice, made plain and easie, in all the common and useful rules, both in whole numbers and fractions, vulgar and decimal. Also interest {simple and compound} and annuities. Likewise extraction of the square and cube roots. As also the tables and construction of logarithms, with their use in arithmetick, and compound interest. Together with arithmetical and geometrical progression, and the combination and election, permutation and composition of numbers and quantities. The like not extant.

Year: 1716 Place: London Publisher: J. M. for D. Midwinter Edition: 2nd Language: English

Binding: contemporary leather

Pagination: pp. [iv], 120, 129–136, 121–128, 137–144, 153–160, 145–152, 159–182, 185–378, [102]

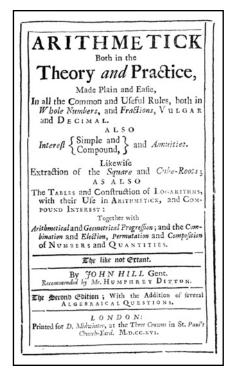
Collation: A<sup>2</sup> B–T<sup>4</sup> X<sup>4</sup> V<sup>4</sup> Y–3B<sup>4</sup> 3C<sup>2</sup> A<sup>2</sup> B–N<sup>4</sup> (i.e. signatures S and X misbound)

Size: 180x110 mm

See entry for the 1733 edition.

Illustrations available:

Title page



H 135

H 136

# Hill, John (fl.1716)

Arithmetick, both in the theory and practice, made plain and easy in all the common and useful rules, both in whole numbers and fractions, vulgar and decimal. Also interest simple and compound and annuities. Likewise extraction of the square and cube roots. As also the tables and construction of logarithms, with their use in arithmetick, and compound interest.

Year: 1733 Place: London

Publisher: Printed by T. W. for D. Midwinter and A. Ward.

Edition: 5th Language: English

Binding: contemporary leather

Pagination: pp. [4], 176, 175–190, 193–378, [102]

Collation: A<sup>2</sup>B–3C<sup>4</sup>B–N<sup>4</sup> Size: 184x111 mm

This is a standard, commercially oriented work on arithmetic. It includes a table of seven-figure logarithms of the numbers from 1 to 10,000. Perhaps the most curious feature of this work is the inclusion, in a description of the number of combinations of *n* items, of six pages of *Artificial Versifying* in which Hill presents tables by which the user can compose Latin verse in either hexameter or pentameter form.

Illustrations available:

Title page

Artificial Versifying section

# H 137

# **Hill, Thomas** (fl.1734)

Practical gauging improved, by the help of a new portable sliding rule, which performs all the operations of Mr. Everard's rule in a more exact manner, the single radius being eight foot long.

b/w: **Hatton, Edward**; *The gauger's guide; or, excise-officer instructed* ..., 1729.

Year: 1734 Place: London

Publisher: Printed for H. Lintot

Edition: Unknown Language: English

Binding: contemporary leather; red leather label

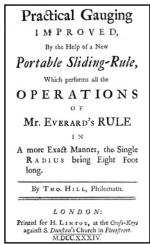
Pagination: pp. [12], 135, [9]

Collation:  $\pi^6B$ – $G^{12}$ Size: 160x95 mm

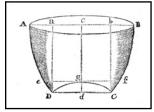
This work describes a sliding gauger's slide rule, which, according to the dedication, is nine times more accurate than the standard one-foot rule while only being itself one foot long when closed. The subject matter of this work is practical gauging with little theory but with unusual examples, i.e., gauging a copper with a convex bottom.

Illustrations available:

Title page Gauging a copper Sliding gauger's rule



H 137



Gauging coppers, H 137

H 138

# Hills, Elijah Justin

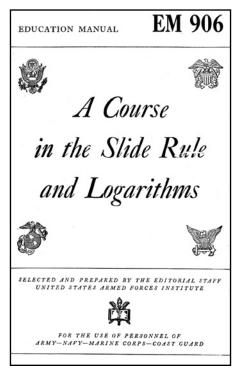
A course in the slide rule and logarithms

Year: 1943 Place: New York Publisher: Ginn & Co. Edition: 1st Language: English

Binding: original paper wrappers Pagination: pp. iv, 107, [1] Size: 204x138 mm

This is, according to the verso of the title page, a reprint of educational material taken from existing standard textbook matter now in use in American schools and colleges. It was specially printed for off-duty study by military personnel and was not for sale or distribution to the civilian market. It begins with a description of many different kinds of linear and circular slide rules, continues with a thorough set of instructions in the use of the different scales, and ends with an appendix containing tables of various physical properties, logarithms and trigonometric functions. The appendix includes a short history of the slide rule in which both **Oughtred** and **Delamain** are given joint credit for the invention of the circular slide rule and **Oughtred** given single credit for inventing the linear version.

Illustrations available: Title page Cover



H 138



H 139

H 139

# Hindenburg, Karl Friedrich (1741–1808)

Beschreibung einer ganz neuen Art, nach einem bakannten Gesetze fortgehende Zahlen, durch Abzählen oder Abmessen bequem und sicher zu finden. Nebst Anwendung der Methode auf verschiedene Zahlen, besonders auf eine darnach zu fertigende Factorentafel, mit eingrstreueten, die Zahlenberechnung überhaupt betreffenden Anmerkungen. Nebst fünf Beylagen und einer Kupertafel.

Year: 1776 Place: Leipzig

Publisher: Siegfried Lebrecht Grusius

Edition: 1st Language: German Figures: 3 folding plates

Binding: contemporary half-bound leather over marbled

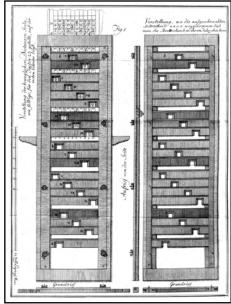
boards; gilt spine Pagination: pp. [8], 120 Collation: \*<sup>4</sup>A-G<sup>8</sup>H<sup>4</sup> Size: 204x116 mm Reference: Pogg Vol. I

Hindenburg was a professor of physics at Leipzig University for most of his career. He was the first to publish, in partnership with others, German mathematical journals. He is best known for his work in attempting to formalize combinatorics.

This is Hindenburg's first book. It is concerned with determining the terms of an arithmetic series. In it, he proposes a mechanical device to assist in the task. The device is illustrated in three folding plates. A previous owner has corrected errors in the tables and mathematical formulae.

The Cambridge University Library catalog entry for this volume indicates that its copy has eight folding plates. This copy has only three.

Illustrations available: Title page Mechanical device



Arithmetic series device, H 139

# H 140

# Hoare, Charles

The slide rule and how to use it: Containing full, easy and simple instructions to perform all business calculations with unexampled rapidity and accuracy

Year: 1875 Place: London

Publisher: Lockwood & Co.

Edition: 5th Language: English

Figures: paper slide rule in pouch inside front cover

Binding: original green cloth boards; front cover blind stamped

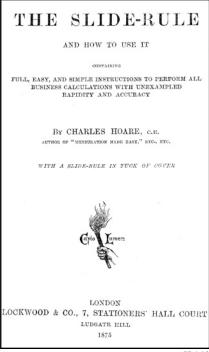
Pagination: pp. vi, 104, (16, 32 catalogs)

Collation: A<sup>3</sup>B–E<sup>12</sup>F<sup>4</sup> Size: 179x108 mm

This introduction to the use of the slide rule has a cardboard slide rule mounted in a pocket glued to the inside of the front cover. This example has two independent slides held in place by thread, making it difficult, if not impossible, to use with any accuracy.

Illustrations available:

Title page Slide rule



H 140

# H 141

# Hoare, Charles

The slide rule and how to use it: Containing full, easy and simple instructions to perform all business calculations with unexampled rapidity and accuracy. With a specimen slide rule

Year: 1953 Place: London

Publisher: The Technical Press

Edition: 22nd Language: English

Binding: original cloth boards Pagination: pp. [2], vi, 104

Collation: A–G<sup>8</sup> Size: 183x121 mm

See the entry for the 1875 edition of this book. It is a testimony to the popularity of Hoare's book that it remained unaltered through all its many editions. This copy lacks the specimen slide rule.

Illustrations available: Title page

# H 142

# Hobson, Ernest William (1856-1933)

John Napier and the invention of logarithms, 1614.

Year: 1914 Place: Cambridge Publisher: University Press

Edition: 1st

Language: English

Figures: Napier portrait photographic frontispiece

Binding: original red cloth boards; spine faded; front cover and

spine gilt embossed

Pagination: pp. 48 Collation: 1–3<sup>8</sup> Size: 189x127 mm Reference: DSB IX, p. 613

Hobson graduated from Cambridge in 1878 as Senior Wrangler (i.e., he placed first in his class in mathematics). He spent his entire subsequent career at Cambridge, becoming well known for his work in mathematical analysis. He was active in reforming the mathematical tripos examinations and in abolishing the Wrangler distinctions.

In 1914, the Royal Society of Edinburgh held the Napier Tercentenary Celebration in recognition of **Napier**'s publication of the *Descriptio* (see entries for **Horsburgh**). This brief work on Napier was written in anticipation of that event. It describes Napier's life, his logarithms (and their errors). It also includes a short description of the work leading up to logarithms by **Michael Stifel** and the independent discovery of logarithms by **Joost Bürgi**.

Illustrations available:

Title page Passage about Stifel Passage about Bürgi Errors in Napier's logs

John Napier and the Invention of Logarithms, 1614

A LECTURE

BY

E. W. HOBSON, Sc.D., LL.D., F.R.S.

\*\*\*SADLEHELD POPTION OF PURE MATHEMATICS PELLOW OF CHART'S COLLEGE, CAMBRIDGE

Cambridge:

at the University Press

1914

H 142

# H 143 **Hodder, James** (fl.1661)

Hodder's arithmetick or, that necessary art made most easie. Being explained in a way familiar to the capacity of any that desire to learn it in a little time. b/w: **Hodder, James**; *Hodder's decimal arithmetick or,* a plain and more methodical way of teaching the said art then hath hitherto been published, 1668.

Year: 1667 Place: London

Publisher: J. Darby for Thomas Rooks

Edition: 4th Language: English

Figures: engraved portrait frontispiece

Binding: contemporary leather Pagination: pp. [x], 216

Collation: A<sup>6</sup>B–K<sup>12</sup> Size: 142 x 83 mm

Hodder was a schoolmaster in Lothbury, London, but moved to Bromley-by-Bow after the Great Fire of 1666, returning to London only after the reconstruction. He appears to have died sometime between the eleventh, 1672, and twelfth, 1678, editions of this work. The twelfth was edited by his successor, Henry Mose. Cocker is said to have based his famous arithmetic book on Hodder's original, the two being almost identical except for Cocker's adoption of the modern mode of division. **DeMorgan** (*Arithmetical books*) argues that Cocker's arithmetic is simply a forged update of Hodder's work.

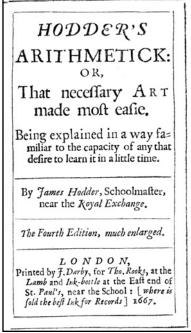
This is a standard arithmetic with its examples all taken from trade and commerce. Hodder continued to teach the galley method of division when it was, by this time, out of favor (see entry for **Hodder**, 1678, for an illustration of the galley division identical with that of this volume). The author is shown in an engraved portrait frontispiece, the engraving being done by Gaywood in early editions and by Van Hove in later ones.

Many editions of this work are known. The first in 1661, third in 1664, ninth in 1672 and others for 1681, 1685, 1693, 1697, 1702, and the twenty-seventh in 1739.

Illustrations available: Title page and frontispiece



James Hodder, H 143



H 143

# H 144 **Hodder, James** (fl.1661) [**Henry Mose**, editor]

Hodder's arithmetick or, that necessary art made most easie. Being explained in a way familiar to the capacity of any that desire to learn it in a little time.

Year: 1678 Place: London

Publisher: T. H. for Ric. Chiswell and Thomas Sawbridg

Edition: 12th Language: English

Figures: engraved frontispiece Binding: contemporary leather; rebacked

Pagination: pp. [12], 216 Collation: A<sup>6</sup>B–K<sup>12</sup> Size: 149x80 mm

This twelfth edition of Hodder's arithmetic was edited by Henry Mose, who on the title page identifies himself as *late Servant and Successor to the Author*. Mose continued as editor until the edition of 1720, when presumably he died. Mose notes that he has *revised*, *augmented*, *and above a thousand faults amended* for this edition. How a work goes through eleven previous editions essentially unchanged and has over one thousand errors to be corrected strains credulity. Despite these corrections, this edition includes an errata page with seven entries.

The last edition was edited by Williams Hume in 1739.

Illustrations available:

Title page and frontispiece
Gelosia division example

# HODDER'S ARITHMETICK

OR,

That necessary A R T

Being Explained in a way familiar to the capacity of any that defire to learn it in a little time.

By James Hodder, Writing-Master.

The Twelfth Edition, revised, augmented, and above a thousand faults amended, by Henry Mose, late Servant and Successor to the Author.

L O N D O N,
Printed by T. H. for Ric. Chifwell, at the
Rose and Crown in St. Paul's Church-yard,
and Thomas Sawbridg, at the Three
Flower-de-luces in Little Britain,
1 6 7 8.

H 144

H 145

# Hodder, James (fl.1661)

Hodder's decimal arithmetick or, a plain and more methodical way of teaching the said art than hath hitherto been publish'd. Also tables of interest upon interest, with the value of all sorts of purchases at any rates from 5 to 12 per cent. Of rebate, resolving any question by ocular view. Likewise, the true use of the said tables.

b/w: **Hodder, James**; *Hodder's arithmetick or, that* necessary art made most easie. Being explained in a way familiar to the capacity of any that desire to learn it in a little time, 1667.

Year: 1668 Place: London

Publisher: J. C. for Thomas Rooks

Edition: 4th Language: English

Figures: engraved portrait frontispiece Binding: contemporary leather Pagination: pp. [12], 157, [3] Collation: [A<sup>6</sup>]C–M<sup>6</sup>N–R<sup>4</sup>

Size: 142 x 83 mm

This is the decimal arithmetic of Hodder. This copy lacks the title page and first five leaves. Instead, it has a repeat of the frontispiece and the first five leaves of the first volume (**Hodder**, 1667). The work is quite

different from the usual Hodder (fractional) arithmetic

and contains tables of interest and rebate. It also covers

623

topics not found in his other work. In this edition the engraved portrait of Hodder is by Gaywood.

**DeMorgan** (*Arithmetical books*) notes the existence of *Hodder's Decimal arithmetic*, but he had not actually seen a copy. His reference came from a listing of the 1671 edition in a sale catalog, and he was unaware of earlier editions.

Illustrations available: Table page

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5	0.2438907	5	0.250456
	0.2097048		0.215315
7.00	0. 855532	7 8	0.192072
	0.1.74578		0.174014
9	0.1534865	9	0.160079
10	01(23775	10	
11	0.1333570	11	0.140876
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21	0.0922890	21	0.099832
2:	0.0904058	22	0.0386321
27	0.0387140	23	0,096422
24	0,0871850	24	0.0549780
25	0,0858105	25	0.0935800
25	0.00456.1	26	0.0925071
27	0.0824268	27	0.091448
23	0.0822020	28	0.0904889
29	0.08:3487	29	0.0896189
30	0.0805853	30	0 0888274
31	0.0798023	31	0.0880546

Sample table, H 146

# H 146

# Hodges, J.

Complete ready reckoner or, trader's companion; shewing, at one view, the value of any quantity of goods from one to one thousand, at any price, from one farthing to one pound

Year: 1827 Place: London

Publisher: Dean and Munday

Edition: 1st Language: English

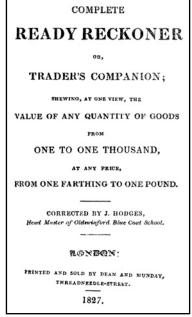
Binding: modern half-bound leather over marbled boards

Pagination: pp. 192 Collation: A–H<sup>12</sup> Size: 125x65 mm

The name J. Hodges occurs as an editor on a number of arithmetic books in the previous century, but it is unknown if there is any relationship between them and the author of this ready reckoner.

This is a pocket-size ready reckoner for the price of goods. It contains the basic table and a three-page description of the weights and measures adopted in England and Wales in 1826.

Illustrations available: Title page Sample table page



H 146

H 147 **Hodgson, James** (1672–1755)

A system of the mathematics, containing the Eucledian geometry, plane and spherical trigonometry; the projection of the sphere, both orthographic and stereographic, astronomy, the use of the globes and navigation: The manner of computing the appulses of the moon to the fixed stars, and their occultations by the interposition of her body, very useful for determining the difference of longitude between places. With an account of the several methods proposed and made use of, by the most celebrated astronomers for ascertaining the same. New solar tables with their construction and use. Tables of the sun's place, right ascension, declination, equation of natural days for every four years; with tables of variation to make them serve for a hundred years to come; and a catalogue of the right ascensions, declinations, & c. of the most eminent fixed stars: deduced from the Flamstedian observations. The construction of the meridional parts, logarithms, sines, tangents and secants, both natural and artificial, by the Newtonian series. With an account of the cycles, periods, epoch's, epacts, kalendars & c. Also a table of meridional parts for every degree and minute of latitude to the ten thousandth place in decimals, calculated de nova. Together with a large and very useful table of the latitudes and longitudes of places; the whole being designed for the use of the Mathematical school, founded by King Charles II. [Volume 1 and Volume 2.]

Year: 1723 Place: London Publisher: for Thomas Page, William and Fisher Mount

Edition: 1st Language: English

Figures: 5 engraved folding plates

Binding: Contemporary mottled calf, elaborately gilt Pagination: v. 1: pp. [4], ix–xx, 323, [1], 285–520, [1], 526–540, 537–697, [1] (lacking i–viii) v. 2: pp.[4], xii, 422,

[2], 417–542, [2], [128]

Collation: v. 1:  $\pi^2c^4d^2A - B^4$  (misnumbering A1 as B1) D-Y<sup>4</sup>Z<sup>2</sup>2A-2T<sup>4</sup>2P-3U<sup>4</sup>3X<sup>2</sup>3Y-4U<sup>4</sup> v.2:  $\pi^2b^4c^2$ 3A-5T<sup>4</sup>4U<sup>4</sup>4T-4U<sup>4</sup>A-O<sup>4</sup>

Size: 215x160 mm

Hodgson, a mathematics teacher and writer, was elected a Fellow of the Royal Society in 1703, and in 1733 he became a member of the Council. He was a friend of John Flamsteed and married his niece. When Flamsteed died, Hodgson helped his widow in the publication of her husband's work and was co-editor of *Atlas Celestis* in 1729. For most of his professional career, he was master of the Royal School of Mathematics at Christ's Hospital in London. This work was designed to be used as a text for that institution.

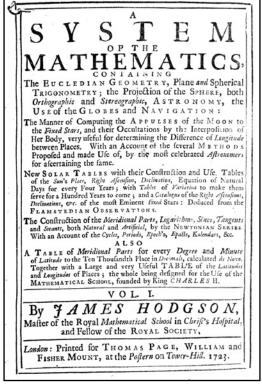
In Volume I the eighth title word is spelled *Eucledian* while in Volume II it is spelled *Euclidean*.

This large work starts with geometry and trigonometry and then applies this background to problems in navigation. The section on navigation is not limited to the mathematics of plane and spherical triangles but also includes information that anyone aspiring to a naval career would need to know. It also contains the tables that would be needed in practical situations. The subject of astronomy follows, including projections of the sphere and use of the globes. Volume 1 ends with a discussion of the construction of logarithms.

Volume 2 is mainly concerned with astronomical problems. It begins with a thorough treatment of spherical trigonometry and its application to astronomical problems. The volume contains tables of longitude and latitude for hundreds of locations, a table of logarithms to seven decimal places and a table of logarithms of the trigonometric functions, again to seven decimal places.

This is a presentation copy from the author to Edward Vernon (1684–1757), who joined the navy in 1700 and eventually became Admiral of the White in 1745. Vernon had a distinguished career and is best remembered for a battle in which he captured Porto Bello (in Panama) in 1740. He is also remembered as the officer who first ordered that raw spirits could not be served aboard his ships. From that time forward, all rum rations were diluted with one quart of water to one half pint of rum.

Illustrations available: Title page, Vol 1 Title page, Vol 2 Sample trig table page Dedication inscription



H 147

Hoffman, Johann Josef Ignaz, translator See Delambre, Jean-Baptiste Joseph; *Ueber* 

die Arithmetick der Griechen. Mit einegen Verbesserungen und einer Tabelle versehen.

H 148

# Holbrook, Nelson M.

The child's first book in arithmetic

Year: 1849

Place: Portland, ME Publisher: Bailey & Noyes

Edition: 1st Language: English

Binding: original paper stiff wrappers

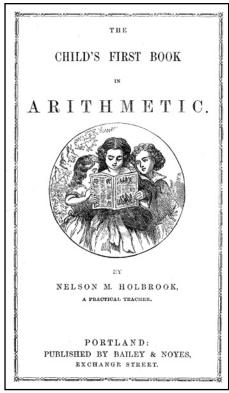
Pagination: pp. 112 Size: 169x102 mm

This is a simple arithmetic book covering the four basic operations and fractions. The examples are mainly commercial. The final pages contain exercises in which the student is asked to draw simple figures. They also contain printed and written versions of the alphabet.

Illustrations available:

Title page

Numeration with Roman numerals



H 148

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Six .		٠,		6				6					VI
Seven .				7		٠.		7					VII
Eight .				8				8					VIII
Nine .				9				9					IX
Ten .				10				10				٠.	X
Eleven				11				11					XI
Twelve				12				12					XII
Thirteen				13				13					XIII

Numeration, H 148

H 149

# Holder, William (1616–1698)

A discourse concerning time, with application of the natural day, and lunar month, and solar year, as natural. And of such as are derived from them; as artificial parts of time, for measures in civil and common use. For the better understanding of the Julian year and calendar. The first column also in our church-calendar explained. With other incidental remarks.

Year: 1701 Place: London

Publisher: J. Heptinstall for Phil. Monkton

Edition: 2nd Language: English

Binding: contemporary leather; red leather label

Pagination: pp. [iv], 106, [2]

Collation: A–G<sup>8</sup> Size: 158x98 mm

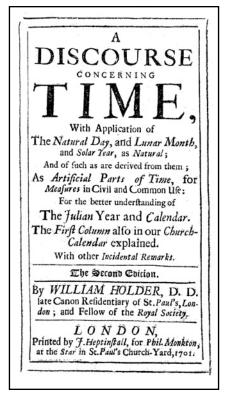
Holder had studied at Cambridge and was elected Fellow of Pembroke Hall in 1640. Later he was a canon of St. Paul's in London. He was elected to the Royal Society in 1663 and contributed several papers to the Philosophical Transactions. He was famous for his teaching a deafmute to speak and did research on deafness for several years, producing books and papers on the subject.

This is an account of various measures of time. Holder gives an historical summary of how each version of the calendar began and concentrates on explaining the Julian calendar (then the one in use in England) but acknowledges its defects. He concludes with a short description of the sounds made by various letters and how the alphabet might be revised.

The first edition of the work appeared in 1698, and a third edition appeared in 1712.

Illustrations available:

Title page



H 149

## [Hollcroft, T. R.]

See American Mathematical Society; The summer meeting in Hanover. In Bulletin of the American Mathematical Society, Volume 46, No. 11, November 1940.

#### H 150

#### Hollerith, Herman (1860–1929)

Complete specification. Improvements in or relating to machines for compiling or tabulating statistics and other numerical data.

Year: 1902 Place: Redhill Publisher: HMSO Edition: 1st Language: English

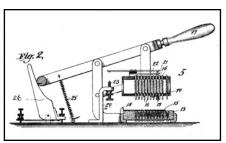
Figures: 11 lithographed plates Binding: modern paper wrappers

Pagination: pp. 14 Size: 280x190 mm

Reference: MTAC, vol. III, pp. 62-63

Herman Hollerith was the child of German immigrants to the United States. He received an engineering degree from the Columbia School of Mines in New York in 1879, and shortly thereafter he joined the Census Bureau in Washington, D.C., as a statistician. His experience at the Census Bureau led him to consider mechanically manipulating the large amounts of data being collected.

In 1882, Hollerith joined the mechanical engineering department of MIT, where he started to investigate a suggestion made to him by Dr. John Shaw Billings, librarian of the Army Medical Corps, whom he had met while in Washington, that the Jacquard loom might be applicable to census work. Hollerith concluded that the Jacquard loom was not applicable to the needs of the Census Bureau but also became convinced that the punched card represented a convenient method of storing the data.



Hollerith card reader, H 150

Hollerith's concept of using Jacquard cards to store data rather than to control a mechanism seems to have been arrived at independently. He apparently had no knowledge of **Babbage**'s plan to use perforated cards to hold data as well as to instruct his analytical engine.

The 1890 census tabulation using Hollerith's punched cards was a marked success. Hollerith made certain that he applied for patents on the tabulating equipment. His application had been filed when the machinery was first built and, after some delay, was issued in 1901.

Illustrations available:

Title page

Illustration of his press card reader

#### H 151

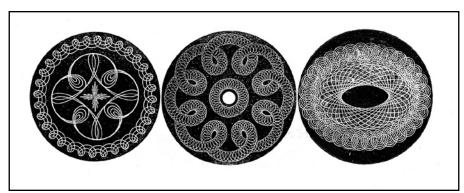
# Holtzapffel, Charles (1806–1847)

A new system of scales of equal parts, applicable to various purposes of engineering, architectural and general science. Illustrated by a facsimile of the scales on copper plate.

Year: 1838 Place: London Publisher: John Weale Edition: 1st Language: English Figures: 1 folding plate

Binding: original cloth boards; paper label

Pagination: pp. 46, [6], xxiv Collation:  $\pi^8 B^8 C^{10} A^4 B^8$  Size: 223x138 mm

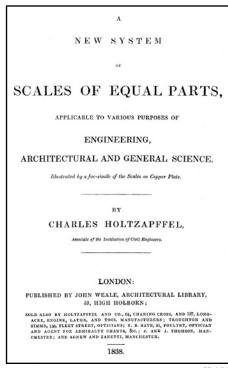


Rose engine work, H 151

Holtzapffel was the son of a German tool and lathe operator who immigrated to London in 1787. His father saw to his training in mechanics. He was a member of the Institute of Civil Engineers and chairman of the Mechanic's Committee of the Society of Arts. The firm of Holtzapffel & Co. made and sold instruments from 1827 to 1914, but the association with this author is uncertain.

This is a description of an instrument used for calculating weights and masses of different materials. It could also be used for finding standard multiples of numbers, e.g., to obtain diameters of circles. Holtzapffel used two scales, one of which was 3.1416 times the other. A catalog of various scales and tools offered by the firm is found at the rear of the book. This lists tools from simple awls and augurs to lathes for both turning and machine finishing work. An illustration in the catalog shows results of the work of a *rose engine* with various attachments.

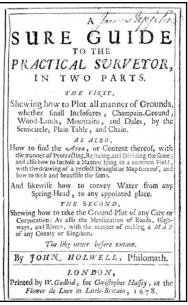
Illustrations available: Title page Rose engine work



H 151

### Holtzapffel, Charles (1806–1847)

See Babbage, Charles and Charles Holtzapffel; Paper on the principles of tools, for turning and planing metals. In Babbage, Charles; Works of Charles Babbage [A Collection of 17 items by or about Babbage bound in 1 volume] From: Holtzapffel, Charles; Turning and mechanical manipulation.



H 152

#### H 152

## Holwell, John (1649–1686?)

A sure guide to the practical surveyor, in two parts. The first shewing how to plot all manner of grounds, whether small inclosures, champain-ground, woodlands, mountains, and dales, by the semicircle, plain table, and chain. As also how to find the area, or content thereof, with the manner of protracting, reducing, and dividing the same; and also how to inclose a mannor lying in a common field, with the drawing of a perfect draught or map thereof, and how to deck and beautifie the same. And likewise how to convey water from any spring-head, to any appointed place. The second, shewing how to take the ground-plot of any city or corporation: as also the mensuration of roads, highways, and rivers, with the manner of making a map of any county or kingdom. The like never before extant.

Year: 1678

Place: London

Publisher: W. Godbind for Christopher Hussey

Edition: 1st Language: English

Figures: 12 plates, 11 folding Binding: contemporary leather

Pagination: pp. [12], 273, 242–255, 280–297, 290–292

Collation: A<sup>6</sup>B–V<sup>8</sup>X<sup>2</sup> Size: 178x110 mm

Holwell was a surveyor, dial maker, astrologer and self-appointed prophet. He was apparently a rabid anti-Catholic because his prophecy was often liberally laced with predictions of the demise of the Pope, etc. In 1865, he was sent to survey the town of New York and died

while on this assignment At the time there was some gossip that he was poisoned by government agents to silence his anti-Catholic views.

This is a two-part work on surveying. The first part covers elementary concepts (using instruments such as Gunter's chain and a protractor) as well as survey techniques such as measuring when the area is not entirely accessible. The second part has its own title page and discusses how the results of a survey should be drawn on documents and the best way of presenting different subjects.

Illustrations available: Title page

## Holyday, Barten (1593–1661)

See **Juvenalis**; *Decimus Junius Juvenalis and Aulus Persius Flaccus translated and illustrated, as well with sculpture as notes* 

H 153

#### Hood, Thomas (ca.1557–1620)

The use of the two mathematicall instruments, the crosse staffe (differing from that in common use with the mariners) and the Iacobs staffe. Set foorth dialogue wise in two briefe and plaine treatises. The one most commodious for the mariner, and all such as are to deale in astronomicall matters. The other, profitable for the surveyor, to take the length, height, depth, or breadth, of anything measurable.

Year: 1596 Place: London

Publisher: Richard Field for Robert Dexter

Edition: 2nd Language: English

Binding: 18th-century leather; gilt spine in compartments; red leather label; red edges; edges of boards gilt tooled

Pagination: [40]

Collation: A-E4 (misnumbering E3 as D3)

Size: 175x120 mm

Reference: Drake GMC, p. 34; Win ESTC, 13695; Tay I, #48

Little is known about Hood other than that he was the first mathematical lecturer to the City of London and gave public lectures there on topics such as the sector and other instruments. **Edmund Gunter** was obviously influenced by Hood, and it is likely that Hood's lectures and writings influenced several of the more famous mathematicians at Gresham College.

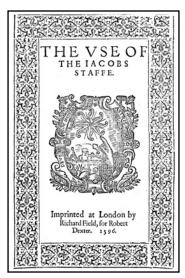
Hood wrote this work, in question-and-answer format, as a discussion between a master and a student. The first section, dedicated to Lord Howard, is devoted to the cross staff. The second, dedicated to Baron Lumley, is devoted to the Jacob's Staff. The two sections have

different title pages, but the collation is continuous, so they were presumably never issued separately. The work contains no diagrams of the instruments. See also the Addenda entry for Hood.

Illustrations available: Title page 1 Title page 2



Title page 1, H 153



Title page 2, H 153

H 154

#### Hooper, Alfred

Makers of mathematics

Year: 1949 Place: London Publisher: Faber and Faber

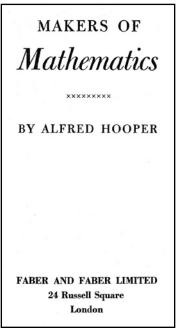
rublisher. Paber and Pat

Edition: 2nd Language: English Binding: original cloth boards

Pagination: [6] vii–ix [3] 3–402 Size: 214x134 mm

This is a popular history of mathematics. It selects a few individuals and topics from the time of the ancient Greeks up to the eighteenth century.

Illustrations available: Title page



H 154

## H 155

# Hooper, William (fl. 1770)

Rational recreations, in which the principles of numbers and natural philosophy are clearly and copiously elucidated by a series of easy, entertaining, interesting experiments. Among which are all those commonly performed with the cards. [four volumes]

Year: 1774 Place: London

Publisher: L. Davis; J. Robson; B. Law and G. Robinson

Edition: 1st Language: English

Figures: v.1: 12 folding plates; v.2: 19 folding plates; v.3: 20

folding plates; v.4: 14 folding plates

Binding: modern half brown leather, marbled boards; red leather labels

Pagination: v.1: pp. [4], xvi, 267, [1]; v.2: pp. [4], xii, 280; v.3: pp. [4], xii, 296; v.4: pp. [4], xii, 367, [1]

Collation: v.1:  $\pi^2$ A-R<sup>8</sup>S<sup>6</sup>; v.2: A-S<sup>8</sup>T<sup>4</sup>; v.3: A-T<sup>8</sup>U<sup>4</sup>; v.4: A-2A<sup>8</sup>

Size: 205x126 mm

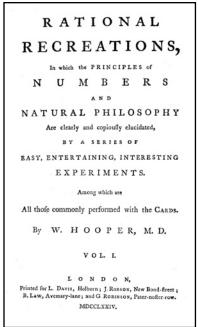
This is a four-volume set of popular science tricks and card games. It contains individual sections on arithmetical, mechanical, pyrotechnic, sound, electrical, pneumatic, hydrological, magnetic and color experiments. The main

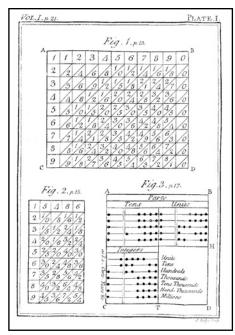
interest here is in the first volume, which contains a short section on the table abacus and describes a set of Napier's bones and a Chinese abacus (swan pan). The swan pan is not that traditionally used in China; Hooper had adapted it from one *improved* by Mr. G. Smethurst of Manchester.

Illustrations available:

Title page

Napier's bones and modified abacus





Napier's bones, H 155

#### Hooper, William (fl.1770)

Rational recreations, in which the principles of numbers and natural philosophy are clearly and copiously elucidated, by a series of easy, entertaining, interesting experiments. Among which are all those commonly performed with the cards. [four volumes]

Year: 1782–1783

Place: London

Publisher: L. Davis; J. Robson

Edition: 2nd

Language: English

Figures: v.1: 12 folding plates; v.2: 19 folding plates; v.3: 20

folding plates; v.4: 14 folding plates

Binding: contemporary mottled leather; rebacked; red and green labels

Pagination: v.1: pp [4], xvi, 267, [1] = 288; v.2: pp. [4], xii, 280

= 296; v.3: pp. [4], xii, 296 = 312; v.4: pp. [4], xii, 367

= 296; v.3: pp. [4], xii, 296 = 312; v.4: pp. [4], xii, 367, [1] = 384 Collation: v.1:  $\pi^2$ A-R\*S<sup>6</sup>; v.2: A-S\*T<sup>4</sup>; v.3: A-T\*U<sup>4</sup>; v.4: A-2A\*

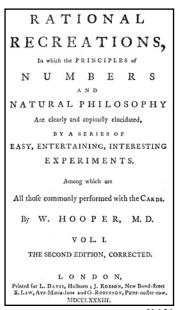
Size: 201x126 mm

This edition is the same as the first except that a previous

owner has had the plates hand colored.

Illustrations available:

Title page



H 156

H 157

## Hoornaert, Charles

Arithmetica. Ofte reken-konste, beschreven, op d'alder kortste, ende bondigste maniere ...

Year: 1641 Place: Deventer Publisher: Coenraet Thomassz Edition: 1st Language: Dutch Binding: original paper wrappers Pagination: pp. [20], 208, 211–279, [3]

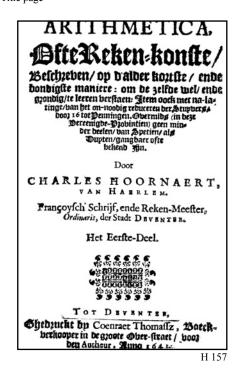
Collation:  $\pi^{10}A-R^8S^4$ Size: 143x94 mm

Reference: B de H BNHS, #2132 p. 130; Not in Smi Rara

Hoornaert, a native of Haarlem, was a writing master and teacher of arithmetic in Deventer, Netherlands.

This rare volume was neither recorded by **DeMorgan** (*Arithmetic books*) nor examined by Hoock and Jeannin. It begins with the four basic operations, division being done by the galley method, and then repeats the same topics again for mixed radix numbers (money) and fractions. The exercises and examples are commercial in nature and range from simple examples for multiplication and division to the calculation of the contents of a trading ship. Preceding the main text are several pages of laudatory poems about the author.

Illustrations available: Title page



H 158

## Hopper, Grace Brewster Murray (1906–1992)

Automatic coding for digital computers. In Computers and Automation, Vol. 4, No. 9, September, 1955.

Year: 1955 Place: Newtonville, MA Publisher: Berkeley Enterprises Edition: 1st Language: English Figures: engraved frontispiece Binding: boards Pagination: pp 21–24 Size: 272x205 mm

Grace Hopper was a visionary software pioneer who throughout her long, illustrious career was a major influence on the computer field. Her work on automatic coding languages laid the foundations for many of today's higher-level languages. She received her B.A. at Vassar College and her M.A. and Ph.D. degrees in mathematics from Yale University. After teaching at Vassar from 1933 to 1943, she joined the U.S. Naval Reserve during World War II with the rank of Lieutenant, junior grade, and was assigned to work on the Harvard Mark I computer at the Bureau of Ordnance Computation Project at Harvard University. She subsequently identified herself as the third programmer on the world's first large scale digital computer, Ensign Richard Bloch and Ensign Robert Campbell having preceded her in the position then identified as coder. In 1949, she joined the Eckert-Mauchly Corporation, where UNIVAC was under development, and remained with that firm and its successors for her entire career in private industry. Her accomplishments are legion. She developed the first compiler A-0 (1952) and the first English language compiler, B-0 (Flow-Matic) in 1957. Flow-Matic, in turn, was a major influence on the specifications for COBOL (COmmon Business Oriented Language), which became a widely used computer language for government, military, industrial and commercial applications. Hopper remained an active member of the Naval Reserve all her active life. She was recalled to active duty in 1967 and retired with the rank of Rear Admiral in 1983.

Her life has been well documented. For a biography, see Billings, Charlene W.; *Grace Hopper, Navy admiral and computer pioneer,* Enslow Publishers, Hillside NJ, 1989.

This article appeared in the September 1955 issue of *Computers and Automation*, one of the earliest (established 1951) computer journals. *C&A* was edited and published by **Edmund Berkeley**, author of *Giant Brains*. It is based on a talk presented by the author at Louisiana State University in February 1955. The article is introductory and tutorial in nature. The benefits of increased speed and reduced labor costs (obvious today) are emphasized, and a summary of worldwide efforts to develop pseudo-code presented.

This paper is followed by a two-part article titled *Automatic Programming: The A-2 Compiler System.* The second part of this article appears in the October 1955 issue. An editor's note states: *The subject of automatic programming is so interesting and important that it seems desirable to reprint... a large section of the...* 

instruction manual for Remington Rand's automatic programming technique known as the A2 Compiler. This paper is evidently written by a group, headed by Grace Hopper, of the Programming Research Section of the Eckert-Mauchly Division of Remington Rand.

Illustrations available: First page

H 159

# Hopper, Grace Brewster Murray (1906–1992)

The education of a computer. In Proceedings of symposium on industrial applications of automatic computing equipment. January 8–9, 1953, Kansas City, Missouri.

Year: 1953

Place: Kansas City, MO

Publisher: Midwest Research Institute

Edition: 1st

Language: English

Figures: engraved frontispiece

Binding: boards

Pagination: pp. [18], 19-191, [1]

Size: 275x207 mm

In this lecture, Hopper presents the argument for the use of subroutines and explains how they are central to programming computers. She illustrated her talk with examples of subroutines and interpretive systems from the UNIVAC I. At the close she mentions a routine for doing symbolic differentiation.

Illustrations available: First page

H 160

# Hopper, Grace Brewster Murray (1906–1992)

First glossary of programming terminology

Year: 1954 Place: New York

Publisher: Association for Computing Machinery

Edition: 1st Language: English

Binding: original printed paper covers

Pagination: pp. 25 Size: 247x172 mm

Grace Hopper had produced a glossary of terms for a series of Workshops on Automatic Computing held in 1953. This glossary was later expanded by incorporating similar items from the *Proceedings of the I.R.E.* (Vol. 39, No. 3, pp. 271–277) and from *Computers and Automation* (Vol. 2, 1953) to produce this publication. In the preface Hopper noted: *To encourage the reticent and assist the indolent, a questionnaire has been enclosed on* 

which may be recorded an opinion of any or all of the words defined here.

A second copy of this publication is in the collection.

Illustrations available:

Cover

Hopper, Grace Brewster Murray (1906–1992) and John William Mauchly (1907–1980)

See Buchholz, Werner; Influence of programming techniques on the design of computers. In Proceedings of the I. R. E., Vol. 41, No. 10, October 1953.



H 160

## H 161

## Hoppus, Edward (1700-1739)

Practical measuring made easy to the meanest capacity by a new set of tables: which shew at sight the solid or superficial content (and consequently the value) of any piece or quantity of squared or round timber, be it standing of felled, also of stone, board, glass, &c. made use of in the erecting or repairing of any building, &c...

Year: 1777 Place: London

Publisher: By assignment from the Trustees of E. Wicksteed

for J.F. and C. Rivington et al.

Edition: 10th Language: English

Figures: 1 engraved folding plate Binding: contemporary leather Pagination: pp. lxxvi, 204 Collation: a-i4k²A-2B⁴2C²

Size: 197x73 mm

Hoppus is described, on the title page, as *Surveyor to the Corporation of the London Assurance*.

This is a ready reckoner for finding the volumes of timber, stone, etc. It was used to gauge the amount of space that any given object would use when loaded into ships or other transport. It went through many editions for over 200 years until Britain converted to decimal currency and measurement. The last edition evidently appeared in the 1950s. It begins by describing several practical situations. For example, when a tree is cut down the diameter of the trunk varies, and by judicious cutting, it can be made to yield more timber than might otherwise be evident from simple measurement at one place. The book contains tables of volume measurement and also of the price and weight of hardware such as various kinds of nails.

Illustrations available:
Title page
Illustration of cutting timber
Sample nail table



N	AILS.	
Flat-pointed, The Price p Name. Cr. Wa	Strong, or The Name.	Priceper Co. Wr.
1. d. 1. 1. 2 2 0 1 11 2 6 1 10 3 4 1 9	0 4 0	190
Are 28s. pe Here ends the known by GES The TABLE Weight of the Nails.	ofe Nails BRAL Sorts of the P	which are of Naih.
Price per Should weigh po	Price per Thing.	Should weigh per Theof.
1. d. 55. cs. 0 8 0 0 10 0 14 0 11 0 14 0 11 1 1 12 1 3 1 12 1 3 1 14 1 4 2 0	1 9 1 10 1 11 2 4	15. ez. 2 12 2 14 3 0 4 0 5 0
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H 161

Nail table, H 161

#### H 162

# **Hoppus, Edward** (1700–1739)

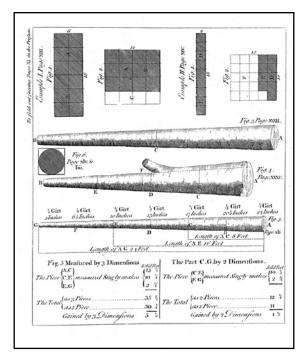
Practical measuring made easy to the meanest capacity, by a new set of tables....

Year: 1792 Place: London

Publisher: A. Law, W. Millar and R. Cater

Edition: 13th Language: English

Figures: 1 engraved folding plate, 3 engraved illustrations in text



Measuring timber, H 161

Binding: contemporary leather Pagination: pp. lxxvi, 204 (pp. lvi–lvii printed landscape) Collation:  $\pi^2$ a–d<sup>4</sup>A–2H<sup>4</sup>2I<sup>2</sup>

Size: 208x77 mm

This edition is much the same as the tenth edition of 1777

Illustrations available: Title page

## H 163

# **Hopton, Arthur** (1588–1614)

A concordancy of yeares. Containing a new, easie, and most exact computation of time, according to the English account

Year: 1615 Place: London

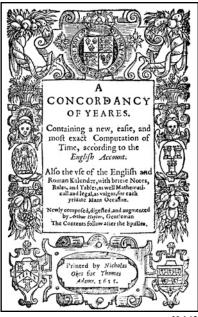
Publisher: Nicholas Okes for Thomas Adams

Edition: 2nd Language: English Figures: woodcut title border Binding: contemporary limp vellum

Pagination: pp. [14], 254, [2] Collation: A<sup>7</sup>B–R<sup>8</sup> Size: 169x109 mm

Reference: Win ESTC, 13779

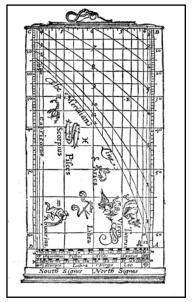
Hopton was an astrologer, surveyor and mathematician. He is known to have written books on surveying (*The topographical glass*, London, 1611) and to have provided the first detailed instructions in English for triangulation. He should not be confused with the diplomat Sir Arthur Hopton (1588–1650), who was born the same year.



H 163

This book is the second (first in 1612), enlarged, edition of his popular handbook on astronomical and astrological data. It contains instructions and tables for astrological calculations, finding the time by either the position of the sun or the moon, determining dates of movable Christian feasts, etc. The calendar section is followed by shorter sections on financial advice, tables of historical information and legal matters.

Illustrations available:
Title page
Calendar for August
Telling time by the sun



Time by the sun, H 163

## Horcher, Phillipp

Libri tres: in quibus primo constructio circini proportionum edocetur. Deinde explicatur, quomodo eodem mediante circino, tam quantitates continuae, quam discretae, inter se addi, subduci, multiplicari, & dividi: radices tetraedricae, cubicae, octaedricae, dodecaedricae, icosaedricae & sphaericae extraht: vel dictis radicibus datis, illarum solida, & multae aliae proportiones investigari, brevissimo compendio possint. Tandem horum omnium utilitas exemplis pluribus illustratur.

Year: 1605 Place: Mainz

Publisher: Balthasar Lipp

Edition: 1st Language: Latin

Figures: woodcut of proportional compass on title page

Binding: later paper boards

Pagination: pp. 54 Collation: A–F<sup>4</sup>G<sup>3</sup> Size: 210x164 mm

Reference: BL, 17th-C German, H1592

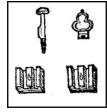
Horcher was a physician in Bernkastel. Little else is known about him.

This is the second major publication on the adjustable proportional compass (not to be confused with the sector that is often, in mainland Europe, called a proportional compass). The device was apparently first developed by Joost Bürgi and first published by Levinus Hulsius (Dritter tractat, 1604). Hulsius offered the instrument for sale and thus limited himself to instructions for its use and did not detail its construction. The present work provides construction details on the hinge and the creation of the scales. The proportional compass was a precursor to the sector and could be used for enlarging and contracting diagrams according to either lengths, areas or volumes. See the essay on the sector. This work is divided into three sections: the first provides the theory on which the instrument is based, the second describes the construction of the hinge and the marking of the scales, and the third gives applications.

Illustrations available:

Title page

Construction of the device and its scales



Hinge construction, H 164



H 164

H 165

## Horsburgh, Ellice Martin (1870–1935), editor

Handbook of the exhibition of Napier's relics and of books, instruments, & devices for facilitating calculation.

Year: 1914 Place: Edinburgh

Publisher: Royal Society of Edinburgh

Edition: 1st Language: English

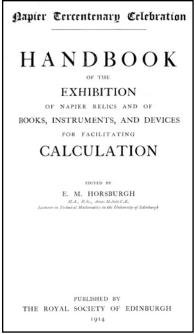
Figures: 7 photographic plates

Binding: modern black leather with original wrappers Pagination: pp. viii, 338, [2], 339–343, [1], vi, ix–xii

Collation:  $\pi^4 1 - 22^8 23^2$ Size: 252x172 mm

Reference: Ran ODC, p. 423

During the summer of 1912, the Council of the Royal Society of Edinburgh was informed that the year 1914 would mark the three-hundredth anniversary of the publication of Mirifici Logarithmorum Canonis Descriptio, in which John Napier described his invention of logarithms. They resolved to hold a celebration to commemorate the event (a detailed account can be found in **Knott**, Napier Memorial Tercentenary Volume, 1915). Horsburgh, a member of the faculty of Edinburgh University, was asked to prepare a handbook to the associated exhibition of Napier relics and other aids to calculation that was to be held during the celebration (July 24-27, 1914). A mathematical conference was also planned to immediately follow the celebration but was cancelled when the worsening political situation in Europe resulted in most attendees leaving Edinburgh



H 165

immediately following the end of the celebration (World War I started five days after the end of the celebration).

This volume was issued in two different forms: this paper-covered edition that was issued to delegates attending the Celebration and a later hard-cover edition given the title *Modern Instruments and Methods of Calculation*. The two versions are identical except for their titles.

This volume contains the best description of the machines, instruments and techniques used for calculation just prior to World War I. It is divided into thirteen sections that discuss Napier's life and work, mathematical tables, mechanical calculating machines, slide rules, nomograms and other mathematical instruments and models.



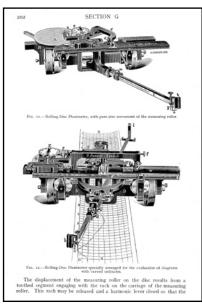
John Napier, H 165

Illustrations available:

Title page Portrait of Napier #1

Portrait of Napier #2

Planimeters Kelvin's tide predictor



Planimeters, H 165

H 166

#### Horsburgh, Ellice Martin (1870–1935), editor

Modern instruments and methods of calculation. A handbook of the Napier tercentenary exhibition.

Year: 1914 Place: Edinburgh Publisher: Bell Edition: 1st Language: English

Figures: 7 photographic plates Binding: original cloth boards Pagination: pp. viii, 343, [5], xii Collation: π<sup>4</sup>1–21<sup>8</sup>22<sup>10</sup>23<sup>2</sup> Size: 252x172 mm

Reference: Ran *ODC*, p. 422

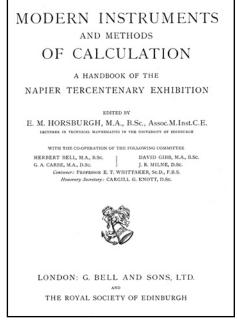
See the entry for **Horsburgh**; *Handbook of the exhibition of Napier's relics and of books, instruments, & devices for facilitating calculation, 1914*, for complete information on this volume.

Illustrations available: Title page

H 167

#### Horsley, Victor Alexander Haden (1857–1916)

Description of the brain of Mr. Charles Babbage F.R.S. In Philosophical Transactions of the Royal Society v. 200; series B.



Year: 1907 Place: London

Publisher: Royal Society of London

Edition: 1st (offprint) Language: English Binding: unbound Pagination: pp. 117–131

Size: n/a

When Charles Babbage died his brain was, at his request, removed for study. It was briefly examined during the autopsy but was then set aside in preservative for many years in the Hunterian Museum of the Royal College of Surgeons. Perhaps because of embarrassment at the length of time it had taken to undertake the study, Sir Victor Horsley, an eminent pathologist, was requested to make a report on the brain by the Museum's directors. He presents a careful physical description but does not, as so

many others of that era did, speculate on any apparent correlation between the cerebral morphology and Mr. Babbage's psychical characteristics.

Illustrations available:

Title page

Photo of Babbage's brain

#### H 168

## Hortolan de Linche, F.

Le régulateur, ou traité complet des poids, mesures, changes et monnaies, de toutes les nations commerçantes; rédigé, d'aprés les renseignments les plus positifs, sur le plan des tables de Martin

> Year: 1830 Place: Naples

Publisher: Chez l'Auteur et L'Imprimerie Française

Edition: 1st Language: French

Figures: v.1: 2 folding tables

Binding: contemporary half-bound green calf; gilt spine with

raised bands

Pagination: v.1: pp. 8, xxxviii,54, 56 (mis# 53 as 31), 18, 32, 34, 26, 48, 20, 12, 12, 36, 24 = 418; v.2: pp. [4], 248,

[8], 173, [15], xvi = 464

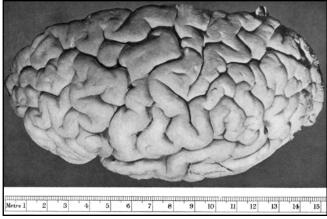
Collation: v.1:  $\pi^3(-p4)1-48^449^21-3^4$ ; v.2:  $\pi^21-31^41^41-23^{4**2}1-2^4$ 

Size: 222x130 mm

This is a set of tables for multiplication, division, conversion of currency, and conversion of weights and measures between Paris and other European cities. The *régulateur* referred to in the title is a small silver mask that can be used with some of the tables. The tables themselves are based on those of **C. F. Martin** (see **Martin**, **C. François**; *Les tables de Martin*, 1817).

Illustrations available:

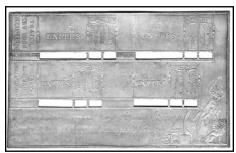
Title page Silver mask Sample table



Charles Babbage's brain, H 167



H 168



Silver mask, H 168

H 169

# Hostus, Matthias (1509–1587)

De numeratione emendata, veteribus Latinis et Græcis usiitata.

Year: 1582 Place: Antwerp

Publisher: Christophe Plantin

Edition: 1st Language: Latin

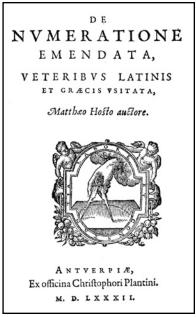
Figures: 1 large engraved folding plates

Binding: modern leather Pagination: pp. 62, [2] Collation: A–D<sup>8</sup> Size: 160x109 mm

Reference: Smi Rara, p. 372

Hostus was a professor of Greek at Fankfurt-am-Oder.

This work describes the Arabic, Greek, Roman, Hebrew and astrological numeral systems. These astrological symbols were occasionally used in Europe and are more fully described by **Noviomagus** in *De numeris libr*, 1539. Hostus discusses the origins of the various symbols used for Roman numerals and remarks that he



H 169

considers all the previous theories as being frivolous. His own theories do not seem much more reasonable (e.g., that the origin of V was the hand with fingers extended and thus showing a V-shape between the thumb and first finger), but there may by validity to his claim that C and M are the initial letters for Centum and Mille. He does illustrate the Roman system as part of a diagram of the table abacus, showing that the two were related. The work is well illustrated with examples from each of the various cultures and a summary of the different systems on a folding plate. The colophon appears on the folding plate and gives a date one year earlier than that on the title page.



Numerical notation, H 169

The work evidently caused an uproar when Catholic readers discovered that it contained quotations from Luther. Jan Moretus, in a letter to an unnamed recipient, apologized and explained that Antwerp no longer had official censors to insure the Catholic orthodoxy of books being published there.

Illustrations available:

Title page

Folding plate of numeral systems and colophon (2)

Roman numerals and table abacus

Numeral examples

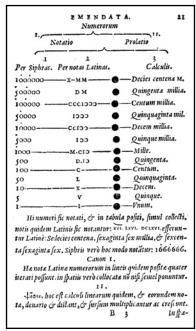


Table abacus and Roman numerals, H 169

#### H 170

#### Hough, George Washington (1836–1909)

The Swedish tabulating machine of Mr. George Scheutz. In Report of the Astronomer in Charge of the Dudley Observatory for the year 1863.

Year: 1864 Place: Albany Publisher: J. Munsell Edition: 1st Language: English

Binding: original paper wrappers

Pagination: pp. 37–42 Size: 228x149 mm

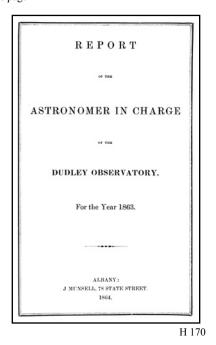
After winning awards at a Paris Exhibition, the **Scheutz** difference engine was sold to an American philanthropist who donated it to the Dudley Observatory in New York State. The report on the Scheutz machine is brief (five pages, most of which are concerned with the method of differences), but it does indicate some details that are not found elsewhere. While it evidently had been

used for a short time in 1858, Hough found the machine in such poor condition that it required several days of adjustments and repairs. He noted that:

... an entire absence of plans, explanations, and directions which might have been expected to accompany an instrument of this character... deterred us from any attempt to investigate the mode of operation.

Once the staff had determined how the machine operated, they found that it could easily produce one complete result every thirty seconds. It was, however, liable to error because of the failure of one or more of the wheels to perform its office, which they thought could be easily remedied by a slight addition to the mechanism. This modification was made to a few of the wheels, and they apparently worked perfectly afterward. A remark is made that the Observatory proposed to provide motive power to the machine. Later reports suggest that it was actually hooked up to a windmill.

Illustrations available: Title page



#### Hough, George Washington (1836–1909)

The Swedish tabulating machine of G. & E. Scheutz. In Annals of the Dudley Observatory, Vol. I.

Year: 1866 Place: Albany

Publisher: Weed, Parsons and Company

Edition: 1st Language: English

Figures: 1 large folding plate of Scheutz engine

Binding: modern cloth boards

Pagination: pp. [6], lxvii, [3], 126, [2], 126

Size: 225x140 mm Reference: Ran *ODC*, p. 442

#### See earlier **Hough** entry.

Illustrations available: None



H 172

## H 172

## Householder, Alston Scott (1904–1993)

Principles of numerical analysis

Year: 1953 Place: New York Publisher: McGraw-Hill

Edition: 1st Language: English

Binding: original cloth boards; gilt stamped

Pagination: pp. x, 274 Collation: no collation Size: 228x151 mm

Alston Householder received his Ph.D. from the University of Chicago. His thesis was on the calculus of variations, a subject dear to the heart of Charles Babbage. Upon completion of his doctoral research, Householder shifted emphasis and spent the next eight years working on the application of mathematics to biology. He interrupted this research to join the war effort. At the end of World War II, he joined the Oak Ridge National Laboratory. In this new appointment, he again changed research topics, this time shifting into numerical analysis—a subject that was fast becoming of major importance as computers became more powerful.

This is an advanced textbook on numerical analysis. It was used as a text for many senior Computer Science courses during the early days of computing.

Illustrations available: Title page

#### H 173

#### Householder, Alston Scott, (1904–1993), editor

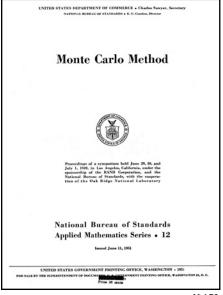
Monte Carlo method

Year: 1951

Place: Washington, D.C. Publisher: USGPO Edition: 1st Language: English

Binding: original paper wrappers Pagination: pp. viii, 42, [2] Size: 260x198 mm

Monte Carlo methods were first described in 1733 by the French scientist Buffon, who gave an algorithm for the calculation of  $\pi$  by noting how many times a needle, when thrown onto a ruled surface, crossed a line. The method was regarded as impractical until the advent of the electronic computer, which is easily able to generate the list of random numbers that the method requires to statistically sample a solution space to a given problem.



H 173

These conference proceedings are one of the first to discuss the Monte Carlo methods in light of their now practical use on digital computers. The conference was sponsored by the Rand Corporation, the National Bureau of Standards and the Oak Ridge National Laboratory. The paper presentation sessions were interspersed with

less formal discussions of approaches to generating pseudo-random numbers, and these were summarized in the proceedings. **John von Neumann**, a major figure in the use of Monte Carlo techniques for solving various nuclear problems, gave a summary of problems associated with the generation of random numbers.

Illustrations available: Title page Table of contents

## H 174

## Howard, C. Frusher

Howard's art of computation and golden rule for equation of payments for schools, business colleges and self-culture. A new, concise and comprehensive teacher and manual of business arithmetic.

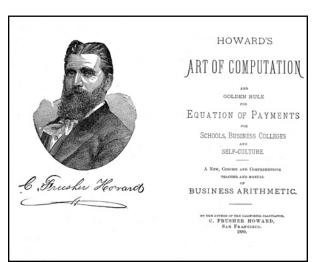
Year: 1880 Place: San Francisco Publisher: Author Edition: 1st Language: English

Figures: engraved frontispiece Binding: original paper wrappers

Pagination: pp. 118 Size: 175x118 mm

From a list on the verso of the title page, it appears that the author had previously published at least ten elementary ready reckoners and works on arithmetic.

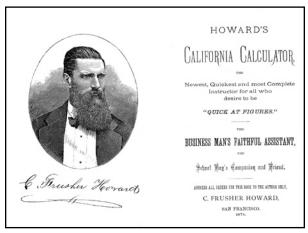
This is a commercial arithmetic. It begins with simple numeration and considers the four basic operations as well as a method for squaring a number by breaking it into simpler values and operating on these. Howard then covers simple and compound interest and money of various types and ends with a set of reference tables giving conversion rates and formulae for simple



Frontispiece and title page, H 174

calculations of area, volume, etc. A curious short item is a description of his *California Calendar for Thirty Centuries* by means of which the day of the week can be determined. It is described in French, German and English. The frontispiece shows a portrait of the author.

Illustrations available:
Title page and frontispiece
California Calendar (English)



Frontispiece and title page, H 175

#### H 175

## Howard, C. Frusher

Howard's California calculator. The newest, quickest and most complete instructor for all who desire to be "quick at figures". The business man's faithful assistant, the school boy's companion and friend.

Year: 1874 Place: San Francisco Publisher: By the author Edition: n/e

Language: English Figures: engraved portrait frontispiece

Binding: original cardboard wrappers

Pagination: pp. 94 Size: 168x115 mm

This volume is similar to Howard's other work, *Howard's* art of computation. The frontispiece shows a portrait of the author.

Illustrations available:
Title page and frontispiece

## H 176

# Hoyau, L. A. D.

Description d'une machine à calculer nommée Arithmomètre, de l'invention de M. le chevalier Thomas, de Colmar. In Bulletin de la Société D'Encouragement pour L'Industrie Nationale, Vingtunième anée No. CCXXI Novembre 1822. Year: 1822 Place: Paris Publisher: Huzard Edition: 1st Language: French

Figures: 1 large folding plate

Binding: half-bound leather over marbled boards

Pagination: pp. 355–365 Size: 257x190 mm

See the entry for **Francoeur, Louis Benjamin**; *Rapport* ... sur la machine à calculer de M. le Chevalier Thomas, de Colmar, 1822 (these two works are bound together) for an explanation of why this article was printed and for basic information on the Thomas arithmometer.

This description is the first one to include working drawings.

Illustrations available:
Plate of Thomas machine

## Hoyau, L. A. D.

See Description d'une machine à calculer nomée Arithmomètre, de l'invention de M. le chevalier Thomas, de Colmar. In Bulletin de la Société d'Encouragement pour l'Industrie Nationale, Vol. 132, September–October 1920.



H 177

H 177

#### Hudson, Hilda Phoebe (1881–1965)

Ruler & compasses

Year: 1916 Place: London

Publisher: Longmans, Green

Edition: 1st Language: English

Binding: original cloth boards; covers and spine embossed

Pagination: pp. [8], 144 Collation:  $\pi^4$ A–I<sup>8</sup> Size: 185x123 mm This volume is a discussion and demonstration of the types of geometric figures one can produce with only ruler and compass. It is a serious, rather than a recreational, mathematical text inspired by the techniques of elementary geometric proofs.

Illustrations available: Title page

H 178

#### Hülf, L. J.

Il calcolo senza cifre ossia nuivo metodo di fare la moltiplicazione e la divizione senza altre cifre che quelle dei due termini dell'operazione

> Year: 1837 Place: Verona

Publisher: Gabinetto Letter Edition: 1st (Italian) Language: Italian

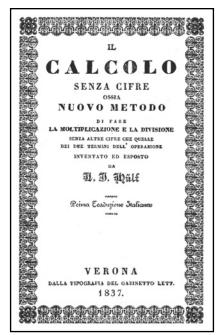
Binding: original paper wrappers

Pagination: pp. 48 Collation: 1–6<sup>4</sup> Size: 211x133 mm

Reference: Not in Rcdi BMI

Hülf had originally written this work in German, and this is the Italian translation. It is a description of several techniques aimed at making mental arithmetic easier. They are usually quite straightforward (e.g., when adding 54 and 23, do it as 57 plus 20 = 77, etc.). The work covers methods for addition, multiplication and division.

Illustrations available: Title page



#### Hulme, Fredrick Edward (1841–1909)

Cryptography or, the history, principles, and practices of cipher writing

Year: [1898] Place: London

Publisher: Ward, Locke and Co.

Edition: unknown Language: English

Binding: original cloth boards

Pagination: pp. 192 Collation: A–M<sup>8</sup> Size: 182x120 mm Reference: Gal *BLC*, p. 94

Hulme was the art master at Marlborough College and, from 1870, professor of geometrical drawing at King's College, London. He wrote a number of other works, mainly on popular subjects such as wildflowers, design and sketching. He also wrote a work on drawing instruments in this collection.

This book explores the simple code schemes used by various groups. It discusses little beyond simple substitution ciphers.

Illustrations available:

Title page



H 179

H 180

### Hulme, Fredrick Edward (1841–1909)

Mathematical drawing instruments and how to use them

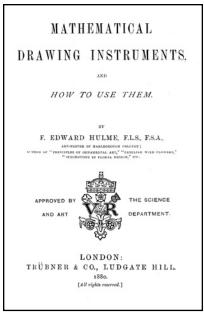
Year: 1880 Place: London Publisher: Trübner & Co. Edition: 1st Language: English Figures: 10 lithographed plates

Binding: original cloth boards; spine gilt; embossed front cover

Pagination: pp. xvi, 152 Collation:  $\pi^8A-I^8K^4$ Size: 185x132 mm

This is an elementary description of drawing instruments and materials. It ranges from simple pens and T-squares to the best kinds of drawing paper. There is a small section on the use of the sector to expand or reduce drawings and to create lines at specific angles by using the line of chords. The book appears to have been designed for use in Hulme's courses at Marlborough College. It constantly reminds students that *few things are so dear as cheap instruments*.

Illustrations available: Title page



H 180

H 181

# Hulme, Fredrick Edward (1841–1909)

Mathematical drawing instruments and how to use them

Year: 1884 Place: New York

Publisher: William T. Comstock

Edition: 2nd

Language: English Figures: 10 lithographed plates

Figures: 10 lithographed plates Binding: original cloth boards Pagination: pp. xvi, 152 Collation: π<sup>8</sup>A–I<sup>8</sup>K<sup>4</sup> Size: 182x130 mm

While there are a few minor changes in this second edition, it remains essentially the same as the first.

Illustrations available: Title page

#### Hulsius, Levinus (1546–1606)

Ander Tractat Der Mechanischen Instrumenten ... Gründlicher unterricht dess newen Büchsen Quadrants., wie der selbe, dass grosse Geschütz, bey Tag oder bey Nacht zurichten, gebrauch sol werden. Item dess gemennen Massstabs die Kugelschwere zuerkennen. Und dess Visierstabs, zu erfahren, wie viel Centner das Rohr dess Geschützes wegt.

b/w: Hulsius; Erster tractat der Mechanischen ..., 1604

Year: 1603 Place: Frankfurt

Publisher: Wolffgang Richtern in verlegung dess Authorn

Edition: 1st Language: German

Figures: 21 engraved plates (10 folding) Binding: contemporary vellum with ties Pagination: pp. [6], 3–123, [1], 20, 29, [1], 23, [1]

Collation: A-Q<sup>4</sup>A-B<sup>4</sup>C<sup>2</sup>A-C<sup>4</sup>D<sup>3</sup>A-C<sup>4</sup>

Size: 195x143 mm Reference: Cro *CL*, #113

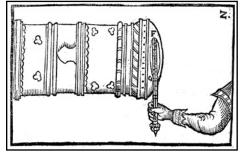
Little is known about the life of Levinus Hulsius other than that he was born in Ghent, was in the book trade in Nürnberg and later in Frankfurt, and died there in 1606.

In this work Hulsius discusses quite simple instruments for use in gunnery. The only device mentioned of any sophistication is an inclinometer. The printer had trouble with this volume and printed the title page illustration upside down.

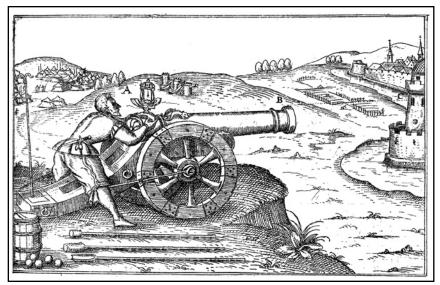
Illustrations available:

Title page
Gun barrel diameter measurement
Inclinometer
Inclinometer in use

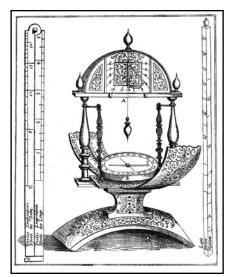




Diameter measurement, H 182



Inclinometer in use, H 182



Inclinometer, H 182

## H 183 **Hulsius, Levinus** (1546–1606)

Erster Tractat der Mechanischen Instrumenten .... Gründlicher Augenscheinlicher Bericht dess newen Geometrischen Gruntreissenden Instruments, Planimetra genandt, mit seinem Inductorio und Ramen. Sampt dess Quadrats und Quadrants auff dreverley arth. Damit man mit sonderlichem Vortheil, ein streitig Landtschafft, ein Augenschein, Statt, Vestung, Läger oder jede Grundtfläche inss Veldt absehen, auffs Papier reissen, und Arearn oder die Grösse desselben finden kan. Item alle Höhe, Weite, Länge und Tieffe abzumessen, &c.

b/w: **Hulsius**; *Dritter Tractat Der Mechanischen*, 1604



Year: 1604 Place: Frankfurt

Publisher: In Verlegung dess Authorn

Edition: 1st Language: German

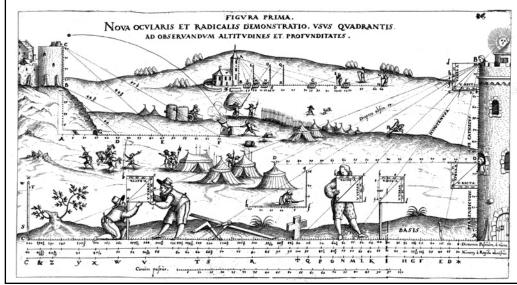
Figures: 21 engraved plates (10 folding) Binding: contemporary vellum with ties

Pagination: pp. [6], 3–123, [1], 20, 29, [1], 23, [1] Collation: A-Q4A-B4C2A-C4D3A-C4

Size: 195x143 mm

Reference: Cro CL, #113; Ben GW, p. 58

In this work Hulsius describes the use of three different surveying instruments and a grid system for drawing



Quadrant in use, H 183

survey results. The three instruments are a protractor with shadow scales, a protractor with a compass and a geometric square. All three of the surveying devices may be described as simple sighting mechanisms that evolved from the astrolabe and quadrants with shadow scales. The drawing system is similar to the well-known transparent screen system with which **Albrecht Dürer** illustrated his system of perspective drawing (see **Dürer**, **Albrecht**; *Institutiones geometricae*, 1532). All four instruments are illustrated on the title page as well as being shown in more detail in the plates. The title page illustration was a challenge for the printer because it has been printed separately and glued into the proper place.

The work begins with a list of authors who have written on some form of instrument. It starts with Archimedes and ends with Bürgi in 1603. After a short introduction to geometric figures, Hulsius discusses simple arithmetic and includes a table of squares of all integers up to 500. The rest of the work is devoted to an explanation of the use of the instruments. These are illustrated with examples of simple surveying and drawing situations.

Illustrations available:

Title page
Table of squares
Planimetra instrument
Surveyor's equipment
Drawing screen in use
Geometric quadrant in use
Waterworks survey

H 184

#### Hulsius, Levinus (1546–1606)

Dritter Tractat Der Mechanischen Instrumenten ... Beschreibung und Unterricht dess Jobst Burgi Proportional Circkels, dardurch mit sonderlichem vorthail einjegliche Rechte oder Circkel lini, alle fläche, Landcarte, augenscheinen, Vestungen, Gebew, ein Kugel mit den fünff regularibus, auch alle irregularia corpora, &c. bequemlich können zerrhailt, zerschnitten, verwandelt, vergrössert und verjüngert werden. Niemals zuvorn in Druck geben.

b/w: Hulsius; Erster Tractat der Mechanischen..., 1604

Year: 1604 Place: Frankfurt

Publisher: In Verlegung Levini Hulsii

Edition: 1st Language: German

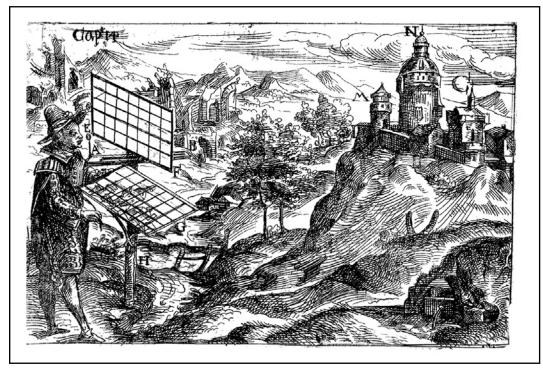
Figures: 21 engraved plates (10 folding)

Binding: contemporary vellum with ties Pagination: pp. [6], 3–123, [1], 20, 29, [1], 23, [1]

Collation: A-Q<sup>4</sup>A-B<sup>4</sup>C<sup>2</sup>A-C<sup>4</sup>D<sup>3</sup>A-C<sup>4</sup>

Size: 195x143 mm Reference: Cro *CL*, #113

In this work Hulsius describes, for the first time after **Bürgi**'s invention of the device, an adjustable proportional compass. This should not be confused with the sector that, particularly in Europe, was often called by the same name. He describes how the instrument can be used for



Drawing screen, H 183

enlarging or diminishing any drawing and illustrates this with various examples of geometric figures. He does not provide any construction details (these were published a year later by **Phillipp Horcher**, *Libri tres*, 1605). A folding plate at the end of this work is actually a diagram of the drawing screen described by Hulsius in his publication *Erster tractat* done in the same year (see **Hulsius**, *Ester tractat*, 1605), and this may simply be a binder's error. Hulsius might have intended a full-scale diagram of the proportional compass at this point, which would have provided some of the construction details.

Illustrations available:

Title page



H 185

## **Hulsius, Levinus** (1546–1606)

Ocularis et radicalis demonstratio usus quadrantis. Das ist Ein Augenscheinlicher und gründtlicher Bericht vom gebrauch des gevierdten Geometrischen Instruments alle höhe, weite, länge, und tieffe abzumessen.

b/w: **Brentel, Georg**; *Quadrantis astronomici et geometrici, 1611* 

Year: 1596 Place: Nürnberg

Publisher: For the author by Christoph Lochner

Edition: 1st (German) Language: German

Figures: engraved title page, 2 folding plates Binding: contemporary red-stained vellum

Pagination: ff. [42] Collation: A–K<sup>4</sup>L<sup>2</sup> Size: 183x141 mm

Reference: Zin GBAL, #3662

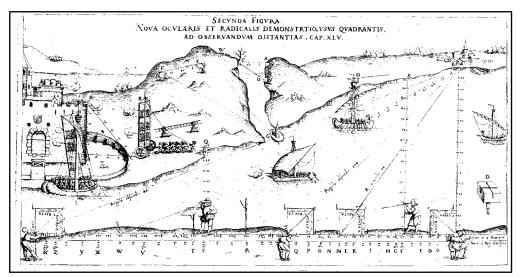
This work deals with the use of the geometric square in both military and civilian tasks. It discusses the usual (for the period) surveying methods based on right angled triangles and contains a section on the calculation of area.

Hulsius wrote other books on surveying that are often mentioned in reference works. This volume is not so mentioned because it is quite rare, and it does not contain the fine copper engravings of his earlier work.

Illustrations available:

Title page

Two plates showing surveying



Quadrant usage, H 185



H 186

#### Hulsius, Levinus (1546–1606)

Theoria Et Praxis Quadrantis Geometrici &c. Das ist Beschreibung, Unterricht und Gebrauch, des gevierdten Geometrischen und anderer Instrument damit ein jede ebne, höhe, breite, länge, weite, tieffe, und gewisse distantz eines jeglichen dings, nahulsiushch des Euclidis, und anderer gelehrter Mathematiken Regel abzusehen und zumessen. Item ein Statt, Garten, Wener, oder Land von 5.6 oder meh: meile grosz, nach dem kleinen Schuch zuverjüngen und in Grund zu legen. Mit xxxvii Kunstreichen Kupfferstücken gezieret.

Year: 1594 Place: Nürnberg Publisher: Typis Gerlachianis for Cornelius de Jode

Edition: 1st Language: German

Figures: 1 folding plate engraved on both sides, many copper

engravings in text

Binding: contemporary limp vellum made from an illuminated

manuscript Pagination: pp. 70 Collation: A–H<sup>4</sup>I<sup>3</sup> Size: 220x174 mm

Reference: Zin GBAL, #3573; Ada CBCE, H-1153; Cro CL,

#92, p. 92

Although little is known about the life of Hulsius, he is quite famous for this book on surveying. It contains fine copper engravings by Cornelius von Jode of Antwerp. There was a Latin edition published in the same year with the same illustrations.

This work describes three different types of survey instruments and their uses: the standard geometric square, the quadrant and a sighting device with a long alidade and a compass. Although the use of the quadrant is described apart from the geometric square, the detailed engraving of the instrument shows both scales marked on a single device. The survey methods described are based on the right-angle triangle (survey methods using similar triangles were developed later). Unlike some other contemporary works, this one shows exactly how to find the point of the end of the hypotenuse (see illustration).

Illustrations available:

Title page

Geometric square and quadrant instrument

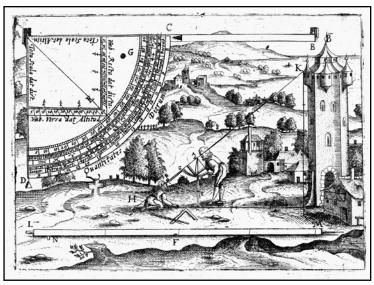
Relations between degrees and shadow scales

Height of an inaccessible tower

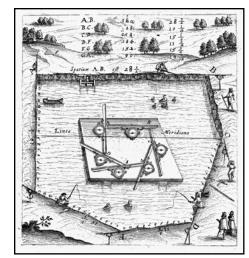
Finding end of hypotenuse

Sighting with quadrant and compass

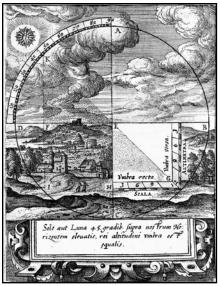
Mapping with quadrant and compass



Hypotenuse measurement, H 186



Mapping, H 186



Degrees and shadow scales, H 186

#### Hulsius, Levinus (1546–1606)

Vierdter Tractat Der Mechanischen Instrumenten ... Gründtliche Beschreibung dess Diensthafften unnd Nutzbarhn Instruments Viatorii oder Wegzählers. So zu Fuss, zu Pferdt unnd zu Gutzen gebraucht werden kän, damit mit geringer mühe zu wissen, wie weit man gegangen, geritten oder gefahren sey: als auch zuerfahren, ohne messen oder zehlen, wie weit von einem Orth zum andern. Daneben wird auch der grosse Verborgene weg-weiser angezeigt und vermeldt.

b/w: Hulsius; Erster Tractat der Mechanischen..., 1604

Year: 1605 Place: Frankfurt

Publisher: Wolffgang Richtern in verlegung dess Authorn

Edition: 1st Language: German

Figures: 21 engraved plates (10 folding) Binding: contemporary vellum with ties Pagination: pp. [6], 3–123, [1], 20, 29, [1], 23, [1]

Collation: A-Q<sup>4</sup>A-B<sup>4</sup>C<sup>2</sup>A-C<sup>4</sup>D<sup>3</sup>A-C<sup>4</sup>

Size: 195x143 mm Reference: Cro CL, #113

In this work Hulsius describes a pedometer, the first such description in print. He illustrates how it may be attached to humans, horses and carriages to record distances.

Illustrations available: Title page



H 187

H 188

## [**Hume, James** (fl.1639)]

Traité de la trigonometrie, pour resoudre tous triangles rectilignes et spheriques. avec les demonstrations des deux celebres propositions du Baron de Merchiston, non encores demonstrees.

Year: 1636 Place: Paris

Publisher: Nicolas & Jean de la Coste

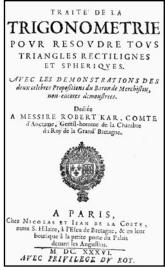
Edition: 1st Language: French Figures: 1 folding plate

Binding: contemporary mottled calf; spine gilt Pagination: pp. [16], 116, 167, 186–194

Collation: a<sup>4</sup>î<sup>4</sup>a-o<sup>4</sup>p<sup>2</sup>A-Y<sup>4</sup> Size: 157x87 mm.

Reference: Soth/Zeit BCM, #9545

Hume lived for a time in France, as had his father before him. He knew **John Napier** and evidently provided him with proofs of several theorems.



This work was inspired by Hume's distaste for the *Trigonometriae canonicae* (1633) written by Jean-Baptiste Morin, with whom Hume had a long-standing dispute. It consists of a comprehensive treatment of plane and spherical trigonometry together with a briefer discussion of problem solutions using the newly invented logarithms. He does not provide the standard logarithm table but does include a table of multiple roots of 10 with their base 10 logarithms. The table is noteworthy in that it does not use a decimal point but indicates the number of decimal places by means of a number in Roman numerals after each entry.

```
Les Logarymes d'icelles Racines.
1. entier.
5.1.
25.11.
125. 111.
625. iiij.
3125. V.
15625. vj.
78125. vij.
390625. viij.
1953125. ix.
9765625. X.
48828125. Xj.
244140625. XIJ.
1220703125. XIII.
6103515625. XIV.
30517578125. XV.
152587890625. XVj.
762939453125. xvij.
3814697265625. XVII).
```

Powers of 5 with power in Roman numerals, H 188

An engraved coat of arms of Robert Ker, first Earl of Ancrum, the dedicatee, is printed on the verso of the title page. The verso of the last page has an interesting printer's mark. According to the *Dictionary of National Biography*, there should be a list of nine mathematical works, written in Latin, at the end of this volume, which is lacking in this copy.

Illustrations available: Title page Table Printer's mark



Printer's mark, H 188

# H 189 **Hunt, William**

A mathematical companion or the description and use of a new sliding rule, by which many useful and necessary questions in arithmetick, military orders, interest, trigonometry, planometry, stereometry, geography, astronomy, navigation, fortification, gunnery, dialling, may be speedily resolved, without the help of pen, or compasses.

Year: 1697 Place: London

Publisher: Printed by B. M. for R. Wellington

Edition: 1st Language: English

Figures: 2 engraved folding plates rebacked

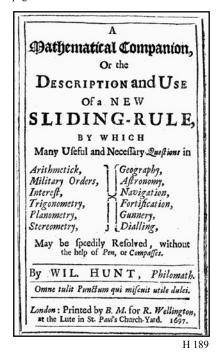
Binding: modern leather Pagination: pp. 298, [2] Collation: A–M<sup>12</sup>N<sup>6</sup> Size: 156x181 mm Nothing is known of William Hunt except for the fact that he published two other works (The gaugers magazine, 1687, and Demonstration of astrology, 1696).

This book describes a twelve-inch slide rule that may be used, as the title indicates, for many different tasks. The slide rule is described but not illustrated. There are also a number of tables for use in calculations involving gauging, astronomy, navigation, dialing, etc.

An advertisement at the end of the book indicates that the slide rule can be obtained from the instrument maker Isaac Carver (in business from 1667-1713), who was known to have made several different types of slide rules. Hopp (Slide Rules) indicates that Carver made Hunt's slide rule about 1673, but that seems rather early if this is the first edition of this work. It is possible that Hunt also designed other slide rules.

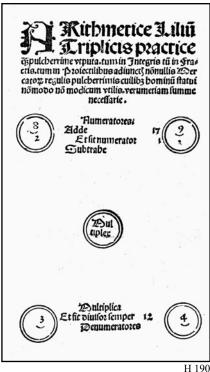
Illustrations available:

Title page



**Hurd, Cuthbert C.** (1911–1996), editor See **IBM** - Hurd, Cuthbert C.; Proceedings-seminar on scientific computation - November 1949, 1950; and three similar entries.

Huskey, Harry Douglas (1916–); R. Thorenson (1921–); Biagio F. Ambrosio and Everett C. Yowell (1920–) See Buchholz, Werner; The SWAC - Design features and operating experience. In Proceedings of the I. R. E., Vol. 41, No. 10, October 1953.



[Huswirt, Johannes] (ca.1500)

Arithmetice lilium triplicis practice quem pulcherrime utputa, tum in integris tum in fractis, tum in proiectilibus adiunctus nonnullis mercatorum regulis pulcherrimis cuilibet hominum statui nonmodo non modicum utilis verum etiam summe necessarie.

> Year: 1511 Place: Cologne

Publisher: [Cornelis van Zyrickzee]

Edition: 1st Language: Latin

Figures: engravings v.A1 & v.E4

Binding: modern grey boards; half-bound vellum

Pagination: ff. 20 Collation: A-E4 Size: 213x140 mm

Reference: Smi Rara, p. 507

Huswirt (Johannes Huswirt Sanensis) was a German arithmetic master, but little else is known of his life. He is sometimes referred to by the name Sanensis, which might suggest that he came from Sayn in Germany.

**Smith** (*Rara*) indicates that this work is a verbatim copy of Huswirt's 1501 arithmetic Enchiridion algorismi. That does not seem correct. While this work has roughly the same contents as the earlier one, the language is different, and the problems considered are different. The book is divided into four tractati, each dealing with a different topic. The first covers the basic arithmetic operations,

# **Erwin Tomash Library**

including mediation and duplation. The second considers the table abacus, here called a *proiectilibus*, which is consistent with the normal use of the counters being *thrown* or *cast* onto the table. The third deals with fractions, and the last section is a collection of various techniques such as the rule of three, etc. There are several curious circles on the title page whose meaning is not clear, but it is possible they represent table abacus tokens. They are, however, marked similarly to the *apices* of the abacus of Boethius. A woodcut of God and Jesus surrounded by angels is on the verso of the title page.

Illustrations available:

Title page Verso of title page Page on the abacus Explicit or Colophon Printer's mark



Printer's mark, H 190

#### H 191

## Huswirt, Johannes (ca.1500)

Enchiridion novus algorisimi summopere visus de integris. Minutiis vulgaribus proiectilib[us] et rgulis mercatoru[m] sine figuraru[m] (more ytaloru[m]) de letione p[er] co[m]mode tracta[tibu]s om[n]ib[u]s cuiuscu[m] q[ue] status fuerint summe necessarius.

Year: 1501 Place: Cologne

Publisher: Henricus Quentell

Edition: 1st Language: Latin Binding: modern leather Pagination: ff. [20] Collation: a<sup>6</sup>b<sup>4</sup>c<sup>6</sup>d<sup>4</sup> Size: 195x135 mm

Reference: Smi *Rara*, p. 74; Ada *CBCE*, #H-1215; DeM *AB*, p. 3

This is a very early German algorism arithmetic. **Smith** (*Rara*) considers it the first printed in Cologne. Smith is, however, incorrect in considering that this is the same work as Huswirt's 1511 publication (see **Huswirt**, *Arithmetice lilium triplicis practice*, Cologne, 1511). It is true that this book follows the same general plan as the 1511 work in that it is divided into four *tractati* that treat the same subjects. That is, the fundamental operations, line reckoning, fractions, rule of three, partnership, etc., but the examples given and text are different.

Illustrations available: Title page

Multiplication table Colophon



Inuide ne latres: linguam compelce furentem Nec nimium rabidis garrulus efto labris, Autpete tartareas (fuperis incognitus) vmbras Et phlegetonteos labere adulta lacus Arqs illic potius lites: et iurgia mifce Et viuis pacem concubitare fine

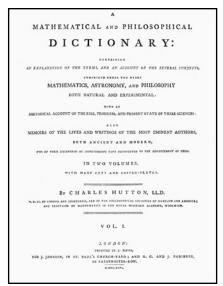
H 191

# Type of the continue of the co

Multiplication table, H 191

Enchiridion algorilmi lagaci cura fludio que Poliane hulwirt Sandles elaborar .caracteri pomifius Colonic In officina felicis memorie hos nefi viri Denrici Quentell .Anno repatoris huane feruitus Locccegi.

Colophon, H 191



H 192

## **Hutton, Charles** (1737–1823)

A mathematical and philosophical dictionary: containing an explanation of the terms, and an account of the several subjects, comprised under the heads mathematics, astronomy, and philosophy both natural and experimental: with an historical account of the rise, progress, and present state of these sciences: also memoirs of the lives and writings of the most eminent authors, both ancient and modern, who by their discoveries or improvements have contributed to the advancement of them.

Year: 1796 and 1795 Place: London Publisher: J. Johnson Edition: 1st Language: English

Figures: v.1:12 plates; v.2: 25 plates (#13–37)

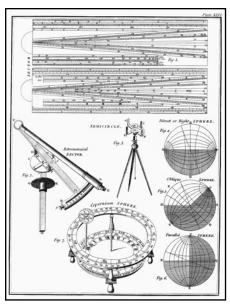
Binding: modern half-bound calf over contemporary marbled boards

Pagination: v.1: pp. iii–viii, 650; v.2: pp. [ii], 756 Collation: v.1:  $\pi^3B$ –4N<sup>4</sup>4O<sup>1</sup>; v.2:  $\pi^1B$ –5C<sup>4</sup>5D<sup>2</sup>

Size: 268x207 mm.

Reference: H&L, #9396, p. 1116; Glais RCMT, p. 37

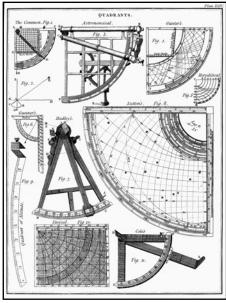
Charles Hutton was born in Newcastle-upon-Tyne to working-class parents. Although he had some formal schooling, he was largely self-educated. He taught himself mathematics and became so skilled that, at the age of twenty-three, he was able to open a school of mathematics in Newcastle in 1760. In 1773, he was appointed professor of mathematics at the Royal Military Academy in Woolwich, a position he held for the next thirty-four years. He was elected to the Royal Society in 1774 and later served as its foreign secretary. He edited many different journals, including



Sector and other instruments, H 192

the *Philosophical Transactions*, and was also a regular contributor of papers and commentary to many others. While not significant as an original mathematician, he was well regarded as an author of background material and textbooks. Many of his works, particularly his *Dictionary* and the introduction to his *Tables*, are still considered useful historical references.

This two-volume dictionary was criticized at the time as lacking judgment and being unbalanced in content and cautious in tone. It has, however, stood the test of time and has been reprinted several times. A reprint edition is currently available from the Thoemmes Press.



Quadrants, H 192

# Erwin Tomash Library

Although this work covers all types of mathematical topics, it includes material ranging from heraldry to watch making and is quite useful as a source of biographical information. It contains simple illustrations in many of the entries and nicely engraved plates of more complex figures and apparatus at the end of each volume.

While this is the first edition, dated 1795, the first volume may well be a later issue because it is dated 1796. Copies are known to exist with both the 1795 and 1796 dates on the title page.

Illustrations available:

Title page for both Volume 1 and 2 First page of "B" as a sample Plate of quadrants Plate of sector

#### H 193

#### **Hutton, Charles** (1737–1823)

Mathematical tables containing common, hyperbolic, and logistic logarithms. Also sines, tangents, secants, and versed-sines, both natural and logarithmic. Together with several other tables useful in mathematical calculations. To which is prefixed, a large and original history of the discoveries and writings relating to those subjects. With the compleat description and use of the tables.

Year: 1785 Place: London

Publisher: Printed for G. G. J. and J. Robinson and R. Baldwin

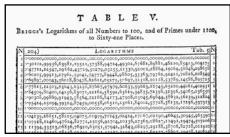
Edition: 1st Language: English

Binding: contemporary polished leather; rebacked in lighter

calf; black leather label Pagination: pp. xii, 176, 343, [1] Collation: π<sup>2</sup>A–Z<sup>4</sup>A–2U<sup>4</sup> Size: 227x143 mm

Reference: Hend BTM, #88, p. 87; Glais RCMT, p. 7

Hutton's tables were among the most popular of his day. They were often reprinted and represent, at least from the fourth edition on, experiments with different table layouts and typefaces. These were eventually continued by **Charles Babbage** (*Table of logarithms*). It is useful to compare the layout of these tables with those published



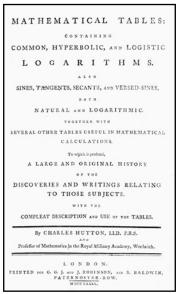
Sample 61 figure table, H 193

later (such as Babbage's) to see how much improvement in utility can be made by simple typographic changes. Of significant interest in this edition is the 121-page essay on the history of such tables. Today, it is the starting point for all histories of the subject. The essay was, unfortunately, omitted from later editions of the tables. The historical essay is followed by a very well-written essay on the use of the tables in arithmetic and in both plane and spherical trigonometry. Besides the usual tables of logarithms of numbers and logarithms of trigonometric functions, Hutton includes small tables of logarithms to 20 and 61 decimal places for special cases. The last two pages give a list of errors found in Gardner's tables of 1742 and 1770.

This copy was given by Thomas Hill to his son, Sir Roland Hill, the creator of the penny postage system and the stamps that went with it. At the time of the gift, Roland was only twenty or twenty-one and was still helping his father run a school.

Illustrations available:

Title page (with inscription from Thomas Hill) Sample table page Sample of 61 figure logarithms Errata for Gardiner's tables



H 193

H 194

# **Hutton, Charles** (1737–1823)

Miscellanea mathematica: consisting of a large collection of curious mathematical problems, and their solutions. Together with many other important disquisitions in various branches of the mathematics. Being the literary correspondence of several eminent mathematicians.

Year: 1775 Place: London

Publisher: G. Robinson and R. Baldwin

Edition: 1st Language: English Binding: modern leather Pagination: pp. iv, 342, [2]

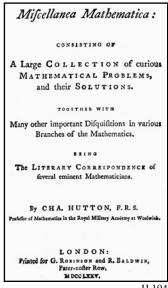
Collation:  $\pi^2B-E^6F^2G-K^6L^2M-T^6U^2X-2H^6I^4$ 

Size: 172x98 mm

Reference: Soth/Zeit BCM, Vol. III, #875-#615, p. 48

Hutton wrote a great many short articles for a variety of journals. This work is a collection of articles written by himself and others (often with pseudonyms such as Analyticus). The format is usually to briefly discuss a problem, pose a question and then print the answers he received from readers. The problems range from the time it takes fluids to drain from different shaped vessels, through eclipse calculations, to determining the roots of equations.

Illustrations available: Title page



H 194

H 195 **Hutton, Charles** (1737–1823)

Recreations in mathematics and natural philosophy: containing amusing dissertations and enquiries concerning a variety of subjects the most remarkable and proper to excite curiosity and attention to the whole range of the mathematical and philosophical sciences: the whole treated in a pleasing and easy manner, and adapted to the comprehension of all who are in the least initiated in those sciences ... First composed by Mr. Ozanam ... Lately recomposed and greatly enlarged, in a new edition, by the celebrated M. Montucla. And now translated into English, and improved with many

additions and observations ... in four volumes; with near one hundred quarto plates.

> Year: 1803 Place: London Publisher: G. Kearsley Edition: 1st Language: English Figures: v.1: 21 folding plates; v.2: 34 folding plates; v.3: 34 folding plates; v.4: 8 folding plates (97 plates total) Binding: contemporary speckled calf; spines gilt; red and green labels Pagination: v.1: pp. xvi,xvi, xxii, 448; v.2: pp. [iv], xiv, 464; v.3: pp. [iv], xii, 502 (pp. 11&12 lacking), [2]; v.4: pp. [iv], xii, 516 Collation: v.1:  $\pi^8 b^8 b^8 c^2 d^1 B - 2F^8$ ; v.2:  $\pi^2 b^7 B^5 C - 2G^8 2H^3$ ;

> > v.3:  $\pi^2 b^2 c^4 B^5$  (ff. B6 lacking)C-2I<sup>8</sup>2K<sup>5</sup> $\chi^1$ ;

Size: 207x127 mm Reference: Tay MP II, #1207

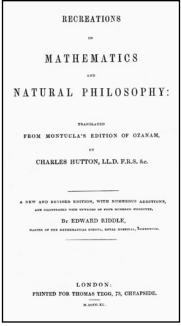
v.4:  $\pi^2 b^2 c^4 B^4 C - 2K^8 2L^4 2M^2$ 

Jacques Ozanam originally published this collection of mathematical problems in 1694, and it was reprinted several times before Jean Étienne Montucla edited a new edition in 1778. Hutton translated Montucla's edition and added a few items of his own to create this work. The additions by Hutton are usually minor and consist mainly of changing tables of eclipses visible from Paris to those visible from London, converting tables to reflect English weights and measures, etc. Each of the four volumes contains different subject matter: Volume 1 covers arithmetic and geometry; volume 2 is on mechanics, optics and acoustics; volume 3 is on astronomy, dialing, navigation, architecture and fireworks; and volume 4 deals with miscellaneous problems in physics and chemistry.

Illustrations available: Title pages of all 4 volumes



H 195



H 196

# **Hutton, Charles** (1737–1823)

Recreations in mathematics and natural philosophy: Translated from Montucla's edition of Ozanam ... A new and revised edition, with numerous additions, and illustrated with upwards of four hundred wood cuts, by Edward Riddle ...

Year: 1840 Place: London

Publisher: Thomas Tegg

Edition: 3rd Language: English

Binding: original cloth boards faded

Pagination: pp. 8, xiv, 826 Collation: <sup>4</sup>A<sup>7</sup>B–3F<sup>8</sup>3G<sup>5</sup> Size: 223x139 mm

This is another edition of Hutton's *Recreations*. It has been expanded in some sections (e.g., mention is made of the binary number system in a new section on number systems, and experiments in electricity have been added at the end), but many of **Ozanam**'s problems are repeated. This edition is inferior in almost every other way to Hutton's first edition.

Illustrations available: Title page

#### H 197

## **Hutton, Charles** (1737–1823)

Tracts on mathematical and philosophical subjects; comprising, among numerous important articles, the theory of bridges, several plans of recent improvement.

Also the results of numerous experiments on the force of gunpowder, with applications to the modern practice of artillery. In three volumes.

Year: 1812 Place: London

Publisher: F. C. and J. Rivington [and 10 others] (printed by T.

Davidson) Edition: 1st Language: English

Figures: v.1: engraved portrait frontispiece; v.2: 7 plates (1

misbound); v.3: 3 plates

Binding: contemporary half-bound calf over marbled boards;

red leather labels

Pagination: v.1: pp. x, [2], 486; v.2: [iv], 384; v.3: [iv], 384

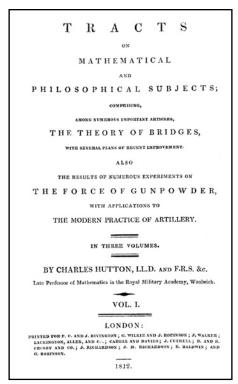
Collation: v.1:  $\pi^6B-2G^8H-I^4K^3$ ; v.2:  $\pi^2B-2B^8$ ; v.3:  $\pi^2B-2B^8$ 

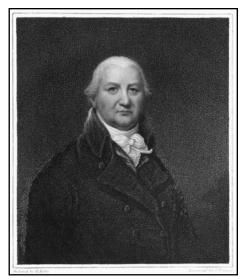
Size: 205x126 mm

Reference: Glais RCMT, p. 7

Hutton originally made his reputation by publishing several important papers: on bridge design, on converging series, on the force of gunpowder and velocities of cannon balls, on calculating the mean density of the Earth and on cubic equations and infinite series. In this three-volume set Hutton has reproduced these and other papers to form a collection of his major writings. The additional papers range from short notes to a 150-page essay on the history of algebra. The frontispiece in volume 1 is a fine portrait of Hutton in his later years.

Illustrations available: Title page and frontispiece





Frontispiece, Charles Hutton, H 197

# **Hutton, Charles** (1737–1823)

A treatise on mensuration, both in theory and practice.

Year: 1770

Place: Newcastle upon Tyne

Publisher: For the author by T. Saint, and for John Wilkie ...

and Richard Baldwin

Edition: 1st

Language: English

Figures: engraved frontispiece

Binding: contemporary leather; red leather label

Pagination: pp. xxvi, 646, [2] Collation: a-f<sup>2</sup>g<sup>1</sup>A-8A<sup>2</sup> Size: 230x164 mm.

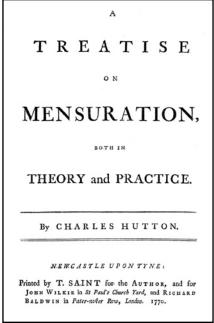
Reference: DNB, X, pp. 351-352

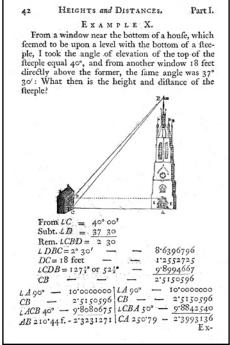
This is Hutton's second publication, produced while he was a schoolmaster in Newcastle. It was originally issued in parts from 1768 to 1770. The subscription list occupies ten pages at the beginning of the book. While many of the subscribers are listed as schoolmasters, it seems likely that the material would have been beyond the mathematical abilities of many of them. Unlike many earlier works on measurement and surveying that contain engraved plates of instruments and survey situations, this volume has a minimum number of illustrations—primarily line diagrams used to illustrate the mathematics. The illustrations do, however, have one point of interest—they were done, in his apprenticeship years, by Thomas Bewick (1753-1828), who was later to become famous as a wood engraver. Bewick often used the tower of St. Nicholas's church in Newcastle in his work, and his first representation of it can be found illustrating a problem on page 42. The book consists of a thorough mathematical treatment of plane trigonometry and geometry that is followed by sections on surveying (Hutton had previously done surveys in the Newcastle area) and gauging. A shorter section at the end deals with calculations necessary in the building trades. There is a table of the areas of segments of a circle (to eight decimal places) for every ten-thousandth part of the diameter.

Illustrations available:

Title page

Bewick illustration of St. Nicholas's church tower





Bewick's St. Nicholas's church tower, H 198

