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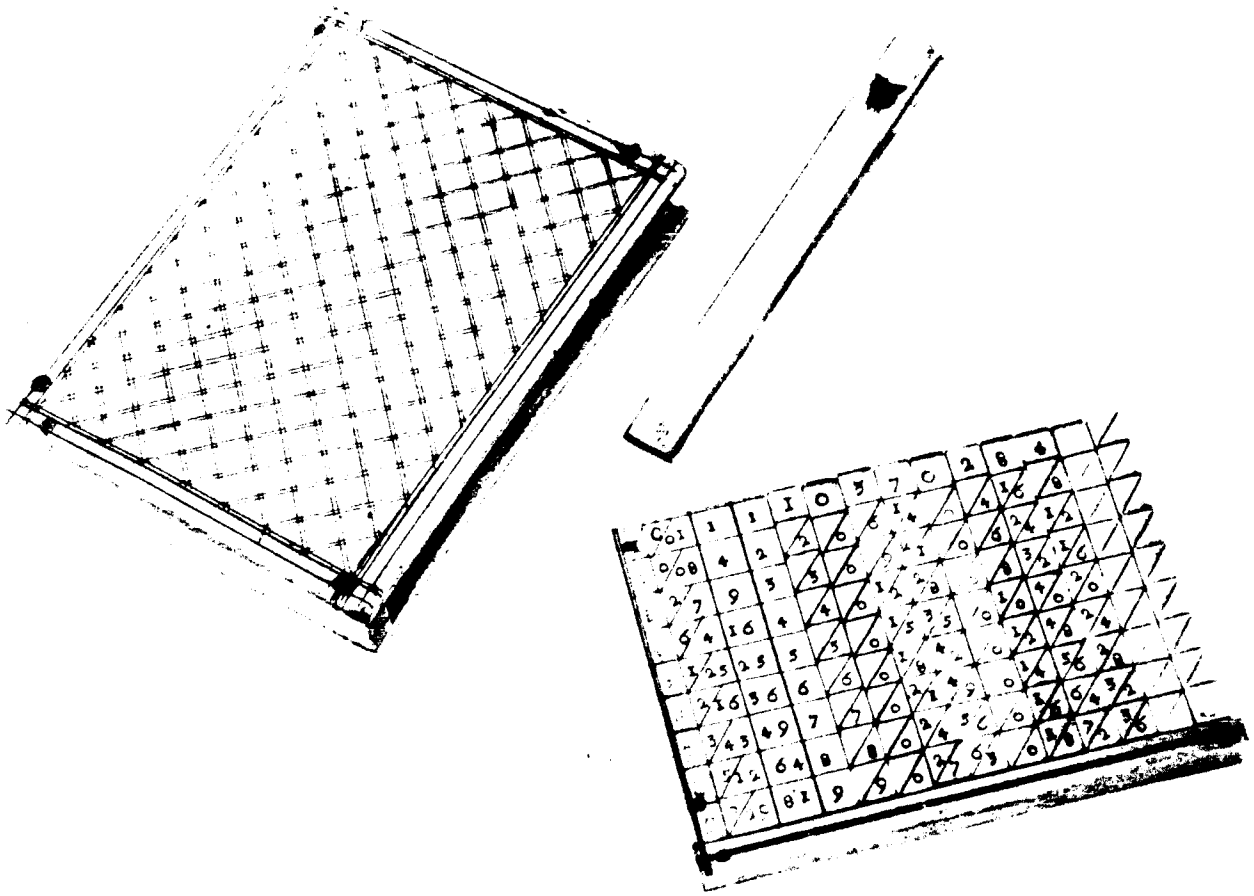
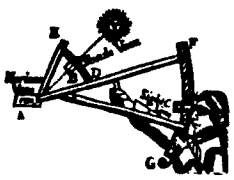


ITEM 200

CASED NAPIER RODS



Catalog 129
Summer, 1986
Six Dollars

62. Berger Catalog, "ENGINEERING, SURVEYING and MINING INSTRUMENTS", 40th Ed, C.L. Berger & Sons, Boston, 1925. Original cloth binding 9 1/2" h, 6 1/4" w; pgs. xi, 194, (18), many text figures and several inserted sheets and booklets. Covers showing use but contents fine. (For sale only to purchasers of surveying instruments.) (postpaid) $ 25

What If? The Panama Canal in Nicaragua!

63. O.W. Childs, "MAP AND PROFILE of the ROUTE FOR THE CONSTRUCTION OF A SHIP CANAL from the ATLANTIC TO THE PACIFIC OCEANS, Across The Isthmus of NICARAGUA, CENTRAL AMERICA, Surveyed For THE ATLANTIC AND PACIFIC SHIP CANAL COMPANY", Wm. C. Bryant, New York, 1852 Original printed boards 9 5/8" h, 6 3/4" w, with replaced cloth back strip, containing extremely large folding map 34" h x 108" (9 ft) w. Generally fine condition although the covers are stained and there are a few small tears at some folds of the map. The construction of a canal across Central America was proposed as early as 1550 by the Portuguese navigator Antonio Galvao with possible routes in Tehuantepec, Nicaragua, Panama, and Darien. Various schemes, surveys, etc. were initiated in 1698, 1771, 1779, 1808, 1825, and 1830, but it was not until the discovery of gold in California in 1848 that there was much serious thought directed towards the problem. A railroad at Panama and a canal in Nicaragua were both projected. Instrumental surveys for the former in 1849, and for the latter in 1850 and 51, were made by American engineers. The work done in Nicaragua, the result of which is the map here, was the first accurate survey in the region. No actual construction was begun, however. It was recognized that locks would be required for a canal in Nicaragua while it was believed (quite wrongly as de Lesseps failure showed) that a sea level route could be built across Panama. A study of the overall history of the Panama Canal will show the close relationship between the route depicted here and the actions of the United States in finally going into Panama. (postpaid) $ 175

4 Volumes on Mineralogy

64. Gabriel Delafosse, "NOUVEAU COURS DE MINÉRALOGIE COMPRENANT LA DESCRIPTION DE TOUTES LAS ESPÈCES MINÉRALES AVEC LEUR APPLICATIONS DIRECTES AUX ARTS", 4 Vols, La Librairie Encyclopédique de Roret, Paris, 1858, 60, 62. Original half leather bindings 8 1/2" h, 5 1/4" w; pgs. I. 546; II. 486, (1); III. 628; IV. 24, 40 folding plates. Generally fine condition although the outer corners of some bindings are damaged and there are some internal repairs and a few stains. The author (1796-1878) has been called the "founder of crystallography" and was the first to show a relationship between the direction of rotating power of crystals and orientation of their facets. He held a number of academic posts including professor of mineralogy, Paris Faculty of Sciences (1840), and member French Academy of Sciences. This book seems to have been derived and updated from his ealier works "Traités de Cristallographie" of 1821 and "des Minérlogie" of 1822. (In French) (postpaid) $ 215

First New York & Fifth American Edition

65. Robert Gibson, "A TREATISE OF PRACTICAL SURVEYING:", 8th Ed, William A. Davis & Co, New York, 1798. Early stitched leather cover over (worn?) original leather binding 8 3/4" h, 5 1/4" w; 452 pgs and 13 plates (some with early hand coloring). Very good condition, lacking end papers, and showing signs of extensive use. The 1st Aerican ed (called the 4th) was published in 1785, taken directly from a London edition (the 4th?) of the period. The 1st ed was Dublin published about 1750 and Taylor 2 notes a 2nd London ed of 1767. The author may well have been the Dublin surveyor (fl 1731-61?) who held the post of examiner of applicant surveyors to the Surveyor General of Ireland, and was a teacher of mathematics (Temple Lane, Essex St. 1753; Anglesey St. 1754). (postpaid) $ 120

66. Robert Gibson, "THE THEORY AND PRACTICE OF SURVEYING: CONTAINING ALL THE INSTRUCTIONS REQUISITE FOR THE SKILFUL PRACTICE OF THIS ART. . . . NEWLY ARRANGED, IMPROVED, AND ENLARGED . . . BY JAMES RYAN,", (7th New York & 15th American Ed), Duyckinck, New York, 1821. Original leather binding with red title label 8 1/2" h, 5 1/2" w; pgs. v, (3), 360, 184, 14 foldout plates, but lacking frontis plate called for in text although not listed in Karpinski. Generally fine condition although missing upper corner of front flyleaf and extensive moderate foxing. This issue has the major revisions which first appeared in the 1812 5th New York edition. (postpaid) $ 35

67. Keuffel & Esser Catalog, "DRAWING MATERIALS SURVEYING INSTRUMENTS MEASURING TAPES", 36th Ed, K & E, New York, 1921. Original cloth binding 8 3/4" h, 5 3/4" w; pgs. viii, (2), 482, hundreds of illustrations; inserted 40 pg price list and several other sheets. Covers with weak hinges and edge wear, contents in fine condition. (For sale only to purchasers of surveying instruments.) (postpaid) $ 25

Second American Edition of Century Old English Treatise

68. John Love, "GEODEASIA: OR, THE ART OF SURVEYING AND MEASURING LAND MADE EASY . . . AS ALSO To lay out New Lands in AMERICA, or elfewhere: . . . ", 13th Ed adapted to American Surveyors, Samuel Campbell, New York, 1796. Modern leather binding 8" h, 4 1/2" w; pgs. (4), 189, 53 (tables), 8 (appendix on surveying by chain only), many text woodcut diagrams. Contents fine with only minor stains. The 1st ed of this work was published in London in 1688 just after Love had returned from surveying in America. He appears to have been the world's first surveyor to realize that the vastness of North America, and the inaccessibility of hugh tracts within the interior called for techniques quite foreign to the typical English country surveyor. Quality (fine accuracy) had to be replaced by quantity. The many editions of this work (at least 13 in England) found ready use on this continent. By the end ot the 18th c the demand was so great that it proved profitable for copies to be printed here with one edition in 1793 (based on the 12th London) and this one (based on the 13th London). (postpaid) $ 140

Good Description of English Instrumentation

69. J. Butler Williams, "PRACTICAL GEODESY: COMPRISING CHAIN SURVEYING, AND THE USE OF SURVEYING INSTRUMENTS; LEVELLING, AND TRACING OF CONTOURS, TOGETHER WITH TRIGONOMETRICAL, COLONIAL, MINING, AND MARITIME SURVEYING", 2nd Ed "WITH NEW CHAPTERS ON RAILWAY, PARISH, AND ESTATE SURVEYING", John W. Parker, London, 1846. Original cloth backed boards binding 9" h, 5 3/4" w; pgs. xx, 330, (2), very large folding frontis plate with original hand colouring and many text illustrations. Very fine condition although there are some spots due to foxing on the cover and frontis plate. The author, Late Professor of Geodesy in the College for Civil Engineers, London, published the first ed of this work in 1842. This book is somewhat more than a college textbook and the sections on instrumentation are particularly interesting. (postpaid) $ 75

EARLY CALCULATING MACHINES AND INSTRUMENTS

Computation by Sector

70. Paolo Casati, "FABRICA ET VSO Del Compasso di Proportione", 2nd Ed, G. Longhi, Bologna, 1658. Original vellum binding 8 1/2" h, 6" w; pgs. (6), 250, 4 folding woodcut plates and many woodcut diagrams in the text. Minor worming of binding, very fine overall condition. The 1st ed of this elaboration of Galileo's book was published in 1664. The author (1617-1707), a member of the Jesuit order, a professor of both mathematics and theology in Rome, later at the University of Parma, wrote other well received books including ones on mechanics, hydrostatics, and optics. He was characterized by Robert Boyle as a "famous mathematician". In his preface Casati notes the rarity of books on this instrument, Galileo's being the only one known to him. (One may wonder why he never heard of Edmond Gunter.) This 2nd ed has been enlarged from the 1st and rearranged in format. (In Italian) (postpaid) $ 285

Almost Perfect Copy of the Extremely Rare Morland's "Instruments"

71. Samuel Morland, "The Deſcription and Uſe OF TWO ARITHMETICK INSTRUMENTS. TOGETHER With a Short Treatiſe, explaining and Demonſtrating the Ordinary Operations of ARITHMETICK. As likewiſe, A Perpetual ALMANAC And ſeveral Uſeful TABLES", (only Ed), Moses Pitt, London, 1673. Original leather binding, rebacked and reedged, 6" h, 3 3/4" w; pgs. frontis portrait plate, overall title, 'Addition and Subtraction Instrument' title with plate I printed on its reverse, 88 pgs with very erratic numbering (1-78, with some leaves numbered, some pages, several numberings out of order; i.e. pgs 47 & 50 back to back), engravings printed on the backs of leaves 1-5, foldout engravings pasted on the backs of leaves 6, 7, 9, 10, more engravings printed on the back of pg 30 and on pgs 38 & 46, pgs 1-5, (51, tables with several blanks), 16, with the perpetual table for the sign of the moon in photostatic copy, the book otherwise original and complete. The few known copies of this work tend to lack the portrait plate and may be missing other pages, some of the paste-on plates, etc., all very difficult to determine without direct comparison between copies. Generally fine condition noting that there are extensive annotations concerning the book on the replaced endpapers and bookseller catalog entries have been pasted within the rear cover. This book is listed as Item 23 in the Science Museum Calculating Machines Catalogue where Items 21 and 22 are examples of Morland's pounds - shillings - pence - farthings adding - subtracting machine. No physical example of his "CYCLOLOGICA" multiplying machine is known and even the Science Museum must use the plates from this book to illustrate its working. See the Science Museum Catalogue for further information on Morland's calculators. (postpaid) $ 695

Solving Algebraic Equations

72. John Rowning, "Directions for making a Machine for finding the Roots of Equations universally with the Manner of using it:", extract from the Philosophical Transactions, Vol LX, London, 1770. Modern full leather binding 9" h, 7" w; 17 pgs and the large folding engraved plate. Very fine condition. This paper describes the first analog computer designed to solve algebraic equations of the n'th degree expressed in the form $y = a + bx + cx^2 + dx^3 + \cdots + qx^n$. It was completed in 1768 by Rowning based upon the graphical method invented by A. de Segner in 1751. An actual machine mechanized to the second degree was presented to the Royal Society in 1770 but apparently no longer exists. A discussion of this analog computer may be found on pgs 47 & 48 of the Science Museum catalogue "Calculating Machines and Instruments". (postpaid) $ 135

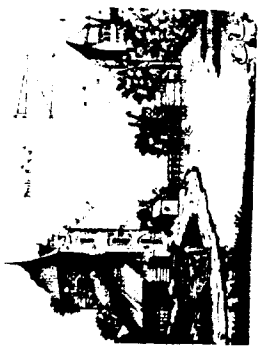
German Instrument Maker's Sector

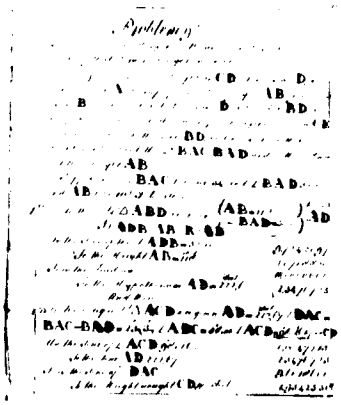
73. Michael Scheffelts, "INSTRUMENTUM PROPORTIONUM, oder Unterricht vom Proportional - Zirkul Durch welchen So wohl Mathematische als Mechanische . . . in Theoria und Praxi,", Daniel Bartholomai und Sohn, Ulm, 1738. Early leather binding 8" h, 6 1/2" w; pgs. (18), 148, 12 engraved plates. Very fine condition. The 1st ed of this work was in 1697, the 2nd in 1708, and it continued to be reissued in new editions until 1781. Scheffelts (1652-1720) was an instrument maker specializing in computational devices (this is his only known book). Several of his instruments (or circles) of proportion, known to us as computational sectors, have survived and are probably quite similar to the one shown as fig. 1 of the 1st plate of this book. It is interesting to compare Scheffelts' sector with Italian or French versions of the same period, which tend to be less sophisticated. (In Gothic letter German) (postpaid) $ 235

ON THE MATHEMATICS

Three Volume Manuscript Treatise

74. (Anon.), I. "LONGIMETRY", II. "PLAIN TRIGONOMETRY", III. "MENSURATION", English, probably 18th c, no author or place, but with book plate of Nicolas Roundell Toke, Corpus Christi College, Cambridge, in two of the volumes. Original leather backed board covers 10 1/4" h, 8 1/4" w, in modern leather backed box 10 3/4" h, 8 1/2" w; pgs. I. 28 leaves including 11 full page engraved plates; II. 34 leaves with many pen & ink diagrams; III. 26 leaves with many pen & ink diagrams. Bindings worn with cracked hinges but contents in fine condition. It is difficult to tell whether these are student notebooks or a manuscript for an intended book. The elegant pictorial engravings of the "Longimetry" volume suggest the latter although the format (specific problems and their solutions) suggest the former. A rare, elegant, and interesting set in either case. (postpaid) $ 325





75. Charles-Auguste-Albert Briot & Jean-Claude Bouquet, "THÉORIE DES FONCTIONS ELLIPTIQUES", 2nd Ed, Gauthiers-Villars, Paris, 1875. Original half leather binding, rebacked, 10 1/2" h, 8 1/2" w; pgs. iv, 700, many text diagrams and many more equations. Very fine overall condition. Briot (1817-82), noted for his researches into problems in mechanics, astronomy, and analytic geometry, became professor of mathematical physics at the Sorbonne in 1870, and was the author of several books on mathematical physics including one on light in 1864 and on heat (thermodyamics) in 1869. Bouquet (1819-85), professor of physics and experimental mechanics at the Sorbonne, also in 1870, was the more mathematically oriented of the two authors. The 1st ed of this work was

published in 1859 as the "Théorie Des Fonctions Doublement Periodiques". It begins with a theory of functions based upon ideas expressed in Cauchy's Memoire of 1825. There is then a development of double periodic functions, the simplest of which result from elliptical integrals. (In French) (postpaid) $ 45

76. Antoine Cagnoli, "TRIGONOMÉTRIE RECTILIGNE ET SPHÉRIQUE, . . . TRADUIT DE L'ITALIEN PAR N.M. CHOMPRÉ", 2nd Ed, Courcier, Paris, 1808. Modern half leather binding 11" h, 9" w; pgs. xvi, 508, (3), 12 folding tables (of equations), 8 folding engraved plates (of trigonometrical diagrams). Very fine condition. The 1st French edition was published in 1786, but Ricardi lists no Italian printing and we have not been able to find one either. It is possible that it was Chompré's translation which brought it to general attention. Cagnoli, an Italian astronomer, first had an obsevatory in Verona, then in Milan. Nicolas Maurice Chompré (1750-1825), French mathematician and physicist, was quit active in the scientific community and served in several governmental positions. He was Director of the Bureau of Mines and Agriculture (1771), Geometer to the Minister of the Interior (1794), Consul in Malaga (1795), and a member of the Council for Mitigating Civil Disputes (1806-14). The work here is quite comprehensive, first providing derivations of the formulae of plane and spherical trigonometry, and then applying them to problems of astronomy and navigation. (In French) (postpaid) $ 80

77. Petro Galtruchio, "PHILOSOPHIAE AC MATHEMATICAE TOTIVS INSTITVTIO, CUM Assertionibus disputatis, & vario genre Problematum", A. & J. Cavelier, Cadomi, 1656. Original vellum binding 4 3/4" h, 2 3/4" w; pgs. (6), 315, (5), 15 engraved plates (on geometry, astronomy, dialling, optics, and music). Fine overall condition except that an owner's name has been torn off the title page and the binding is not tight (although there are no loose pages). The subjects covered include arithmetic, geometry, astronomy, chronology, dialling, the terrestrial sphere, optics and music. It appears that this work was not intended as a textbook, but rather as a comprehensive treatise representing the author's own interests. (In Latin) (postpaid) $ 170

Mathematical Foundation of the Wave Propagation of Light

78. D. Guidone Grando, "GEOMETRICA DEMONSTRATIO THEOREMATUM HUGENIANORUM CIRCA LOGISTICAM SEU LOGARITHMICAM LINEAM, . . . ADDITA EPISTOLA GEOMETRICA AD P. THOMAM CEVAM S.J.", (1st Ed), Petrum Antonium Brigonei, Florentiae (Florence), 1701. Original vellum binding (minor worming of spine) 10" h, 7" w; pgs. half title, title, (12), 216, many text diagrams. Binding in very good and contents in fine condition. The author (1671-1742), professor of philosophy at the University of Pisa in 1700, professor of mathematics in 1714, was elected F.R.S. in 1709. He made important contributions to the development of geometrical theory and published several works on the analogies of the circle and equilateral hyperbola, logarithmic curves, curves of double curvature on the sphere, and the quadrature of certain partial spherical surfaces. This book is a development of 13 theorems of Christian Huygens, starting with his "Theoremata de Quadratura Hyperboles, Ellipsis, et Circuli" of 1651, and leading to his "Traité de la Lumière", written in 1678 and published in 1690. (In Latin) (postpaid) $ 190

One of the Great Euclids

79. David Gregory, "EUCLIDIS QUAE SUPERSUNT OMNIA", Oxford, 1703. Original leather binding, rebacked, 13" h, 8 1/4" w; pgs. (16), 686, (1), hundreds of text figures. Generally fine plus condition with some page yellowing. Each page is set with parallel columns of text in Greek and Latin. The author (1661-1708) started his teaching career by being elected to the chair of mathematics at the University of Edinburgh in 1683. Isaac Newton and John Flamsteed were able to get him appointed Savilian professor at Oxford in 1691. His principal work supporting Newtonian theory was his "Astronomiae Physicae et Geometricae Elementa" of 1702. According to the DNB, "In pursuance of Dr. Bernard's scheme for printing the works of ancient mathematicians, Gregory brought out in 1703, through the University Press, a splendid edition in Greek and Latin, accompanied by an elaborate preface, of all the writings attributed, with any show of authority, to Euclid." [The book here.] Indeed, the 11th ed of the Britannica notes that this edition is the only one to contain all the extant works attributed to Euclid and that the Greek text is that of the Basel edition (of 1533), corrected from the manuscript copy bequeathed to Oxford by Sir Henry Savile, and from Savile's annotations on his own copy. The Latin translation is, for the most part, that of Commandino. (In Greek & Latin) (postpaid) $ 245

Three Hundred Year Old Manuscript Book on Military Mathematics

80. (Lacombe?), "Oeuvres De Mathematiques", 1686. Early (original?) leather binding 11 1/2" h, 8" w; pgs. 148 (Traité De Fortification), 37 (Theorie De Perspective), 7 figures on separate pages, 88 (Traité De Sphere Ou Introduction a La Geographie), 89-104 (Pratiques Necessaires pour une Parfaitte Intelligence de la Geographie), and over 60 text diagrams (some quite elaborate) in the fortification section and 5 in the last section. There are a number of blank pages between each section. The binding is worn and the hinges cracked , but the covers still tight; the contents are in fine condition. There is no signed author, the name "Lacombe" having been found on the front flyleaf in what appears to be a different hand from that of the text. The contents suggest that this book was prepared for a course in military mathematics. (In French) (postpaid) $ 395

81. Lewis Lochée, "A SYSTEM OF MILITARY MATHEMATICS", 2 vols bound in 1, for the Author, London, 1776. Modern leather binding 8 1/2" h, 5 1/4" w; pgs. I. (1), 262, ix, foldout engraved plate of piles of cannon balls; II. (1), 169, (15), 26 foldout engraved plates. Fine to very fine overall condition. The author, Master of the Military Academy, Little Chelsea, first develops the rules of arithmetic using so-called military problems as demonstrative examples (i.e. how many men to form a square battalion when we want 12 men in every rank?). Then he goes on to algebra, ratios, plane and solid geometry and applications of these to military surveying and fortification. This is not a book of theory, but rather a development of rules of basic mathematics for specific applications. (postpaid) $ 145

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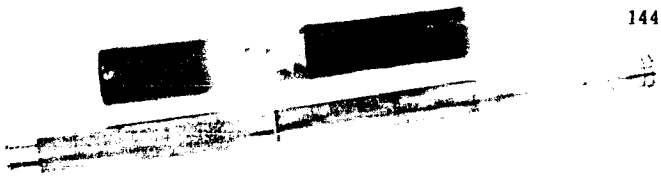
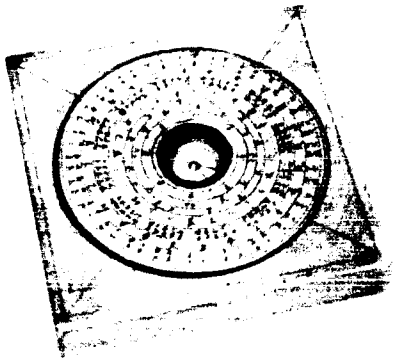


144. **CASED POCKET SPYGLASS** - English, early 19th c, unsigned. Varnished mahogany barrel, 1 1/4" d, with bright lacquered brass fittings, objective and eyepiece protective slides, and 2 brass draw tubes, 8 1/4" long closed, extending to 19 3/8". The 3/4" clear aperture achromatic objective is a triplet on Dollond's design. The original leather covered cardboard case is 1 3/4" d x 8 1/2" long and is in fine condition. The telescope is very fine with restored finishes. Its optics produce sharp images over a flat field. (4 lbs, UP, PS) **$ 195**

145. **SEVEN RING GEOMANCER'S COMPASS** - Chinese, 19th c, unsigned. Constructed of varnished boxwood like wood, the compass disc is 3 3/4" d with a 3/4" d inset magnetic compass; the surround tray is 4 1/2" sq x 3/4" thk with a 3 7/8" depression for the removeable compass and a 7/8" d hole in its bottom (for pushing out the compass). The flat face of the compass is scribed with 7 rings of markings in black and red. The innermost ring is divided in 8 and the others in multiples thereof. The signature and instruction table are on the under side. Fine plus overall condition.

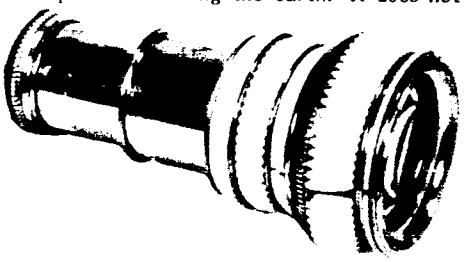


This dial was not intended for use as a compass; the south-north alignment was to place the user in the proper frame of mind for making predictions of events associated with the earth - good and bad omens for daily actions. These included the setting up of fields, erecting buildings, construction of drainage and waterways, and planting. Some of the markings are usually in a mystical langauge, supposedly known only to the maker and practioner. (3 lbs UP, PS) **$ 195**

146. **GEOMANCER'S SUNDIAL** - Chinese, about 100 years old, marked (possibly signed) on the bottom. Age darkened, boxwood-like wood, 4 1/2" long x 2 1/8" w x 1/2" thk (closed), with 7/8" d inset compass and 1" h folding brass pin gnomon. The various markings are in red and black. Fine condition except for fading of some markings.

The inclining (pseudo-equatorial) sundial ring is divided into 24 equal hours, each subdivided into quarters, the compass ring into 4 cardinal points and also 24 intervals. The sundial can be placed in 13 discrete inclinations through the ladder-like slot arrangement on the base. These correspond to the bi-monthly "chieh ch'i" (listed alongside the slots), words denoting the seasons, weather, planting times, etc. This is not a true universal equatorial dial because it is intended to be used at but one latitude with the variation in inclination a way of 'adjusting' the dial to generate correct prognostications with respect to working the earth. It does not tell the time. (2 lbs, UP, PS) **$ 195**

147. **ELEGANT PROSPECT GLASS** - French, 18th c, unsigned. Gold plated brass construction with applied rings of turned and carved ivory, 2 1/4" max dia by 2 3/8" long (min) extending to 4 1/4" by 2 draw tubes. Cemented achromatic objective of 1 1/2" clear aperture and Galilean eyelens result in 2 x's magnification. Extremely fine condition except that each of the ivory rings has split due to age shrinkage (shown in photograph). This telescope is certainly a first class object d'art even though it is of limited importance in the history of optics. (2 lbs UP, PS) **$ 275**



148. **HORIZONTAL SUNDIAL BY "THE MASTER DIVIDER", MAKER OF THE WORLD'S FIRST SEXTANT** - English, c. 1750, signed "J. Bird London" and marked for Lat 52° 10'. Cast and engraved bronze dial 11 7/8" d with 6 1/4" h gnomon. There is a compass rose in the center and a chapter ring with minute graduations along the edge. It is in extremely fine condition (with mottled green-brown patina), except for some scratches and rubbing on the western side of the base plate.

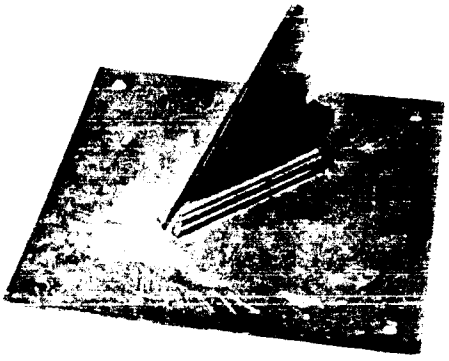
John Bird (1709-76) was a weaver by trade when he moved from Durham to London to become an instrument maker. He worked for Jonathan Sisson and, with further instruction from George Graham, was able to set up his own business by 1745. The refitting of hte Royal Observatory, Greenwich, which was initiated in 1748, brought him contracts for an 8 foot radius mural quadrant finished in 1750, a transit instrument about 1750, a 40" moveable quadrant, and redivision of Graham's mural quadrant in 1753. The quality of his work led to contracts with many English and continental observatories including St. Petersburg, Cadiz, Paris, Gottingen, Oxford, and Harvard College. He made Tobias Mayer's reflecting circle for the Board of Longitude in 1755 followed by the first sextant in 1757 (see articles by Moskowitz and Alan Stimson in Bulletin No. 8, 1986, of the Scientific Instrument Society). It is possible that the sundial here dates from the early days of his career since all evidence points to his having more important instrument commissions than he could possibly complete once his reputation had been established. (18 lbs UP) **$ 1,395**

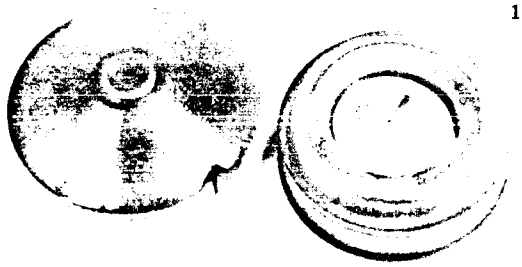
149. **EARLY PEWTER WINDOW DIAL** - American, 18th c, unsigned. Cast pewter 4 1/2" d, 1 7/8" h gnomon of approx 41°. Somewhat abused condition from extended outdoor use and then some cracking and deformations which probably took place in the process of removing it from its mounting. The measured gnomon angle, with 1/2° uncertainty, corresponds to the latitude band from New York City to Providence, Rhode Island. A good example of colonial or early Federalist Americana. (3 lbs UP, PS) **$ 165**

150. **EARLY GUNTER QUADRANT** - English, probably between 1630 and 1650, unsigned. Boxwood quadrant of 4 1/8" radius x 3/8" thk with newly replaced 1/4" sq brass sight vanes and turned plumb bob which fits in the original stowage hole in the forward edge of the quadrant. There are scales on the front surface and two radial lines at right angles on the rear. Extremely fine overall condition with all the incised markings unusually clear and sharp.

The scribed side follows Edmund Gunter's original design as laid out by woodcut on pg. 188 of the 1624 1st ed of his book, "THE DESCRIPTION and Vſe of the SECTOR. The Croſse-ſtaffe and other inſtruments.", with, however, a more generous spacing for the calendar scale. Both quadrants use but 5 stars in the projection and the edges of the inner squares are numbered from 1 to 10. By the 3rd qtr of the 17th c the numbering of this inner square had become, in most cases, 10 to 50 (see Item 195 of the Linton Sale, October, 1980, Paris). A square version of Gunter's quadrant from the underside of a diptych compendium ascribed to Henry Sutton, c. 1650 (?), is shown as Fig. 119 of Wynter and Turner. The brass Prujean quadrant (Fig. 19 of the same book) dated c. 1680 (?), still has a 1 to 10 scale but with an added 6th star. However, Fig. 16 (same book) is of a brass quadrant dated 1630 with its square numbered 10 to 50. Thus we see that variations in Gunter's designed occured within only 6 years of publication, although it is quite likely that other makers stayed with the original fromat for many more years. Relatively few early wooden quadrants have survived the years in the condition of the one here. (4 lbs UP) **$ 2,350**

151. **BRONZE GARDEN DIAL** - English, 19th c, signed "LATITUDE 53° 45' ??" PRITT MAKER". Cast and engraved bronze 9" sq with a 4 3/4" h gnomon. The chapter ring is 8 1/2" d. Red-brown-green patina of weathered bronze with some loss of surface detail. Very fine overall condition. Pritt is not listed in our references. The indicated latitude suggests that he worked somewhere in a band across northern England which includes the cities of Preston, Hull, Halifax, York, and Leeds. This is a well made sundial. (8 lbs UP, PS) **$ 265**

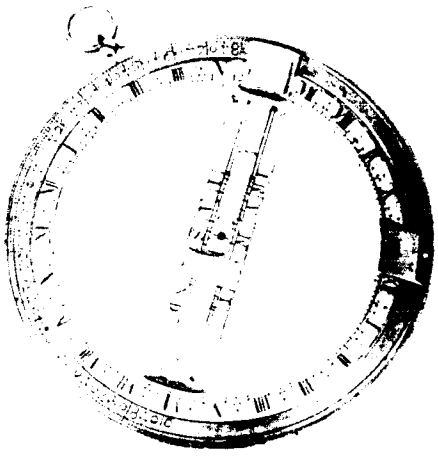




152. **FLOATING GNOMON SUNDIAL** - German, late 18th c, signed "Stockert". Turned wooden case with push-on cover, 2 1/2" d x 1 3/4" h. There is a printed and hand colored compass card upon which is fixed a brass gnomon, with a compass needle beneath, a printed and hand colored fixed outer ring with compass directions, all under a highly curved glass crystal (which is a modern replacement). Interior condition is very fine and the case is fine except for three nicks in the edge of the cover.

Little seems to be known about Stockert and even Zinner is unclear as to whether "Stockert a Bavaria" is the signature of E. Ch. Stockert, Johann Paul Stockert, or someone else. Fig. 153 of Wynter & Turner is of a paper surfaced wooden diptych dial by "E. Ch." which shows great similarities of workmanship to the example here as well as the "in Bavaria" diptych dial listed as Item 210 in our Catalog 109. Unsigned, but quite similar floating gnomon dials are also known. (2 lbs UP) **$ 475**

153. **UNIVERSAL RING DIAL** - English, between 1700 and 1752, unsigned. Bright brass, restored lacquer finish, inner ring with restored silvering, 4" d. The (inner) chapter ring is divided in half quarter hour (7 1/2 min) increments, the latitude scale on the outer ring by degrees as is the shadow scale on it reverse. The bridge with its sliding aperture is graduated in degrees of solar declination on one side and with Julian calendar dates on the other (i.e. the equinoxes occur on March 10 and September 13). Fine plus overall condition.

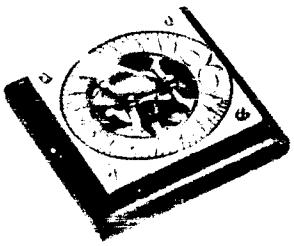


The universal ring dial (shown folded in the photograph) could be used on land or sea to obtain local true solar time knowing only latitude and date, but not true north. Since England adopted the Gregorian calendar in 1752, this instrument must predate the event, marked as it is in Julian dates, but also cannot be earlier than the year 1700 when the date of the vernal equinox advanced from March 11th to March 10th. Design details and engraving suggest an origin early in this period. (3 lbs UP) **$ 1,595**

154. **MAHOGANY CASED POCKET HORIZONTAL DIAL** - English, possibly late 18th c, unsigned. Mahogany case 3 7/16" sq x 15/16" thk, silvered chapter ring 3 3/16" d, 1 1/2" h folding bright lacquered brass skeleton gnomon for about 50° lat, the southern-most coast of England. A 2 3/8" needle is above the engraved paper compass dial. The silvering is a modern restoration, all else original; very fine overall condition except for some browning of the compass dial.

The most typical 18th c English pocket sundials were those in mahogany or circular brass cases with folding skeleton gnomon and horizontal chapter ring coaxial with, and located above the necessary compass. The compass dials were almost always on paper printed from engraved plates. The workmanship of the example here is top quality. (3 lbs UP) **$ 495**

155. **CASED INCLINING DIAL** - English, mid 19th c, unsigned. Bright lacquered brass base 2 1/2" d with 1 3/4" d compass (printed compass card), 2 1/2" d silvered inclining chapter ring with 1 3/8" h black oxidized brass folding skeleton gnomon, and silvered folding latitude quadrant. Original red leather covered case, 3" d x 1 1/4" thk, in very good condition with some surface wear. The sundial is fine with restored silvering, original finish elsewhere. This form of dial is almost uniquely English. It consists of a typical English horizontal dial designed for Latitude 60° which inclines so that it can be used at as low as Latitude 5°. Thus traditionalism is retained and converted to (almost) universalism - quite a contrast with continental true universalism. (3 lbs UP) **$ 695**



156. **DAVID BERINGER POCKET DIAL** - German, 3rd qtr 18th c, signed "B". Wooden base with fluted edges, 2 1/2" sq, upon which is mounted the 2" sq bright lacquered brass base plate with its 1 1/4" h gnomon of 49 1/2° angle. The compass well (1 3/8" needle) has a hand colored engraved card with magnetic north marked 20° west of true north. Extremely fine overall condition with restored finishes.

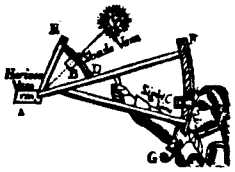
An identical dial with the same stamped "B" signature is to be found in the Evans collection of the History of Science Museum at Oxford. A slightly larger dial of identical design and workmanship, with the engraved signature "David Beringer" is at the Whipple History of Science Museum at Cambridge. Zinner notes that Beringer was working in Dieppe in 1725, then going on to Nurnberg, and lastly, Augsburg. His latest known dated dial is from 1776 but it is believed that he was working as late as 1800. He is best known for his paper faced wooden cube dials and then his paper faced wooden diptych dials. The form here is far less common. The gnomon angle corresponds to the latitude of Nurnberg which would place it in his middle period during the 3rd qtr of the 18th century. (3 lbs UP) **$ 595**

157. **FRANKFURT UNIVERSAL EQUATORIAL DIAL** - German, 1st half 18th c (?), signed "Johan Melchior Hager - Frankfort". Bright brass, restored lacquer finish, oval base plate, 2 3/4" long x 2 3/8" w, with 9/16" d inset compass, 2 1/4" d folding chapter ring with 7/8" h folding pin gnomon, and folding latitude quadrant. The face of the base plate is engraved with the wind directions rather than the geometrical and floral patterns typical of Augsberg dials. The reverse lists 12 cities and their latitudes. Generally very fine condition although some of the graduations on the latitude scale have been worn off. The original silk lined case with tooled leather covering is 3 1/2" long x 2 7/8" w and is in almost fine condition.

Zinner lists Hager as working from 1705-55, first in Braunschweig and then Frankfurt. Examples of his work are listed in the British Museum, the Oxford Museum of the History of Science, and the Braunschweig State Museum. However, the item here, particularly the case, seem later to us than Zinner's dating. It is not known if this is because there was actually a Hager family of sundial makers working over a long period of time, or Zinner is in error, or our judgement is in error. The dial is certainly rarer than corresponding Augsberg examples. (3 lbs UP) **$ 795**

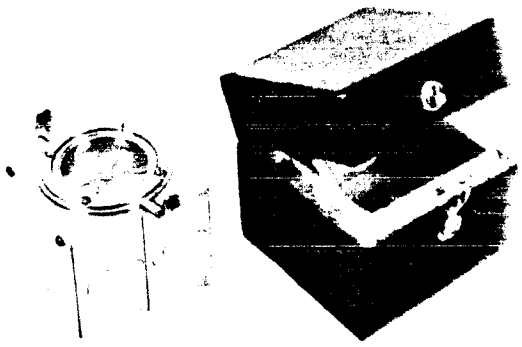
158. **SMALL SINGER'S PATENT POCKET COMPASS** - English, 2nd half 19th c, signed "F. BARKER & SON, MAKERS, LONDON". Bright lacquered brass case, 1 1/2" d, with floating compass card within, the northern half of which is black with white markings and the southern half, just the reverse. Fine condition although the original finish has worn thin in places. Singer's invention, patent no.1496 of 1861, was intended to produce a compass card which was easily read under poor light. (1 lb, UP, PS) **$ 95**

159. **TINY PEWTER DIAL** - American, 18th c, unsigned. Only 1 3/4" d. Fine overall condition with only minor wear and the typical patina of old pewter but not particularly weathered, suggesting that it had been located on the inside of a window. The 39° gnomon angle (with an uncertainty of ± 1/2°) means that this dial was made for a location somewhere in the southern tip of New Jersey, Delaware, or Maryland. The largest old city in this latitude band is Annapolis, Maryland. Pewter dials this small are quite rare. (1 lb, UP, PS) **$ 275**



160. ENGLISH SURVEYOR'S COMPASS - early 19th c, signed "Spencer & Co. LONDON". Bright brass, original lacquer finish, silvered compass dial with 5" d housing on 12" long base. The screw-on sight vanes are 4 3/4" h each. The brass compass cover is present but the ball and socket joint is now lacking. Original hand dovetailed stained pine case, 6" deep x 2 7/8" h x 12 1/4" w, in fair condition with a 2 1/4" long chip out of one end and typical pine surface wear. The compass is very fine.

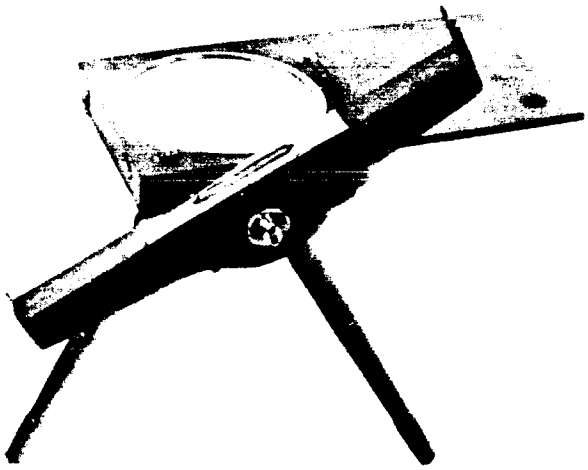
Spencer & Co. was the name used by Spencer, Browing & Rust for their higher quality instruments, particularly those in brass. Item 207 of our Catalog 120 was made under this name after they had moved to 111, Minories (1840 according to Brewington). A slightly larger compass on the same design was listed by us as Item 117 of Catalog 113. It is interesting that English makers did not include bubble levels, considering them unnecessary within the accuracy capabilities of such instruments. Proper mathematical analysis shows this stance incorrect and American makers were quick to improve their compasses accordingly. (10 lbs UP) **$ 650**



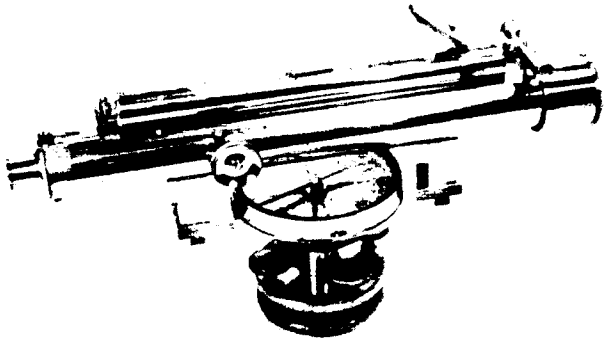
161. **SUPERB MINIATURE SURVEYOR'S CUBE** - French, within a year of 1693, signed "Chapotot AParis". Bright brass, restored lacquer finish (but with original dial silvering), 2 1/4" sq base x 2" h, the top plate with a 1 1/4" d recessed compass and a 2 3/4" long rotating sight vane alidade which reads out on a scale graduated in 2 deg intervals. The compass dial is well engraved and magnetic north is indicated at about 6° west of true north. There are vertical sighting slits at 45° intervals in the body of the cube, in the 4 corners and in the centers of the 4 sides. One small screw is a modern replacement, all else original. The original chamois lined, leather covered wooden case is 2 7/8" on a side. The outer covering is a modern restoration matched to a remaining fragment of the original, all else original including the brass hardware. Case and instrument in extremely fine condition.

Daumas notes that Louis Chapotot was active in the second half of the 17th c, although the earliest known reference to him was by Chérubin in 1670. His son (Jean?) seems to have taken over the business about 1690, working until 1721. The Webster index notes that while instruments by "Chapotot" are found in many museums and collections, it is "hard to distinguish between the work of father and son". Daumas' commentary on the Chapotots emphasizes the surveying instruments made by the father, noting that "In 1683 he supplied, for the sum of 344 livres, instruments for Cassini and La Hire who were charged with continuing the extension of the meridian begun by Picard". Our best course in dating this instrument lies with the engraved magnetic declination, the angle between magnetic and true north. The declination was zero in London in 1657 and in Paris in 1666 and was moving from east to west. According to Table II of Ralph Walker, "A TREATISE ON MAGNETISM", London, 1794, the observed declination in Paris in 1692 was 5° 50' west and in 1693, 6° 20' west. Thus if this instrument was made in the same year as its engraved declination (6° west) then it dates from just about 1693 and then would be the work of Chapotot the younger. The quality of workmanship here is at least the equal of known pocket sundials signed "Chapotot", sundials which are considered significantly more desirable than those by Butterfield, or even Bion. It is far more rare, however, for we have not been able to find a similar example in any of the known collections. (Postpaid in the U.S., air freight elsewhere) **$ 2,350**

162. **EIGHTEENTH CENTURY MILITARY SURVEYOR'S COMPASS** - Possibly American, unsigned. Mahogany construction with bright lacquered brass fittings, 6 1/8" d silvered compass face. The compass body is 7 1/2" w x 7" deep x 1 1/2" thk with a hinged cover which hooks closed. A 14 3/4" long alidade, pivoted in elevation, is attached to a wooden bracket below the compass body. It has brass sight vanes (one now broken off short) and a bubble vial recessed under a 6 1/2" long x 1 1/8" w brass plate. A 5" d turned mahogany tripod head is permanently affixed to the underside of the compass body. Its turned legs are 10 1/2" long. Very fine restored display condition.



Age shrinkage had caused the original cover glass to crack (now replaced) and 2 large cracks to develop in the compass body. The compass was removed, the cracks glued together, the now oval compass well rebored on a lathe, and the compass refitted. The brass fittings were relacquered. The dial silvering is original. The thumb screw for the compass needle lifter is present but not the rod. This instrument has seen hard field use, but now it would meet museum exhibition standards. This specialized form of surveying compass is described in George Adams, "Geometrical Essays", 1791, and illustrated by Fig. 3 of Plate XV of the same work. The instrument here could very well have been used during the Revolution, but by which side is subject to speculation. (13 lbs UP) **$ 1,100**



163. **COMPASS MODEL DUMPY LEVEL WITH TRIPOD** - English, 2nd qtr 19th c, signed "W & S Jones 30 Holborn". Bright lacquered brass, 7 3/4" h incl the 4-screw leveling base, the telescope is 14 1/2" long (min) with 1" of rack & pinion extension. It has 9 3/4" longitudinal and 2 1/2" transverse bubble housings, 4 1/2" d silvered face compass with 3 3/4" needle, a snap-on mirror for viewing the longitudinal bubble from the eyepiece position, and an objective sunshade with pivoted protective cover. The original hand dovetailed mahogany case, 20" long x 6 1/4" w x 5 3/8" h, is in very good condition as is the 55 1/2" h original tripod with brass head and mahogany legs. The level is very fine with 80 % restored - 20 % original finish, and a replaced bubble vial. There is a place in the case for a second (right angle?) eyepiece which is now missing.

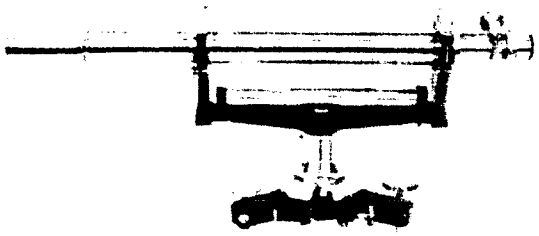
William and Samuel Jones purchased the rights to George Adams Jr's instrument designs and books after his death in 1795. They moved to 30 Holborn (in London) in 1802 and the firm retained this address through 1860. The form of the instrument here suggests a post 1825 date (although the case appears earlier), and is typically English. Later, similar examples can be found in this and some of our earlier catalogs. This is a particularly elegant version from an early stage in the evolution of the design. (2 UP packages, 20 lbs & 12 lbs) **$ 695**

164. **MILITARY ENGINEER'S TYPE SIGHT VANE LEVEL** - English, 1st half 19th c, unsigned. Bright lacquered brass, 4 1/4" h, 9" long with 6 5/8" bubble level and 2 1/8" h vanes. Original hand dovetailed stained pine case, 10" long x 5" w x 1 7/8" h, in fair condition. The level is in original, extremely fine condition. Level adjustment by a pair of screws should be compared with the single screw & leaf spring system of Item 170 of Catalog 123. Examples of this general design are known with military markings such as Item 154 of Catalog 121. (7 lbs, UP, PS) **$ 275**

SURVEYOR'S CHAINS
(For Sale Only To Purchasers Of Other Surveying Equipment)

165. **WIRE HANDLE 50 LINK 2 POLE CHAIN** - American, 4th qtr 19th c, unsigned, brass center tag marked "J H". Made from drawn soft steel wire, with a circular ring between each pair of links, one handle formed from the same 0.137" dia wire, the other, an old replacement from another source. This is a typical New England 'half chain' favored for surveying in the old towns with their small house plots. Very good plus overall condition noting uneven darkening of the links and a few spots of minor surface etching. (6 lbs, UP, PS) **$ 125**

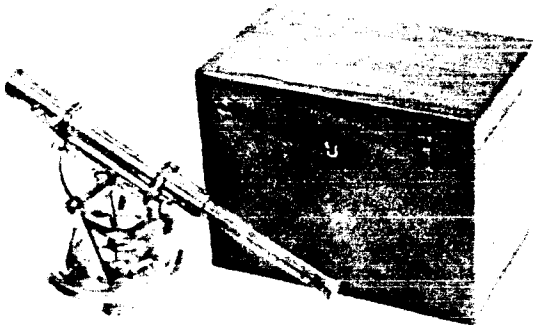
166. **RARE 2 POLE IRON CHAIN TAGGED AT HALF POLE INTERVALS** - American, mid 19th c, unsigned. Brass handles and 3 marker tags (2, old replacements), 48 full length iron links, each pair connected by a pair of small loops, 2 half links at the center, one an anti-twist joint, and 2 very short links at the ends which, when added to the handles, make two more half links; giving 50 links in all. In this way, 12 1/2 link lengths, or half poles, are easily marked and identified. The iron links vary in thickness fron 0.134" to 0.143". Very good to fine overall condition except for surface etching and pitting and some spotting, mostly at the small loops. This is the first such chain we have encountered. (8 lbs, UP, PS) **$ 185**



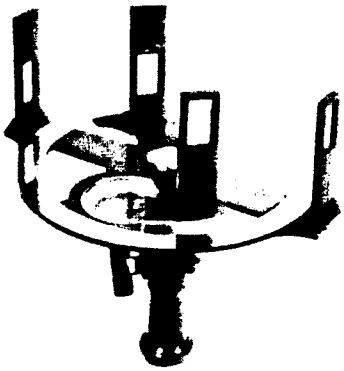
167. **A FINE FRENCH LEVEL** - c. 1900, Signed "H. Morin 11, rue Dulong Paris". Brass construction in nickel plated and black lacquered finishes, 18 3/4" long (including sunshield) and 8" h. The rack & pinion eyepiece focussing telescope rotates and reverses in the Y's but the 7 1/2" long bubble level is fixed to the frame, as is the case for dumpy levels. There is a spring loaded tangent screw for azimuth slow motion. The 3-screw leveling base is compatible with either plane table use or on an appropriately designed tripod. Original walnut case 17 5/8" long, 9 3/4" w, 7 3/4" h, in fine condition except for age crack in top. The level is extremely fine, but needs new crosshairs.

This design is known as an Egault level, a cross between the wye and the dumpy requiring an unique alignment procedure. Examples were made as early as the 1st half of the 19th c (see Item 169, Catalog 112), but the standard English texts on the subject, as well as Daumas, have nothing on its origin. (28 lbs UP) **$ 465**

168. **VERY SMALL THEODOLITE** - English, c. 1815, signed "Harris & Co. 50 Holborn LONDON" and a trade label within the case also states "BY HIS MAJESTY'S ROYAL LETTERS PATENT. WILLIAM HARRIS & Co. Manufacturers of Optical, Mathematical & Philosophical INSTRUMENTS". The instrument is brass in its original lacquer finish, but with dark streaking on the telescope, particularly where it would be held for assembly. Overall ht 6 1/4", with 10 3/4" long telescope (only non-miniature aspect of the instrument) horizontal, the 2 1/2" d silvered dial compass (2" needle) mounted on the 4 1/8" d base plate which has a beveled silver scale reading out by vernier to 3 arcmin. Azimuth motion by gear drive. The 3 3/4" d vertical semi-circle with edge rack (pinion driven) has an inlet silver scale reading by (partly damaged) vernier to 3 arcmin. The telescope with its 2 3/4" long bubble vial reverses in the wyes and disassembles for stowage. The original hand dovetailed mahogany case, 8 1/4" w x 5" deep x 6 5/8" h, is in very good condition with several age cracks and missing 1 internal fitting. The instrument is fine, but is missing its lens cap.

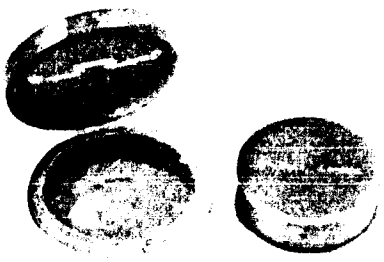


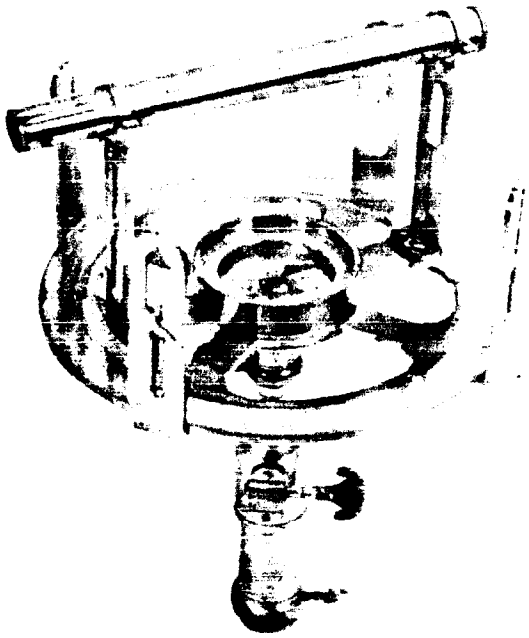
William Harris worked from 1799-1848, at 47 High Holborn until 1812, then at 50, becoming "& Co." in 1814. He made instruments to the designs of David Brewster and in 1811 was granted patent no. 3453 for "telescopes and other optical instruments for measuring angles". Several of his trade cards are listed, but not illustrated, in the Science Museum publication on trade cards. This small theodolite, as well as the other instruments by his firm known to us, all appear made to the same high standards of workmanship. (12 lbs UP) **$ 1,895**



169. **SURVEYOR'S GRAPHOMETRE** - French, for the English speaking market, 2nd half 19th c, unsigned. Brass construction in black oxidized and lacquered finish with bright brass scales, 1 7/8" d silvered dial recessed compass, standing 7 1/2" h incl its ball & socket mounting bracket. The graduated semi-circular scale is 6 1/4" d and the 5 1/4" long pivoted alidade has opposing 1 arcmin verniers and 2 5/8" h sight vanes. The instrument is complete, except for the compass needle lifter, and in very fine original condition. The original walnut case, 9" w x 5 7/8" deep x 6 1/4" h, iron handle on one end, is very good with some worm holes. This type of instrument, first described by Philippe Danfrie in 1597, was far more popular on the continent (for a very long time) than in the English speaking nations. (There was a very interesting early American version of the design, however, usually in wood, an example of which is Item 50 in the Whipple Surveying Catalogue.) (9 lbs, UP, PS) **$ 395**

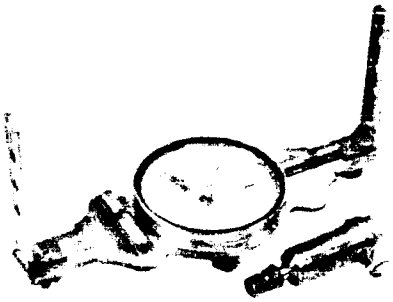
170. **CASED OPTICAL SQUARE** - English, late 19th c, signed "STANLEY, LONDON" with the case adding the address "GT. TURNSTILE HOLBORN W.C." (now a little alley off High Holborn - and maybe even then?). The black oxidized brass instrument, 2 1/8" d x 3/4" thk, has a peep hole, 2 rectangular openings, and contains within, a half silvered (sextant horizon-glass like) mirror & a fixed full width mirror. These result in the visual superposition of 2 lines-of-sight at right angles to each other. Original red leather case, 2 1/2" d x 1 1/4" thk, showing light surface wear, but otherwise in fine condition. The instrument is in very fine original condition. (2 lbs, UP, PS) **$ 95**





171. **TELESCOPIC SIX VANE CIRCUMFERENTOR** - Dutch, c. 1800, signed "ONDERDEWYNGAAR CANZIUS Delft". Bright brass, original lacquer finish, the fixed azimuth circle 8 1/8" d, 12 1/8" overall ht incl ball & socket staff mount. The 4 fixed vanes, 3 3/8" h each, are mounted 90° apart. The rotating alidade has a 2 7/8" d central compass with silvered dial and edge ring scale (2" needle) and opposing verniers reading to 5 arcmins on a 6 5/8" diameter. The alidade vanes are 3 3/4" h and have fittings for the 8 1/4" long x 3/4" d telescope. Fine plus overall condition although the the finish is worn through in places, particularly on the ball & socket joint, there is some helical dark streaking on the telescope, one lateral adj screw on the rear telescope mount is missing, and the telescope eyepiece is not original even though it will produce an image. No case.

According to Daumas, "Onderdewijngaart Canzius (1771-1838) was not himself a constructor, but he invented several instruments and was, from 1797, the owner of a workshop which, in its varied and abundant output can be compared to those of the large-scale English workshops or to that of the Jecker brothers in France. . . . His 1804 catalogue enumerates 650 items. The workshop was closed in 1810." Clay & Court in their discussion of Dellebarre's microscopes illustrates one, Fig. 146, dated 1806 and signed both Dellebarre and Canzius. Although the implication is that Canzius was responsible for the production of a large number of instruments, it is hard to find any listed in many of the museum collections - none at Greenwich, none at Whipple, none in Nachet's, none in Van Marum's - suggesting that maybe his instruments are not all that common after all.
(12 lbs UP) **$ 1,995**



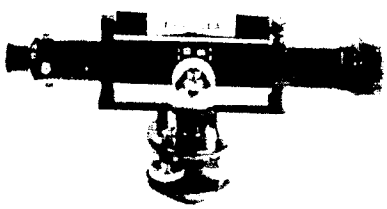
172. **SURVEYOR'S PLAIN COMPASS** - American, 2nd qtr 19th c, signed "L. Colton, New York". Bright lacquered brass with 12 5/8" long base plate, 4 3/4" d compass housing (3 7/8" needle), and 5 3/8" h screw-on sight vanes. The instrument is complete with crossed bubble levels, needle lifter, and ball & socket staff mount and in very fine original condition with an almost perfect silvered compass dial and some (not particularly objectionable) dark streaking of the lacquer finish. The original hand dovetailed mahogany case, 13" long x 6 3/8" w x 3 3/8" h, is in fine condition except for a few age cracks and missing one internal fitting (for holding the staff mount).

Levi Colton (1803-85) born in Longmeadow, Mass, worked at the jewelry and silversmith trades in New York City and Boston and later was involved in selling life insurance. From the existing data, hist first surveying compasses were made while in New York, then moving to Hartford, Conn. by 1854 (the Connecticut Historical Society has a compass so signed). He died in New Haven and it is probable that he did not return to New York after setting up in Hartford. (13 lbs UP) **$ 765**

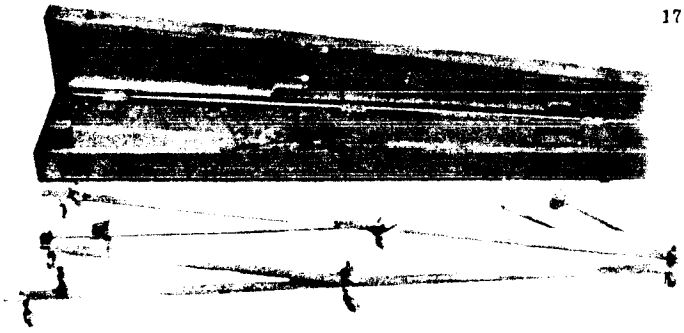
173. **PLOTTING THE HIGH HIMALAYAS** - English plane table alidade, late 19th c, signed and marked, "C.F. CASELLA & Co. LTD. 11, 13, 15 ROCHESTER ROW LONDON, S.W. REEVES'S PATTERN FOLDING TELESCOPIC ALIDADE, No. 8021. ROYAL GEOGRAPHICAL SOCIETY, No. 27". Bright brass parallel rule with restored lacquer finish, 20" long x 2 1/4" w (closed), circular bubble level, and black enameled, 7 1/2" long x 5 1/4" h, fold-down sighting telescope. Elevation readout on nickel plated sector and 1 arcmin vernier. Slight wear to the original black finish on the telescope, otherwise very fine display condition. Original hand dovetailed mahogany case, 21" long x 3 1/2" w x 3 1/4" h, in well worn condition, with internal fittings for a box compass and hand magnifier, but both lacking. This, and other such instruments, were made for expeditions sponsored by the Royal Geographical Society of London. Indeed, they may still have records of where this instrument was used. It may have been used to plot the peaks about Mt. Everest, but then again it may have been used for practice on Houndslow Heath (although in such an instance, one may wonder how the case ended up in such terrible shape). (10 lbs UP, PS) **$ 295**

174. **CASED MARKING PROTRACTOR** - English, 1854-8, signed "Elliott Brothers, 56, Strand, London" and the case marked with the owner's name "C.E. Clarke". Bright lacquered brass with inlet silver scale and opposing silver verniers with 1 arcmin readout. The 6" d, 360 deg protractor is fitted with tangent screw slow motion, the pivoted marking arms are 3 5/8" long each. Original mahogany case, 7" sq x 1 1/2" h, in very good condition with several age cracks and surface scratches. The protractor is very fine with original finishes.

This instrument was intended for both office and field use. It offers an accuracy compatible with precise plotting and at the same time, the marking of lines by pinholes allowed its use in the field under adverse conditions. For the same reason it was used at sea. William Elliott (fl 1825-54) founded the firm which became Elliott & Sons in 1850 and Elliott Brothers in 1854. Goodison lists them at 56 Strand during the period 1854-8. (5 lbs UP) **$ 455**



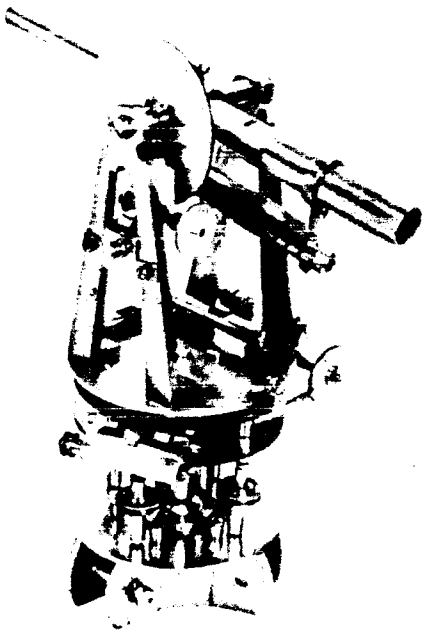
175. **COMPACT BUILDER'S LEVEL** - English, c. 1900, unsigned, quite close in design to ones made by Stanley of Great Turnstyle, London up to the turn of the century. Black lacquered brass, 10" long x 5 1/4" h incl 4-screw leveling base. Rack & pinion focussing of the objective lens. The 4" level bubble adjusts with respect to the telescope; the telescope mount is rigid - essentially a dumpy level. Original mahogany case, 11" x 6 1/2" x 3 1/4" h, in very good condition with a crack in the cover. The level is almost fine. (10 lbs, UP, PS) **$ 245**



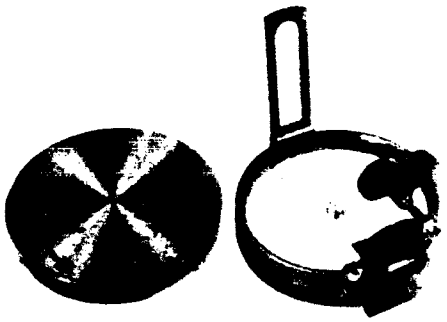
176. **BRASS PANTOGRAPH OF QUALITY** - English, 2nd qtr 19th c, signed "Troughton & Simms, London". Bright brass, original lacquer finish, the two outside arms 33" long each, one marked with ratio scales as is the shorter arm connected to it. There are 6 ivory casters, and 1 fixed sleeve & 2 adjustable ones (on the ratio scale arms) for the tracer point and pencil. Original hand dovetailed mahogany case, 33 1/2" long x 3 1/2" h x 5 3/4" w (max), containing the original tracer point, pencil holder, and lead pivot weight (now lacking its cloth covering), and in very good condition (age crack in cover and some surface marring, but otherwise sound). The pantograph is very fine with minor dark streaking and a few spots, and is completely operational.

A pantograph can be used for reducing or enlarging while transfering maps or plots of one scale to another, sometimes partial plots or details to an overall area map. The maker of this instrument is the same firm represented by several other other unusually well made items in this catalog. (20 lbs UP) **$ 465**

177. **UNIQUE MICROMETER DIAL READOUT TRANSIT** - American, probably 2nd half 19th c, unsigned. Bright brass, restored lacquer finish, with resilvered readout dials on the azimuth and elevation axes; 13 3/4" h incl the integral 4-screw leveling base and tripod head. The telescope is 11 3/4" long with a 7" long bubble level (with its silvered centering scale) fitted below. The graduated 3 3/4" d vertical circle has 360 teeth cut along its edge which can be engaged by a spring loaded worm with its graduated dial reading directly to 1 arcmin. There are two 5" d horizontal 360 tooth gears, each with its own spring loaded worm (to provide the differential rotation), the upper one graduated and with a micrometer dial reading to 1 arcmin. The telescope is as interesting an optical design as one will ever see. It incorporates a north alignment compass needle located at the top of the tube, straddling the erector optics, and with its ends bent down so that each becomes a pointer in each of the focal planes of the erector. When viewed through the eyepiece, one will appear pointing upwards, and the other downwards, and moving in opposite directions when the telescope is moved off magnetic north. Alignment is indicated when the 2 ends of the compass needle point at each other in the center of the field. The instrument is complete and in very fine (restored) display condition, noting that there are surface imperfections due to original defects in the metal and later surface etching, resulting from the instrument not having been given a lacquer finish after it was made. The 3 original 56" long mahogany tripod legs are present (not illustrated) and in very good condition.

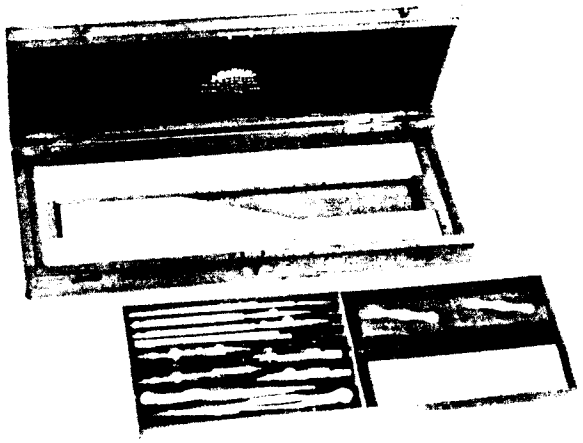


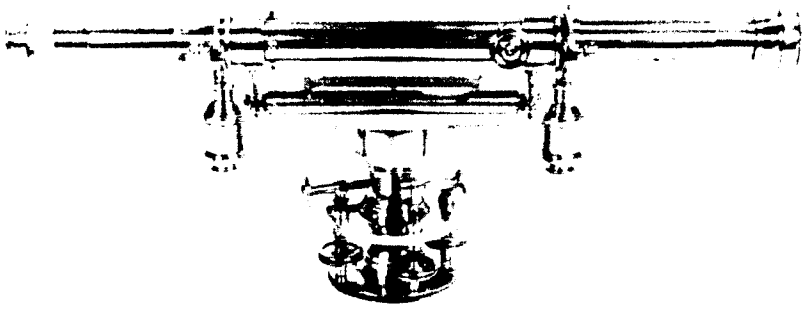
This transit, brilliant in concept (the system of readouts predates the micrometer sextant, possibly by almost a century), seems to have been made without the use of any metal working machinery, probably only a wood turning lathe. The screws are all hand made, each slightly different, and some with quite unusual heads, including the strange 'barrel head'. The telescope bubble tube has a spiral pattern of stamped small circles. The optics are non-achromatic and held in place by strips of brass sheet bent into rings. There appears to be a great deal of hand work in all aspects of construction. Knowing all of this, the method used for the cutting of the gear teeth on the azimuth and elevation dials remains a complete mystery. This instrument was made for use (it is not a patent model), possibly by the man who intended to use it. Clearly much ingenuity and effort went into its construction. We can only wonder why. (2 UP packages, 20 lbs & 12 lbs) **$ 1,100**



178. **WELL MADE PRISMATIC COMPASS** - English, c.1875, signed "TROUGHTON & SIMMS. LONDON". Green-black oxidized brass, 2 3/4" d, 2 1/4" h folding sight vane, green compass card within, the graduations viewed through the folding right angle prism. There are 2 swing-away filters attached to the prism housing as well as a pivoted protective cover on the prism aperture, a level of design sophistication unusual for this type of instrument. There is also a matching brass cover for the compass. The original leather carrying case, 4 1/4" long x 4 1/4" w x 1 5/8" thk, is in very good condition. The compass is very fine except for some minor spotting to the original finish and a small chip in the edge of the compass glass. (3 lbs, UP, PS) **$ 265**

179. **LARGE CASED SET OF DRAWING INSTRUMENTS** - English, late 19th c, case and many pieces signed "W.H. HARLING 47 FINSBURY PAVEMENT LONDON", and abbreviations there-of; also the initials "J. F." on the case nameplate and some of the pieces. Mahogany case, 14 1/4" long x 8 3/8" w x 2" h, containing two 12 1/2" long double sided boxwood scales and boxwood triangle in the bottom. The lift-out tray is complete with a 6" boxwood rule, a 6" ebony parallel rule, and 10 instruments in brass, steel, and ivory. In our opinion 3 of these, although very close matches to the others, and correct in size and function, are later replacements. Fine overall condition with one age crack in the top of the case and a few in the bottom. This is an attractive set and somewhat more extensive that the usual. (7 lbs, UP, PS) **$ 225**

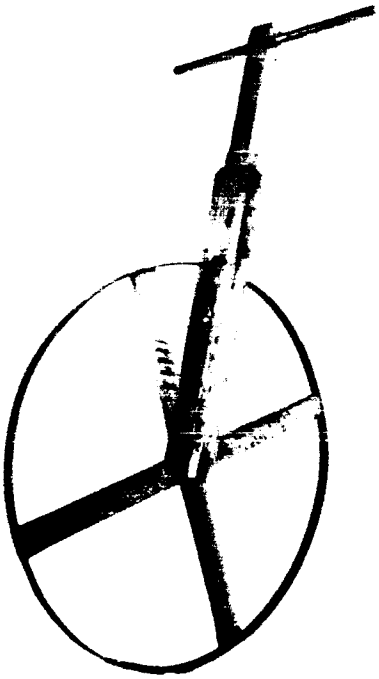


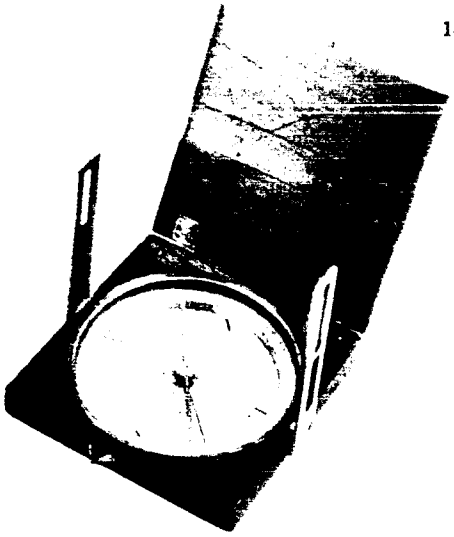


180. **LARGE 'CLASSICAL AMERICAN' WYE LEVEL** - 1865-78, signed "H.M. Pool EASTON, MASS" with many parts batch numbered "56". Bright brass, restored lacquer finish, 8 5/8" h incl 4-screw leveling base, the telescope is 22 1/2" long fully extended. Eyepiece focussing by draw tube and the objective by rack & pinion. The 7 1/8" long level bubble tube is fitted with a silvered centering scale, and the spacing between the wyes is 9 3/8". The instrument is complete, except for its objective lens cap, and in extremely fine condition. No case.

John Pool (1796-1865) founded the firm about 1820 which was to remain in business until 1904. His younger brother, Horace Minot (1803-78), was first his partner, and then in 1865, the sole owner of H.M. Pool. In 1878, upon his death, the name changed again when John's son became the principal of the firm. The design of all the instruments by all the Pools follow what has been identified as a 'Clasical American Style', a form unique to this country and typified by the example here. (17 lbs UP) **$ 650**

181. **EXTREMELY RARE AMERICAN WAYWISER** - 19th c, unsigned. Standing 53" h, the frame, 22" w handle, and wheel spokes are in golden oak. The iron tire of the 31 1/4" d wheel rolls 8 feet, 3 inches (1/2 pole) per revolution. A spring steel wire produces a loud click each of these revolutions. The more common English versions have a geared readout dial which indicates both smaller distances and accumulates much greater distances. The American surveyor using this item would have to keep a mental count of clicks. A waywiser does not give true dimensions in the horizontal plane. Thus its major use is for the rapid determination of approximate distances if there are clear paths along the lines being surveyed, hence its great scarcity in America. It is possible that the example here's greatest use would have been the determination of post road distances for the setting of appropriate charges. Fine plus condition with a few age cracks and pencil marks from the original construction. We have never seen another like it.
(Air freight because of size) **$ 750**

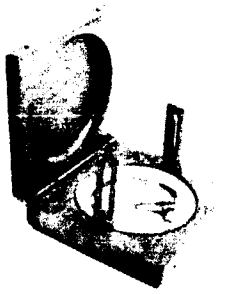


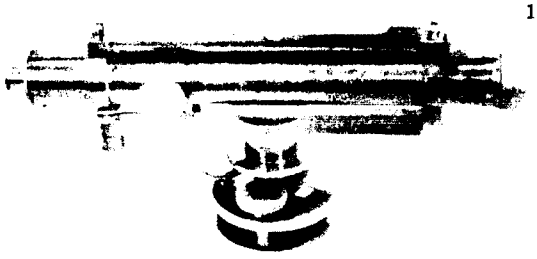


182. **EIGHTEENTH CENTURY FOLDING SIGHTING COMPASS** - English, c.1760-70, signed "COLE Maker Fleet Street LONDON". Mahogany body and hinged cover, 5 3/4" sq x 1 1/8" thk (closed), 5" d inlet compass with silvered dial and 4" compass needle, and bright lacquered brass 4 1/4" h folding sight vanes. Very fine overall condition, the finish on the sight vanes is a modern restoration, otherwise the instrument is original and complete.

The second Benjamin Cole (1695-1755) was a noted maker and several exceptional, signed instruments by him survive. In 1748 he succeeded to the business of the famous Orrery maker, Thomas Wright, located at "The Orrery", later no. 136, Fleet Street. His son (the 3rd Benjamin Cole, 1735-1813) apprenticed to him in 1739 and was his partner by 1751. Instruments signed "B. Cole & Son" are known and should date from 1751-55. John Troughton acquired the firm in 1782. In our opinion, "Cole, Fleet St." is the signature of the 3rd Benj. Cole and was used by him between 1755 and 82. (5 lbs UP) **$ 695**

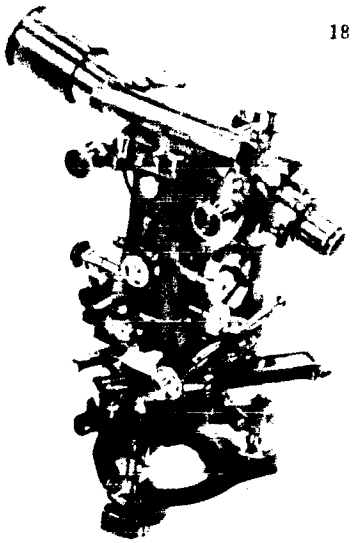
183. **POCKET SIGHTING COMPASS & CLINOMETER** - French, 2nd half 19th c, unsigned. Walnut case with hinged cover, 4 1/4" sq x 1 1/4" thk, inlet compass 3 1/4" d with 2 1/2" needle and silvered dial, an outer ring graduated in degrees. There is also a pendulous indicator pivoted about the compass needle which reads the angle of inclination when held in a vertical plane and sighted through the vanes at a target above or below the horizontal plane. The 2 1/8" h folding sight vanes are black oxidized brass. Fine plus overall condition although the case is missing its 2 closure hooks and (probably) a name plate from its front edge. (3 lbs, UP, PS) **$ 165**





184. **FINE ENGLISH DUMPY LEVEL** - 2nd half 19th c, signed "TROUGHTON & SIMMS LONDON", a serial(?) no. 23188 crudely stamped in case, but not on instrument. Brass construction in original brown-black oxidized finish, with some fittings in bright lacquered brass, 14 3/4" long (min extension), 7 1/4" h incl 4-screw leveling base, and rack & pinion focussing eyepiece assembly. There is an 8 1/2" longitudinal bubble and a 2 1/2" transverse one. The instrument is complete (except for lens cap) and in very fine original condition. Original hand dovetailed mahogany case, 20" long x 5 1/2" w x 5 1/4" h, in fine condition except for a few age cracks.

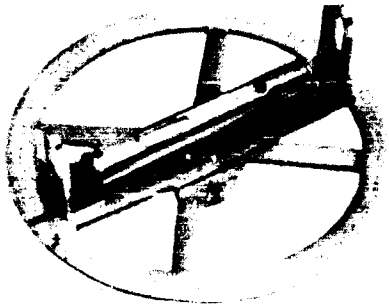
This typical English level of the 2nd half of the 19th c has several design refinements in its adjustments not found on the instruments of the other makers. It is the work of one of the "great" firms of instrument makers, the partnership having been set up in 1826. Item 150 of the Whipple Catalogue is an early (1846) version of this design (also by T & S), then known as Gravatt's level.
(18 lbs UP) **$ 465**



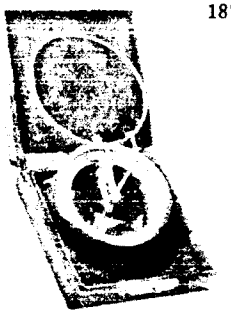
185. **A LATE GREAT MINIATURE THEODOLITE** - English, 1916-22, signed "TROUGHTON & SIMMS LTD. LONDON". Green-black oxidized and lacquered brass with bright lacquered brass fittings, 9 1/2" h overall incl 3-screw leveling base. The 8" long rack & pinion focussing telescope, reversible in the standards, is fitted with a 3 3/8" d vertical circle reading by opposing verniers to 1 arcmin, each vernier with its own swing-away magnifier, and a 3 1/4" bubble level for zero alignment. There are slow motion tangent screws on the circle and the verniers. The 3 3/8" d (classical English) beveled azimuth scale is read by opposing verniers, again to 1 arcmin, and each vernier, again, with its own swing-away magnifier. A 5" long box compass, for north alignment, slides into a fitting on the underside of the azimuth circle. Extremely fine overall condition except for a replaced screw and washer and loss of liquid in the vertical circle bubble vial. The instrument was found in a hand dovetailed, 7" sq x 10" h, mahogany case, in good condition but without internal fittings, and which may not be original.

The early historical background of Troughton & Simms has been presented elsewhere. James Simms (1828-1915) was the son of William Simms (1793-1860), who formed the partnership with Edward Troughton. When he died (1915), his sons William (1860-1938) and James (1862-1939) incorporated the firm as a Limited Liability Company. In 1922 it was merged with T. Cooke & Sons Ltd., of York, to become Cooke, Troughton & Simms, Ltd. Thus this theodolite, which has no serial number but the parts are all batch no. 1, had to be made during the indicated 7 year interval. It provides an interesting design comparison with a known miniature Troughton theodolite of more than a century earlier, the workmanship on both being to equally high standards.
(15 lbs UP) **$ 1,495**

186. **SIGHT VANE SIMPLE THEODOLITE** - English, c.1825, unsigned, but the trade card in the original case reads "WILLIAM HARRIS & Co. . . . 50, High Holborn . . . LONDON AND AT HAMBURGH". Bright brass, original lacquer finish, the 6" d azimuth circle graduated to degrees, and the pivoted alidade providing edge readout against this scale. The alidade is fitted with a 3 3/4" bubble level and 1 5/8" h sight vanes. There is a conical socket on the underside for staff mounting. Original hand dovetailed stained pine case, 6 3/8" sq x 3 1/4" h, in relatively very good condition, with several age cracks and 2 new closure hooks. The instrument is extremely fine.

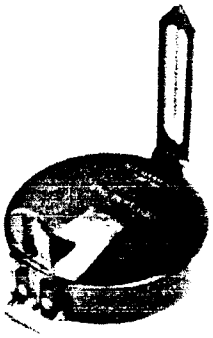


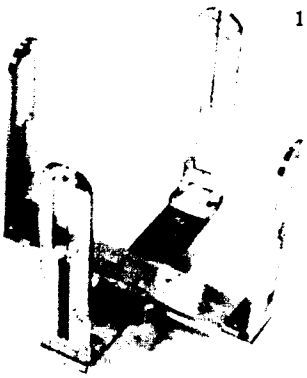
Harris worked from 1799-1848, first at 47 High Holborn, then from 1812 at 50 High Holborn, receiving patent no. 3453 in 1811. The instrument here is a true simple-theodolite, as an azimuth surveying circle was defined by Leybourn, and as is explained in the Whipple Surveying booklets. (6 lbs UP) **$ 795**



187. **CASED DIPPING NEEDLE** - American, c. 1900(?), signed "W.S. DARLEY & CO. Chicago, U.S.A.". Bright lacquered brass case, 3 3/8" d x 1" thk, glass windows on either side, 3 7/8" d folding loop handle, white-faced interior ring graduated by degrees from 0 to 90 (at the bottom) and back to 0, with 2 1/2" needle pivoted in the vertical plane. Original 4 3/4" sq x 1 5/8" thk fabricoid covered case in very good condition. The instrument is very fine with original finish and in working condition (although out of adjustment). The original (quite worn) instruction sheet (included) indicates that this model was intended for the location of underground iron objects. There were dipping needles for tracing veins of iron ore as well. (3 lbs, UP, PS) **$ 110**

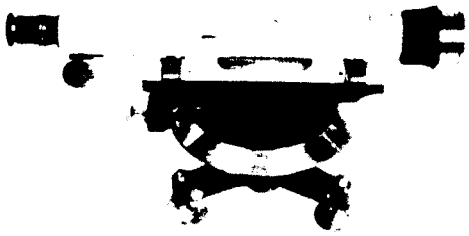
188. **U.S. ARMY ENGINEERS PRISMATIC COMPASS** - American, signed, marked, & dated, "KEUFFEL & ESSER Co. NEW YORK - ENG. DEPT. U.S.A. - 1917". BRASS Construction in flat black enamel finish, 3" d, 2 3/4" h folding sight vane, green floating compass card, the graduations viewed through the folding right angle prism. Original leather case, 4 1/2" long x 4" w x 1 1/8" thk, in good condition. The compass is very fine in terms of its original field-use finish. For an earlier English version of this design see Items 164 of Catalog 124 and 178 of this catalog. (3 lbs, UP, PS) **$ 145**

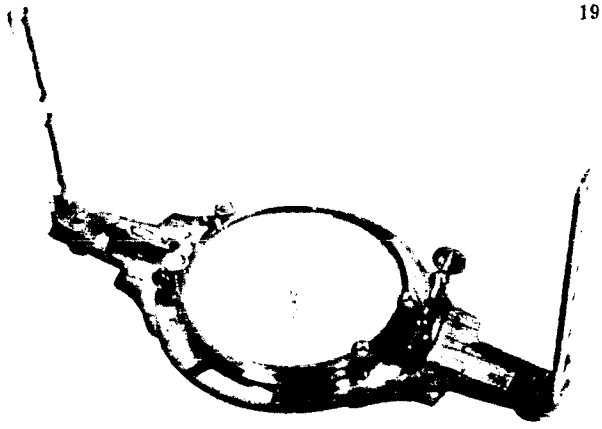




189. **QUITE SMALL SURVEYOR'S CROSS** - English, early 19th c, unsigned. Bright brass, original lacquer finish, each cross leg 5 1/4" long, the folding vanes 4 3/8" h each; 5 3/8" h overall incl the base socket for Jacobs staff or tripod mounting. The original hand dovetailed painted pine case, 5" sq x 2 1/4" h, is in fine condition. The instrument is extremely fine. Although unsigned, the design and workmanship are a close match to known instruments by William Harris (& Co.) of London and probably dates from about 1825. This is a true surveyor's cross, dating in concept from antiquity, and the fundamental instrument needed with a surveyor's chain for rectangular surveying. It was already considered outdated in Leybourn's "Compleat Surveyor" of the 17th century, but in one shape, or another, was still being made through the end of the 19th, primarily by the French in cylindrical and octagonal form. Surprisingly, very few instruments have survived in the basic design of the example here. (4 lbs UP) **$ 445**

190. **CONTINENTAL LEVEL** - German, 1st half 20th c, signed "ERTEL-WERKE A.G. MUNCHEN / 32209". Brass construction in white and black enamel, nickel plate, and bright lacquered brass finishes, 11" long x 6 1/8" h incl the 3-screw leveling base. The longitudinal bubble is 4" long and the azimuth table 4 3/4" d with its beveled scale which reads out by single vernier to 1 arcmin. Generally very fine condition except missing its tangent drive thumb screw, a few worn spots in the white enamel on the telescope, and lacking crosshairs. This form of dumpy level could be used on a tripod or plane table. No case.
(10 lbs, UP, PS) **$ 175**

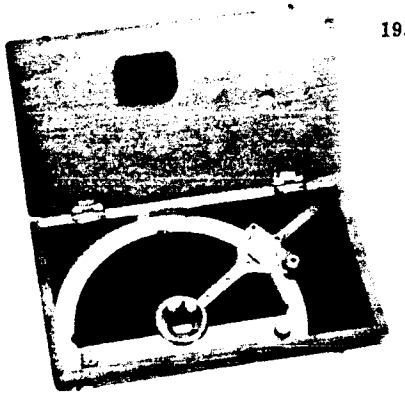




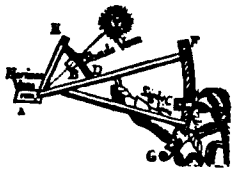
191. **VERY RARE 5 1/2 INCH NEEDLE RAILROAD COMPASS** - American, possibly c. 1860, signed "W. & L.E. Gurley, Troy, N.Y.". Bright brass, original lacquer finish, the base plate 15 3/4" long with a 6 1/4" d compass housing and 7 1/2" h screw-on sight vanes. Overall ht 10 1/2" without the ball & socket joint. The silvered face compass has an interior vernier scale, for setting the magnetic variation, and a 5 1/2" needle. The bubble levels are clustered to one side of the compass and the 7 3/4" w base plate has windows for the opposing azimuth scale verniers. The ball & socket joint is missing. The original hand (not machine) dovetailed mahogany case, 16 7/8" long x 9 1/2" w x 5 1/4" h, is in very good condition. The instrument is very fine except for some dark streaking of the finish.

The Gurley Catalog of 1862 lists small (5" needle) and large (5 1/2" needle) versions of this instrument, a vernier compass with the added complexity of a divided aximuth scale for the precise determination of relative angles, a feature required by the builders of the Trans-Continental Railroads. "As shown in Fig. 10, this instrument has the main plate, levels, sights, and needle of the ordinary instrument, and has also underneath the main plate a divided circle or limb by which horizontal angles to single minutes can be taken independently of the needle. . . . The accuracy and minuteness of horizontal angles indicated by this instrument, together with its perfect adaptation to all the purposes to which the Vernier Compass can be applied, have brought it into use in many localities, where the land is so valuable as to require more careful surveys than are practicable with a needle instrument." Fig. 10 is identical in all aspects to this instrument except in the placement of the bubble levels, but may actually represent the smaller version without so much room to the side of the compass, for the engraving of the large Vernier Compass opposite p. 23 has the same clustering of the bubble levels. An 1868 price list has this instrument at $ 80, the 6" needle Vernier Compass at $ 50, and the Surveyor's Transit with 5 1/2" needle and double verniers at $ 165. Interestingly, the telescopic transit compass (see Item 114 of Catalog 127), also an "in-between" instrument in terms of function and cost, was priced the same as the compass here. Both are correspondingly rare for the same reasons. This is the only Railroad Compass we have had in 16 years. (22 lbs UP) **$ 1,250**

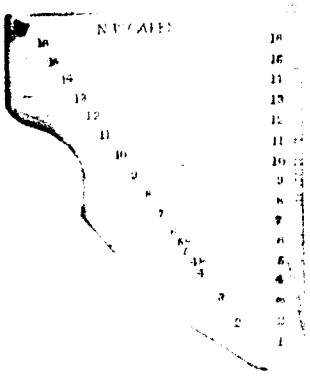
192. **AMERICAN SIGHTING COMPASS** - late 19th c, signed "KEUFFEL & ESSER Co. NEW YORK". Black oxidized brass (original finish), 4 1/4" d, with 3 1/8" h folding sight vanes, silvered compass dial with recessed bubble level vials, outer ring graduated to degrees, and 3 1/2" needle. Original bright lacquered brass ball joint Jacob staff mount. Original mahogany case 6" x 5 1/8" x 1 1/2" thk. Very fine overall condition except for some spotting on the underside of the compass housing. By the end of WWI this model had been given no. 6333 and, although identical in description to the example here, the knurling on the staff mount, diamond vs. the circular edge form here, establishes the given earlier dating. (4 lbs, UP, PS) **$ 165**



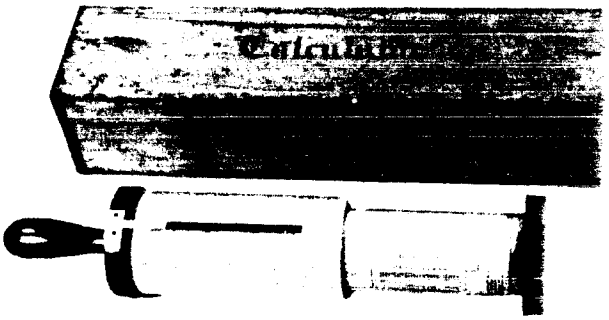
193. **VERNIER SETTING HALF CIRCLE PROTRACTOR** - English, mid 19th c, signed "Troughton & Simms. London". Bright brass, original lacquer finish, the protractor semi-circle 6 3/4" d, graduated to half degrees. The pivoted arm of 6 1/8" radius is fitted with a clamping screw and vernier scale reading to 1 arcmin. The protractor is in very fine condition. Its original mahogany case, 8 7/8" long x 5" w x 1 1/8" thk, is fine plus. This is about as a well made example of this form of drawing instrument as one is likely to see, if not a bit better. (5 lbs UP) **$ 365**



194. **RADIUS SCALE PLATE** - American, 2nd half 19th c, signed "N. W. OAKES". Early rolled brass plate, 0.057" - 0.061" thk, 7 1/2" x 9 1/8", with restored lacquer finish. Along the right hand edge there is a scale graduated every 1/8" with extended lines at 1/4" and 1/2", each 1/2" numbered with a whole integer from 1 to 16. Thus the scale represents radii of the numbered diameters. The numeral "15" was stamped "14" originally and then altered. There is a series of numbered circles, all numbers corresponding to diameters, all circles tangent to the right hand radius scale at its zero point. The centers of the first three circles (1, 2, 3,) are positioned on the plate. All the other centers cannot be on the plate because of the shaped left hand bottom edge. It is not possible to tell if the plate was cut to shape before, or after the circles were scribed. The numerals and maker's name are stamped into the surface. The scribed lines show faint multiples in places, suggesting that several (slippage?) errors were corrected. Very fine overall condition in terms of original fabrication. (4 lbs,UP, PS) **$ 165**



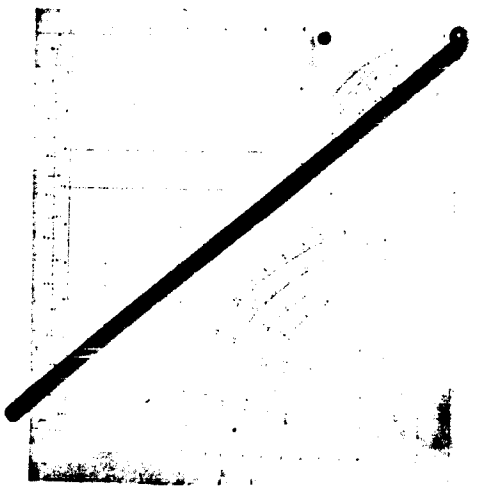
195. **WELL MADE BRASS SECTOR** - French, 18th c, unsigned. Bright brass, restored lacquer finish, 1 1/4" w x 6 3/4" long (closed), varying in thickness from 0.158" - 0.174". Scales on one side for "Les Parties Egales, les Solides, les Poligones, & Poids de Boulets" and on the other for "Les Cordes, les Plans, les Metause, & Calibres des Pieces". Along the edges are scales for French and English inches. This is a form of Galileo's sector, or "Compasso Geometrico", as made by instrument makers in France in the late 17th and early 18th centuries. Extremely fine condition. (3 lbs, UP, PS) **$ 355**

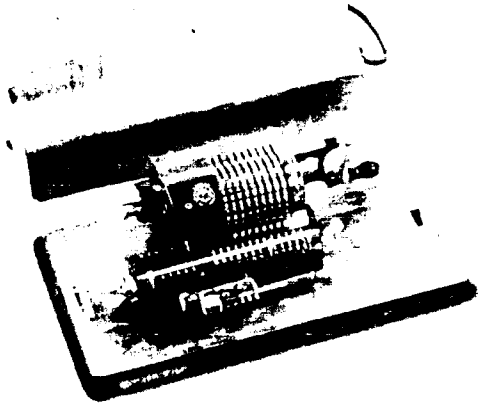


196. **EARLY HAND HELD FULLER SLIDE RULE** - English, c. 1885, signed "STANLEY, Maker, LONDON" with the serial no. "790", but before the use of the last two date digits. Constructed of brass, mahogany, and varnished cardboard, 3 1/2" d x 17" long (incl handle). Original mahogany case, 17 3/4" long x 4 1/2" w x 4" h, in very good condition except for age cracks and a few surface stains. The calculator is in very fine condition with some surface chips at the ends of the cylinders. A reproduction of a 1907 instruction booklet is provided in lieu of the missing original.

This cylindrical slide rule, designed by George Fuller & patented in 1878, has a logarithmic line arranged spirally on the surface of the cylinder in 50 turns resulting in a working length of 41 ft, 8 inches, thus giving an approximation accuracy of 1 part in 10,000. Compare this with your old 10" slide rule! Two forms of the calculator were made, this hand held model and one which mounts on a bracket which attaches to the side of the case. Later on, the version here with data tables on the inner (fixed) cylinder, was designated the No. 1 Model, and Nos. 2 & 3 were made with additional calculating scales on the inner cylinder instead. This and the Thacher were the most popular of the "super" slide rules. (9 lbs, UP, PS) **$ 285**

197. **RECTIFIED CIRCLE AND CHORD PLATE** - American, 2nd half 19th c, unsigned. Early rolled brass plate, 0.035" - 0.038" thk (although with a surface grain which suggests a hand beaten origin), 11 1/4" x 12 1/2", with restored instrument lacquer finish. A number of scales and grids are scribed on the plate. In the upper right is a quadrant of 4" rad, divided to degrees, the zero point of which serves as the pivot point for the 15 1/2" long x 1/2" w blued steel index arm. Along the left hand edge is a scale numbered from 0 to 90 in graduations of 1, each division corresponding to the position of the index arm on the marked quadrant circle. Between this scale and the quadrant is a grid of 1" squares, so arranged that the index arm passes through the marked "10" point when on 90°, "8" point when on (approx) 77.5°, "6" point when on (approx) 62.5°, etc. In the lower right is another quadrant with circles every half inch in radius, marked for their diameters along the lower edge. Starting from this edge there are dimensions in inches which represent the chord length to each successive marked point on the circle. For example, along the 6" d circle are chords of length 1 3/4", 3/4", 5/8", 9/16", 1/2", & 1/2", arriving at the right hand edge of the quadrant. However (due to the granularity of the brass?) the scribed circles are some what irregular and on some, the chord lengths are in error, some by as much as 1/8", except where there has been a gross error, i.e. 2 1/2" stamped for a 3" length. Of course, this interpretation could be in error and these are not marked chords, but something else. Very fine overall condition in terms of original fabrication. (6 lbs, UP, PS) **$ 195**



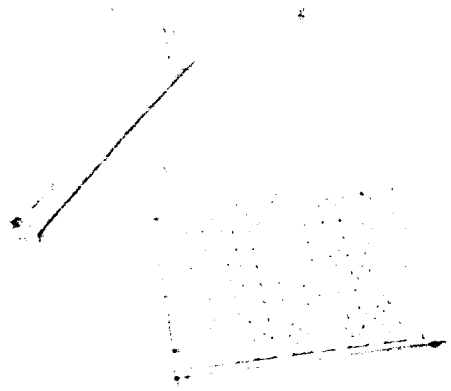


198. **IMPROVED TRINKS - BRUNSVIGA CALCULATING MACHINE** - German, c. 1920, made by "GRIMME, NATALIS & Co. BRAUNSCHWEIG", serial "No. 45700". Steel construction with black and nickel plated finishes, on a 13" w x 7" deep varnished wooden base, with original, 11 3/4" w x 5 3/4" deep x 4" h, shaped wooden protective cover. There is some minor surface wear and loss of some of the applied gold lettering, but external condition is still way above average. It is also in excellent working order, quite unusual for most surviving examples.

An earlier version, with inferior carriage stepping mechanism, is illustrated by Plates 11 & 12 of Science Calculators. The design was based upon the 1891 German patent of W.T. Odhner. Although multiplication and division are by repeated addition, or subtraction, as with the de Colmar type Arithmometer, the use of Odhner's variable tooth wheel instead od the Leibniz type of gear led to an entirely different and more compact design. These wheels fit very close together on the shaft at the back. Setting levers, part of each wheel, project through the slots in t overall condition with some small es set against a number, a corresponding number of pins then project from the wheel. When the operating handle is turned, these pins engage with the small gears of the product register, which then turn the number wheels on the lower moveable carriage. The wing nuts are for zeroing the registers. (15lbs, UP, PS) **$ 195**

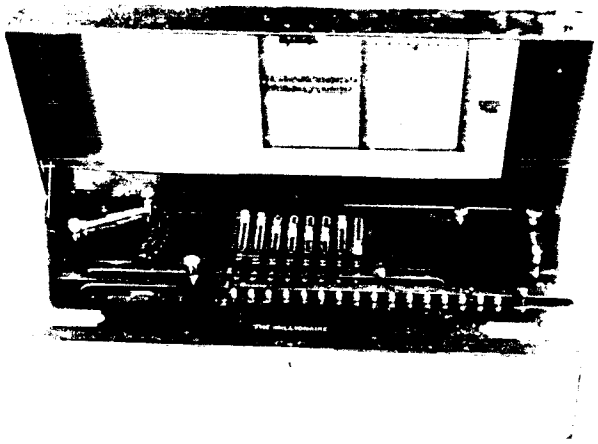
199. **THE CURTA TYPE II - THE LAST MECHANICAL CALCULATOR** - Liechtenstein, 1960's, made by "Contina Ltd Mauren". Black enamel and grey finish metal construction, 2 1/2" d x 3 1/2" h plus the projection of the crank handle. This is the large capacity model with 11 input and 16 output digits. There are little sliding knobs along the input and output scales for setting decimal points and groupings. Original bakelite stowage case 3 1/8" d x 4 7/8" h, in almost fine condition. The calculator is in very fine display and working condition, with slight finger soiling of the grey cylindrical surface.

This calculator is a very clever and compact version of the Thomas de Colmar Arithmometer invented in 1820 based upon the step-gears of Leibniz' calculating machine of 1694. Although there were circular Leibniz machines which predated the de Colmar Arithmometer (by Antonius Braun in 1727, Philipp Hahn about 1798, and J.H. Mullers about 1784) it is most likely that the Curta itself is derived from later machines, Joseph Edmondson's crescent shaped, and somewhat larger calculator patented in 1883, followed by C. Hamann's fully cylindrical version patented in 1902. One of our subscribers has also noted that descriptions of the Curta are to be found in the books: F.J. Murray, "Mathematical Machines, Vol. I, Digital Computers", Columbia, 1961, and G.A. Montgomerie, "Digital Calculating Machines", Van Nostrand, 1956. (4 lbs, UP, PS) **$ 375**



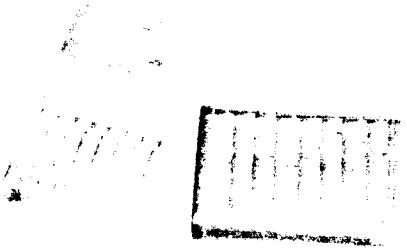
200. **CASED NAPIER RODS** - English, 17th c, unsigned. Scribed boxwood, the 3 1/2" x 2 9/16" x 9/16" thk case with sliding cover in one edge, holds the 3 1/8" w x 4 1/4" deep rod tray with its two edge bars, the left hand edge one numbered from 1 to 9. The moveable rods consist of the double sided square root - cube root block (one side shown to the left in the overall photo and the other in the inset photo) and 10 four-sided numbering rods, 0.21" sq x 2.06" long. The two blanks are modern replacements of missing originals, the other 8 are numbered as follows: two each 0-3-9-6, 0-2-9-7, 1-2-8-7, and one each 1-4-8-5, 3-4-6-5. Thus the missing ones were doubles of the last two. The case and tray are held together with brass rivets and are decorated with finely scribed lines. There are short cracks due to shrinkage about the brass rivets, and the sliding cover is a modern replacement (as are the 2 rods already noted); all else original and in very fine condition.

John Napier of Merchiston Castle (near Edinburgh) published his account of his calculating rods in his book, "Rabdologiae, sev Numerationis per Virgulas libri duo: cum Appendice de expeditissimo Multiplicationis Promptuario", 1617. Although his invention of logarithms in 1614 was to prove of greater importance, his "Bones" (because some sets were made of ivory) made up the world's first (base 10) pocket calculator. The set here contained the usual 10 rods which allowed the processing of any 4 digit number, plus the square root - cube root block which is not typical of many known sets. Fig. 2b of Science Calculators shows a leather cased set of brass rods matching the set here. (See this book for further historical data.) The use of the square root - cube root block is described in Charles Leadbetter's 1732 supposed revision of William Leybourn's 17th c work, "THE Art of Numbring BY SPEAKING - RODS Vulgarly termed NEPIER's BONES". Surviving sets, uncased as well as cased, have become exceedingly rare. This is the only one ever to be offered in our catalog. (Postpaid in the U.S., air freight elsewhere) **$ 2,995**

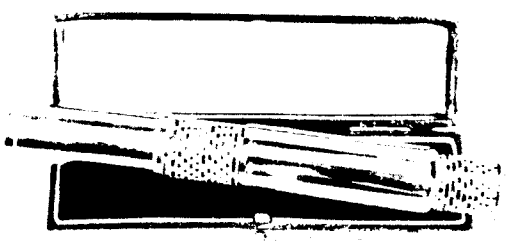


201. **PORTABLE VERSION OF MILLIONAIRE CALCULATING MACHINE** - Swiss, early 20th c, signed "Hans W. Egli Ingenieur Fabrikation von Rechenmaschinen Pat. O. Steiger ZURICH II", with serial no. "3053", and name plate of the American agent, W.A. Morschhauser. Covered, painted, steel case, 25 1/2" w x 11 1/4" deep x 7" h, weighing only 70 lbs, with full instructions in English within the case lid. This is the fully manual model with 8 input digits through sliding knobs. The outside of the case is somewhat worn, as is the black oxidixed brass face plate which has (obviously) seen much handling and use. However, the calculator itself is in excellent working order.

This is a direct multiplying machine, in contrast with the multiple addition designs of de Colimar, Brunsviga, and even the Curta. One turn of the crank produces a complete multiplication resulting in an (average) 4 1/2 fold increase in calculating speed. The original 1893 patent was by Otto Steiger of Munich. It was first made on a commercial basis by Egli in 1899. There were versions with motor drives and a later design replaced the input digit sliding knobs by a keyboard. Plate 16 of Science Calculators is of the motor driven equivalent of the model here. Handle openings in the ends of the case lead to the belief that this 70 pound machine was offered as being portable. (Air freight, approx 90 lbs packed) **$ 995**



202. **TWO SIMPLE ADDING MACHINES** - 20th c, signed: 1. "TASCO POCKET ARITHMOMETER"; AND 2. "THE BASSETT ADDER (Chicago)". The first is 3" x 5 1/4" in nickel plated sheet steel and comes in its original fabric slip case with the original instruction sheet. Stylus missing, but you can use a ball point pen. Fine condition. The second is in painted sheet steel, 4" x 3 1/4" x 7/8" thk, and has its instruction sheet and wooden stylus in its original, rather worn, cardboard box. It has perforated looped plastic bands which circulate inside the housing activating red flags in the next column when a carry is required. Fine overall condition except for the 5th loop which has a tear between 3 adjacent holes and the first loop which does not activate the 2nd loop flag. (3 lbs, UP, PS) **$ 55**

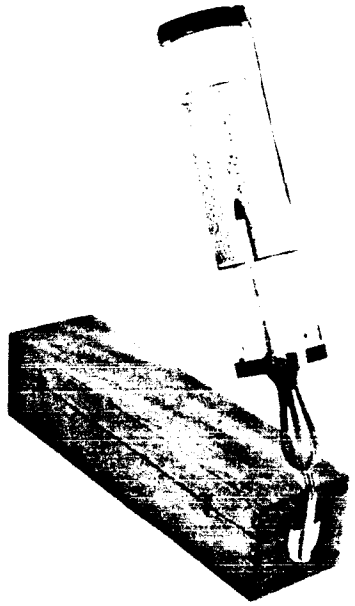


203. **ORIGINAL FORM OF "OTIS KING'S PATENT CALCULATOR"** - English, c.1925, made by Carbic Ltd. of London. Nickel plated brass, 1 1/8" d x 6 3/8" long (closed) extending to 10 1/2". The scales and figues are white on a black ground. The original velvet lined case, 7" long x 2" w x 1 1/2" h, is covered in pebble grained paper (or thin leather) and contains the original 8 pg (undated) instruction book. Science Calculators states (for Item 166), "In this pocket form of cylindrical slide rule, which is a modification of the Fuller type of calculator, the length of the logarithmic line is 66 in. . . . The instrument consists of two tubes, the smaller of which (the 'cylinder') is free to rotate and slide relatively to the larger (the 'holder'). A spiral logarithmic scale, . . . is mounted on each of these tubes, while a third tube, provided with two arrow points, one at each end, is mounted on the holder, forming a tubular cursor, which may be set to any mark on the spiral scale." The model here follows the original 1922 patent. Later versions (see Item 222 of Catalog 128) had black scales and figures on a white ground and the tubular cursor was finished in black. Calculator and case in very fine condition, instruction booklet is parted at some folds. (3 lbs, UP, PS) **$ 135**

204. **FOLDING SQUARE BY RENOWNED MAKER OF POCKET SUNDIALS** - French, c. 1700, signed "Butterfield AParis". Bright brass, restored lacquer finish, 6 3/4" long per side and 13/16" wide. Thickness varies between 0.069" and 0.095". One edge has a scale marked "6 p [for pouce, or French inch] de france" in intervals of just over 1 1/16 English inches. The other edge has a centimeter scale engraved (rather crudely) "Nelle Mesure", and certainly not by the same hand as the signature. In our opinion this instrument was once part of a set of drawing instruments (standard grade) by the firm of Michael Butterfield, established in Paris by 1677 (see discussion of Item 153 of Catalog 128), and which lasted until his death in 1724. About a century later, as a consequence of the French Revolution, the metric scale was added by one who lacked the skill of the original maker. Very fine condition. (3 lbs, UP, PS) **$ 355**

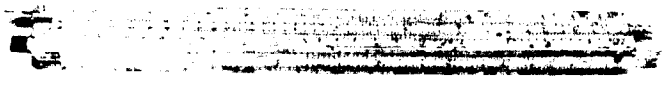
205. **GUNTER SECTOR BY THE MAKER OF THE ORIGINAL ORRERY** - English, c. 1700, signed "I. Rowley Fecit". Bright brass, restored lacquer finish, 6 3/8" long x 1 7/16" w (when closed), varying in thickness between 0.095" and 0.101" (English instrument makers in England had to work to a higher standard than those in France). There is a folding blade for additional rigidity. Scales on one side are marked "S, L, s, Tan, Sin", on the other "Numb, T, C, t", and there is a tenths-inch scale along the outer edge. Condition is fine with some minor surface etching and wear. John Rowley, successor to John Worgan, and succeeded in turn by Thomas Wright, is known to have been working from before 1698 and having died in 1728. However, his later years were spent as "Master of Mechanicks to His Majesty", King George I, and it is believed that he made very few instruments after 1715. John Harris in the 1704, 1st ed of his "Lexicon Technicum" held him in the highest regard. Rowley's famous representation of the Earth - Moon - Sun system (now the property of the Science Museum, London) was made for the 4th Earl of Orrery before 1712. The booklet, "At The Sign Of The Orrery - The Origins Of The Firm Of Cooke, Troughton & Simms, Ltd.", states that, "Between 1698 and 1720 the output of instruments bearing Rowley's name was remarkable for variety, volume and excellence of workmanship." The largest known universal ring dial in the world (Time Museum, Rockford, Ill.) was made by him. This sector is of almost the same quality.
(3 lbs UP) **$ 925**

206. **CASE MOUNTING FULLER SLIDE RULE** - English, dated (19)44, signed "STANLEY, Maker, LONDON" with serial no. "8401". Constructed of mahogany, brass, and varnished cardboard, 3 1/2" d x 17" long (incl handle), 21 1/2" h overall when mounted on its 18" long x 4 1/2" w x 4 1/4" h original mahogany case. Case is in fine, calculator in extremely fine original condition. Also included is the original, 1941 dated instruction booklet. This, one of the last made with mahogany (later ones used brown bakelite) appears to have had its scales printed from the same plates used for making those dating from the 19th c. This is a No. 1 Model with data tables on the inner cylinder, the same as the earliest versions.
(10 lbs, UP, PS) **$ 285**

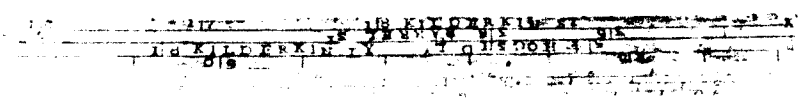


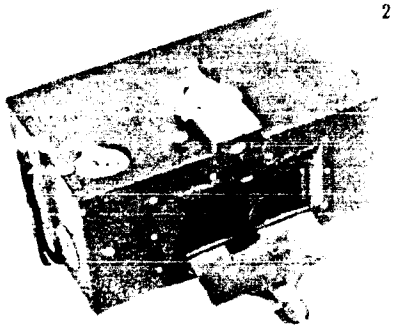
207. **CASED DOUBLE SIDED POCKET CIRCULAR SLIDE RULE** - English, 1st half 20th c, signed "HALDEN'S CALCULEX". German silver 2 3/8" d outer ring, carrying a fixed circular scale, within which is a moveable dial. On each side of these dials are flat milled heads which enable the dial to be set at any point upon the fixed scale; the whole being covered with independently rotating clear discs, each of which has a fine index line radially scribed on its inner surface. The 2 5/8" sq x 3/4" thk original aluminum case also holds the 2 1/4" sq, 94 pg instruction booklet. Case and booklet are in very good, the slide rule is in very fine condition. The same device is listed as Item 161 in Science Calculators where it is noted that that it was derived from Boucher's design of 1876. (2 lbs, UP, PS) **$ 125**

208. **FOUR SIDED, FOUR SLIDE EXCISE RULE** - English, probably just after 1825, signed under one of the slides "COOK · MAKER TO THE HON.BLE BOARD OF EXCISE · LATE WELLINGTON CROWN COURT SOHO London". Boxwood, 3/4" x 1 1/8" x 12" long, with a total of 16 scales on the 4 sides plus one on the back of one slide, and tables on the back of another. Fine overall condition with some small chips near the ends. Taylor 2 lists Alexander Wellington, fl. 1792-1825, at Crown Court, Adinger St., St. Anne's, Soho, London. She also lists Laban Cooke (possible misspelling) at 21 Crown Court, Soho, London as successor to Wellington. It is noted that he made gauging instruments for The Board of Excise: scales, slide rules, etc. (3 lbs, UP, PS) **$ 185**



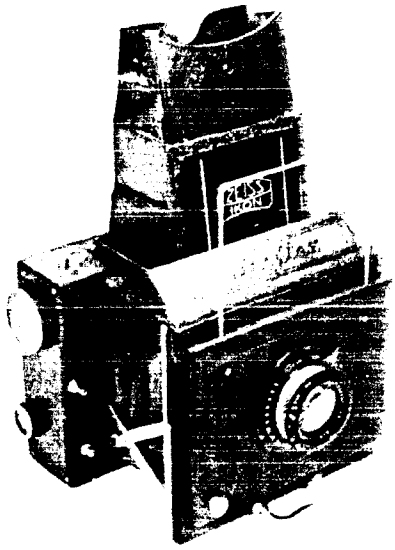
209. **4 FOOT WANTAGE OR GAUGING ROD** - English, 2nd half 19th c, signed "LOFTUS LONDON". Boxwood rod approx 1/2" sq x 48" long with brass cap at one end, a short section of which is illustrated. Inches and tenths scale on one side, IMPL GALLONS logarithmic scale on another, the remaining two sides have 4 scales each, marked BUTT ST(anding) & LY(ing down), the same for wine and beer PUNCH(u)Ms, KILDERKINS, FIRKINS, and HOGSH(ea)Ds. This rod was used, first, for determining the level of liquid in any container of alcoholic beverage, whether standing up or lying down (the keg, not the tester), and then calculating the volume. Fine overall condition although somewhat age darkened.
(9 lbs, UP, PS) **$ 115**



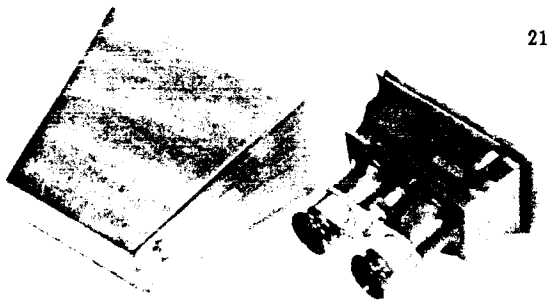


210. **"NO. 1 PANORAM-KODAK MODEL C"** - American, made be Eastman Kodak Co., Rochester, N.Y., serial no. "15405", last patent date 1903. Black leather covered wooden body, 7 3/8" w x 4 3/8" deep x 3 3/8" h, with nickel plated fittings. Unmarked (rapid rectilinear ?) objective lens which swings through 112°, under two different spring tension settings which, in effect, result in two different shutter speeds. An image 2 1/4" x 7" is produced on either (obsolete) 105 or (currently available) 120 roll film. The film is held in place in a curved focal plane. The camera is in very fine original condition although the circular bubble levels have lost their liquid and the shutter does not function well on the low tension, but does on the high. This model was actually introduced after the No. 4, which took 3 1/2" x 12" pictures on what is now another obsolete size of roll film. (6 lbs, UP, PS) **$ 245**

211. **MIROFLEX MODEL B SINGLE LENS REFLEX** - German, c. 1930, made by Zeiss Ikon, serial no. 2214220. Black leather covered metal body, 7" w x 6" deep x 11 1/2" h when the bellows-strut section is extended and the single lens reflex viewing hood is up. It can also be used in a sports mode with its wire frame finder. The objective is a 15 cm fl, F 4.5 Zeiss Tessar in a helical focussing mount, and produces 9 x 12 cm images. The unique, and extremely complex, focal plane shutter has speeds from 1/3 to 1/2000 sec plus T & B. The camera is in its original leather field case, 8 1/2" w x 6" deep x 8 1/2" h, with a single plate holder, a film pack back, and the original instruction booklet in English. The case is worn but the camera is in extremely fine external condition. It is also working, but the shutter while operating, does not do so properly (probably due to an incorrect resetting of the gearing when at some time an attempt was made to increase spring tension).



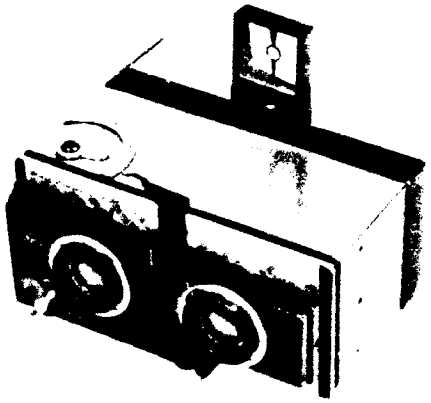
Lothrop in "A Century of Cameras" calls this "one of the finest of the collapsible or folding single-lens reflexes produced in the first third of the century. It was sturdy, functional, and extremely well made. The Miroflex Sport and Reflex Camera is a direct descendent of the "Deckrullo" collapsible focal-plane camera of the early 1900's and the Contessa-Nettle "Super-Speed Deckrullo" of the early 20s, . . ." The focal plane shutter, through a system of cams, gears, and linkages, is set at various tensions and shutter slit widths from a single knob. Contrast this with the Graflex with its separately set shutter tension and slit width. This was one of Zeiss' most complex, and highest priced cameras of the period.
(13 lbs, UP, PS) **$ 295**



212. **WELL-CASED BREWSTER TYPE STEREOSCOPE** - English (?), 2nd half 19th c, unsigned. Viewer with rosewood body, 7 1/2" w x 4 1/2" h (taking 6" x 3 1/2" stereo cards or slides), fixed ocular separation center wheel focussing binocular eyepieces resulting in an overall depth of 5 3/4" (min) to 6 3/4" (max). The conical fixed tubes are leather covered, the draw tubes, connecting plates, and central shaft are gold plated brass, and the eyecaps are black lacquered wood. The sufaces of the body are double curved as is the top door, with its interior mirror, which is used to illuminate opaque slides. The rear of the body is fitted with a ground glass screen for transparent slides. The original, wedge-shaped, hand dovetailed mahogany case, 9" w x 5 1/2" h x 7 3/4" deep, is in very fine condition. The viewer is extremely fine except for a chip in one edge of the frame for the ground glass.

Stereoscopic photography had two great periods of popularity, the first centered about 1860, and the second from about 1890 to 1910. Sir David Brewster's "lenticular" steroscope was first described to the Royal Society of Edinburgh in 1849. A drawing of an 1851 version of his design is shown on p. 188 of Gersheim's "The History of Photography". In general, the more elegant viewers were produced during the first period while the second is characterized by cheap devices intended for mass sale, although high quality viewers were still made. No viewer similar to this one is found in the Auer catalogue. However, on p. 72 of Gross, "Antique & Classic Cameras", a Claudet type viewer (c. 1855?) is shown which has a body quite similar to the one here. Thus, although the unusual case is clearly of English origin, and made for the viewer, the viewer itself has details which speak of a French origin. (8 lbs UP) **$ 495**

213. **"Grand Prix 1900" STEREO PLATE CAMERA** - French, early 20th c, signed "GAUMONT Paris", serial no. "13833". Nickel plated body with black enameled fittings and front lens board, 6" w x 5 1/4" deep (incl plate changing magazine) x 2 3/4" h, with unusual, folding optical viewfinder intended for use at some distance from the eye and incorporating a leveling pointer. Glass plate size 6 x 13 cm. The camera focusses from 2 m to infinity. The lenses are matched Krauss Zeiss Tessars, 85 mm fl, F 4.5. Shutter speed is controled by an air cylinder with adjustable openning. Apertures are set individually for each lens. The camera is in very fine physical, and working, condition except for loss of aperture setting markings due to rubbing of the lens board surface.

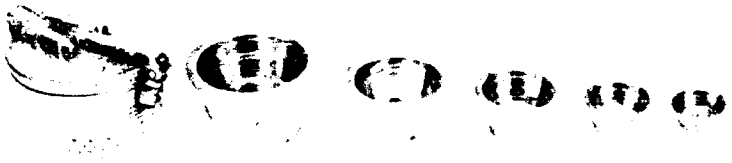


This very camera is said to have been reviewed by Jason Schneider in Vol. 1, pg 53 of "Camera Collecting" (date of publication unknown). Item 181 of the Auer Catalogue, the Spido Gaumont of 1899, has the same type of viewfinder, air shutter, and plate changing back of the model here. Other Gaumont cameras are illustrated as Items 405, 441, 442, 460, 1287, and 1288 in the same book. The Thomas International Directory illustrates 18 different Gaumont cameras, but not this one. However, it lists a Stereospido Metallique (no. 2396) which may be the camera here. (9 lbs, UP, PS) **$ 365**

* * * * *

214. **RARE CASED STANDARD YARD** - English, c.1825-35, signed "Bate London" and marked "Fahrenheit 62°", and stamped (at a later date) "1860". The 1/2" d x 36" long hand forged brass rod is contained in its original fitted dark oak case, 1 3/4" sq x 39 3/4" long. The case is in very good and the standard yard in fine condition (having no sign of ever having an instrument lacquer finish).

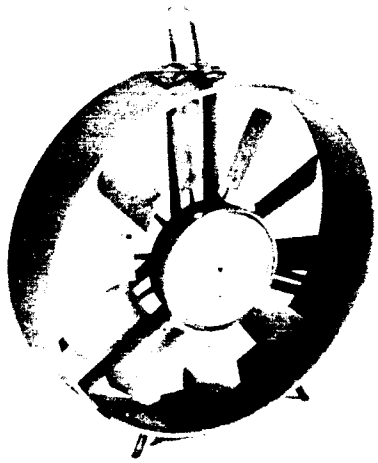
Taylor 2 lists Robert Bretsell Bate (fl. 1807-43) (Goodison extends this to 1849) first at 17, then 20-21, Poultry, London. "In 1807 Bate was apprenticed, and must have started in business about 1815. Before 1840 the firm became Bate and Son. . . . He made the official standard weights for Kater after Edward Troughton had refused to, on account of his age." This important physical standard, valid without correction only at 62° F, could have been taken from the primary standard yard which was kept under armed guard in the Tower of London. Later standard yards were more elaborate, some as inner and outer pairs with steel tips at the points of contact. (14 lbs UP) **$ 595**



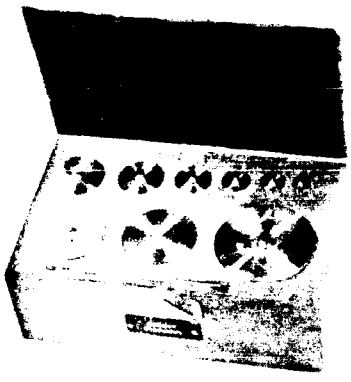
215. **TWO-LIVRE LIDDED NESTED WEIGHTS** - French, mid 18th c, signed with the crown over B hallmark. Set of cast and turned brass cup weights, the master cup 2 1/2" d x 2" h. It weighs 1 livre (French pound) or 2 marcs (and is so marked). Exterior decoration consists of a pattern of 6-pointed stars. There are 5 cups nested within, complete except for the missing 1/2 onze center weight. With it, the combined weight of the set would be 2 livre. Fine condition. The stamped hallmark is that of Renauld, a Parisian maker of scales and weights who worked during the middle of the 18th century. (5 lbs, UP, PS) **$ 235**

216. **POCKET DIAMOND BALANCE** - American, early 20th c, signed "H. KOHLBUSCH 59 NASSAU ST. N.Y.". Mahogany case, 2 3/4" w x 6" deep x 1 3/8" h, with compartments for the 2 pan balance and its set of 5 wts, 4 karats through 64 (although missing the small bent metal ones from their compartment at the front). In use, the cover is held upright by the folding strut and the balance arm placed in the suspension mounted on its inside surface. The tweezers which fits into a slot in the rear edge of the case is also present. Fine condition. (3 lbs, UP, PS) **$ 148**

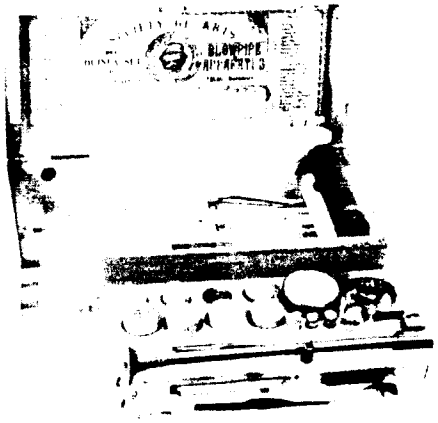
217. **MINING ENGINEER'S LARGE ANEMOMETER** - English, late 19th c, signed "Davis & Son, London & Derby". Black oxidized brass structure, outer cylidrical ring 6 1/2" d x 1 5/8" deep, 2 1/4" d central housing with silvered dial and double scale readout: units 0 - 100 and hundreds 0 - 10. The fan has 10 aluminum blades. A lever at the top (moving left to right) engages and disengages the fan from the readout unit. Very fine overall and operating condition.



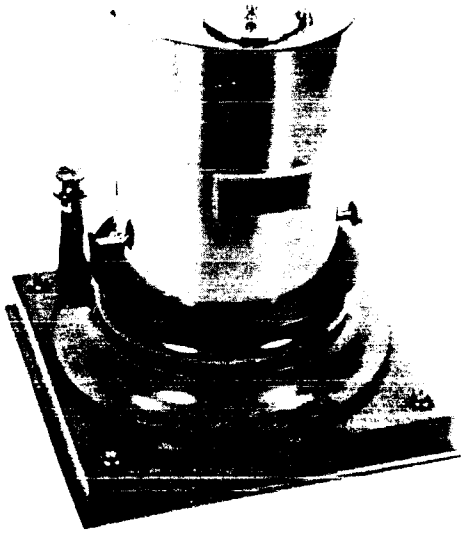
John Davis was working at 14 Iron Gate, Derby, c. 1830 according to Taylor 2. It seems that the firm had become Davis & Son about mid century. The use of aluminum for the fan blades suggests a 4th qtr 19th c origin for this instrument. Aluminum was unbelieveably expensive (100 mid 19th c dollars per pound) until Hall's electrolitic refining system was developed (patented 1886). The price then dropped enough so that it could be used on a commercial scale. Indeed, by the end of the century it was being used for a variety of instruments, from microscopes to sextants, although by the new century its novelty had fallen off and makers returned to the traditional use of brass. (5 lbs, UP, PS) **$ 175**



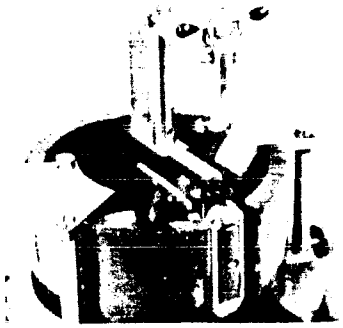
218. **CASED SET OF RUSSIAN STANDARD WEIGHTS** - Possibly American, 4th qtr 19th c, pencilled-in notation "Tested July 4-82" and "Jan-1-90", unsigned. Mahogany case, 8 3/4" w x 5 1/2" deep x 3 1/2" h, fitted with a complete set of brass weights ranging from 1 Loth to 5 Funts. (Note that 1 Funt = 32 Loths = 96 Zolotniks. A Funt is 409.517 gm, or a bit less than the English pound.) This set was found in the attic of the Howe Scale Co. of Rutland, Vermont, and most likely used by them in the 19th c as one of their calibration standards. Very fine condition. (18 lbs, UP, PS) **$ 235**



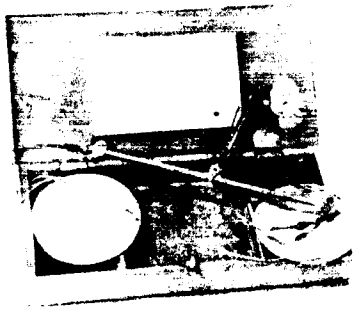
219. **PRIZE ASSAY KIT** - English, trade label within cover reads (in part): "SOCIETY OF ARTS. BEST GUINEA SET OF BLOWPIPE APPARATUS Manufactured by J.T. LETCHER TRURO, Cornwall. Awarded the SOCIETY OF ARTS SILVER MEDAL, and Col. CROLL'S Prize in International Competition, 1873.". Original hand dovetailed deal (yellow pine) case, 10 3/4" long x 5" w x 3 1/4" h, lift-out tray with top and edge openings for various components, and other compartments in the bottom of the case. The label lists 42 separate items within the case and, except for the pestle, all the major items are present as well as much of the expendable material and chemicals. There are only 2 empty spaces, in the edge of the tray (for the pestle and some small cylindrical piece), a few of the test tubes in the bottom of the case are missing and a few damaged. This unusual outfit is in very fine condition and an amazing state of completeness. Indeed, it seems that it is virtually unused, the burner wick never even having been lighted. It is noteworthy that this medal winning set met the conditions set up by the Society of Arts, the same group which promoted the development of inexpensive, but good quality, microscopes. (9 lbs UP) **$ 465**

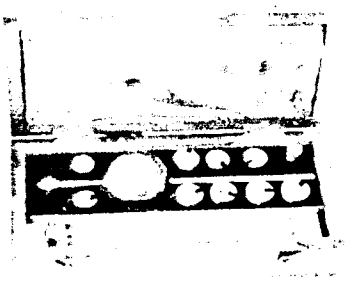


220. **"SULLIVAN'S GALVANOMETER"** - English, c. 1900, signed "No. 579 H.W. SULLIVAN 19 GREAT WINCHESTER ST. LONDON, E.C.". Square mahogany base 10 3/8" sq with turned pedestal, the galvanometer mechanism (see inset photo) is protected by a bright lacquered brass cylinder 6 1/4" d x 7 1/2" h; 12 1/2" h overall. There is the necessary window in the cylinder for the direct and reflected beam of light for projection on an external scale. The galvanometer loop is within the gap of a cylindrical shell permanent magnet 4 1/2" d x 2 1/4" h x 5/16" thk. The galvanometer coil assembly marked "TESTING I" is removeable. The instrument is in superb original physical condition. However the coil suspension wires are broken and would have to be repaired before this instrument could be tested for use. It is contained in its original hand dovetailed, painted pine stowage case, 11 1/2" sq x 14 1/4" h, which is in sound condition but with well worn sufaces. It is possible that Item 219 of Catalog 125, a set of 3 cased galvanometer coil assemblies, could have been used in this very instrument for they appear the same as the one found with it. This galvanometer is just what would be used with a precision Wheatstone bridge. (40 lbs UP) **$ 445**



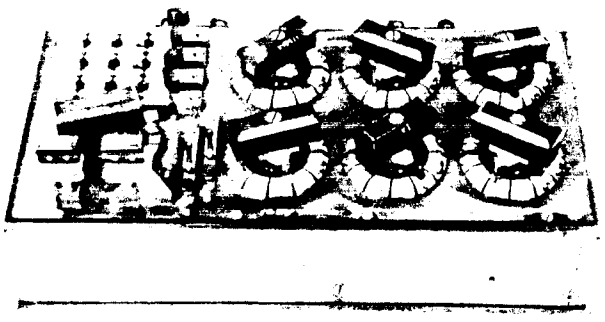
221. **EIGHTEENTH CENTURY TWO PAN HAND BALANCE** - English, with the trade card of "CHARLES DE GRAVE No. 59 St Martins le Grand, the corner of St. Ann's Lane . . . London . . . SCALE MAKER TO HIS MAJESTY." and hand dated "20 Augth 1789". Original mahogany case, 7 3/4" w x 3 7/8" deep x 1 1/4" h, containing hand held balance with 6 3/8" long iron beam and 1 7/8" pointer, 2 1/2" d brass pans, and early (possibly original) suspension strings. Fine overall condition noting some darkening or spotting of the metal parts. Taylor 2 lists Charles de Grave and Son as scale makers (fl. 1780-1821) first at 59, later at 15 St. Martin le Grand. (4 lbs, UP, PS) **$ 235**



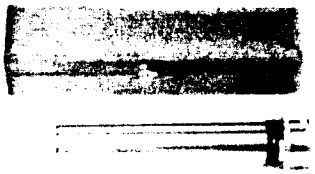


222. **CASED HYDROMETER** - English, c. 1900, marked "SIKE'S HYDROMETER F. ROBSON & Co NEWCASTLE ON TYNE" on the ivory case plate. The float and its complete set of 10 weights are all marked with serial no. "4633". The bright brass float has a 1 1/2" d hollow bulb and a 3 5/8" long graduated stem. The original thermometer is on a 7" long x 7/8" w bone plate. The fitted mahogany case is 8" long x 4" w x 2 1/4" h. Case and contents in very fine condition. These instruments were made for testing the specific gravity (and hence alcoholic content) of beer, ale, wine, or what ever suits your fancy. At one time they were standard equipment for every pub, every inspector of pubs, and every tax collector (the Inland Revenue). (4 lbs, UP, PS) **$ 95**

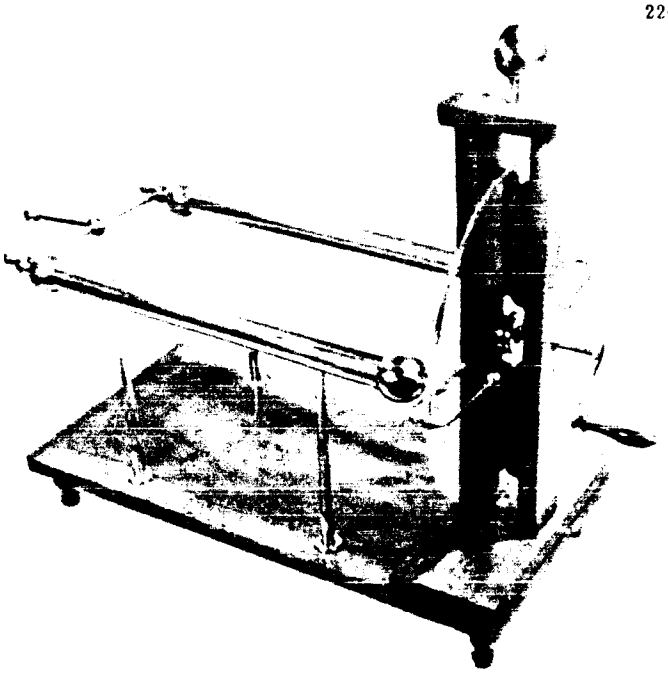
223. **SET OF FIVE DUCK WEIGHTS** - Burmese, 19th c, unsigned. Cast bronze graduated balance weights in the form of stylized ducks. The largest is 2 3/4" h and weighs 9 1/2 ozs, the smallest is 1 1/4" h and weighs 1 oz. Very fine overall condition with a deep green-brown patina. This set is an entity, not a composite or made-up group, the usual situation these days. These duck weights, and corresponding dragon weights, seem to have been the most popular form used to enliven (?) what otherwise may have been mundane commercial transactions. (4 lbs, UP, PS) **$ 195**



224. **SUBSTANTIAL WHEATSTONE BRIDGE** - German, c. 1900, signed "Otto Wolff Berlin 2637". Mahogany base 20 1/2" w x 10 3/4" deep, 9 1/4" overall ht with mahogany cover in place. The Vulcanite face plate serves as the mounting for the 6 decade resistances; x 0.1, x 1, x 10, x 100, x 1000, x 10,000. The commutator consists of a 2 position rotating switch which can insert a combination of fixed resistors into the galvanometer circuit to limit current flow. There are connecting posts on the rear for the galvanometer and the battery. The clamps at the left front are for connecting the unknown resistance into the bridge circuit. Next to them are spring loaded keys for the battery and galvanometer. The cover (not shown) has several shrinkage cracks and surface wear. The instrument itself, with all its original lacquer finish on the various brass components, is in very fine display condition. It has not been tested and so is not offered as a working instrument. (50 lbs UP) **$ 295**

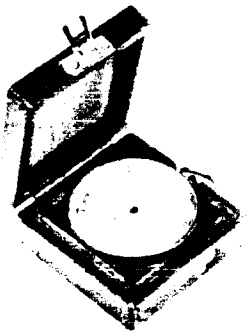


225. **FINE POCKET SPECTROSCOPE** - English, c.1875, signed "JOHN BROWNING 146, STRAND LONDON". Bright brass, original lacquer finish, 3 1/2" long x 5/8" d, contained in its original paper covered wooden case, 4 1/8" long x 1 1/8" w x 1" h. The spectroscope has its original lens cap and is in extremely fine physical and working condition, the adjustable slit in perfect order. The case is sound and in very good condition with some surface wear. John Browning was the last in the line of the firm of instrument makers established a century earlier as Spencer, Browning & Rust. He directed most of his original effort toward the development of spectroscopic instruments, although he designed and made several new types of microscopes as well. (2 lbs, UP, PS) **$ 165**

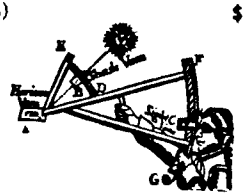


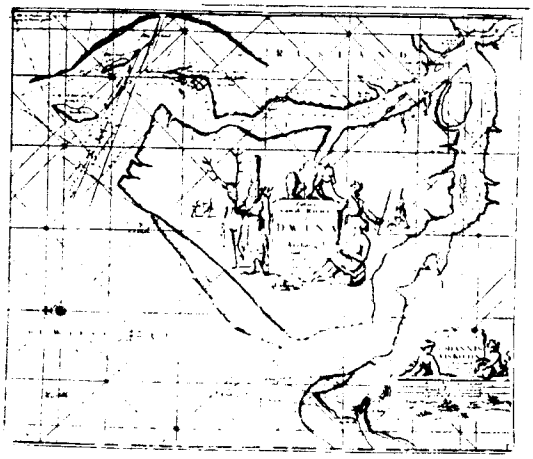
226. **SECOND FORM OF RAMSDEN TYPE OF ELECTROSTATIC GENERATOR** - French (?), in the English style, early 19th c, unsigned. Walnut structure, base 12" w x 24 1/2" deep with turned feet, vertical yoke, bright lacquered brass horizontal charge cylinders supported by 4 glass posts. The rotating glass plate is 13 3/4" d. Overall dimensions: 25 1/4" h x 32 3/4" deep x 13 3/4" w. The lacquer finish and the charge sphere atop the yoke are modern restorations, all else appears to be original (except possibly 4 wood screws). Extremely fine overall display condition. **NOT INTENDED FOR USE. DAMAGE WILL RESULT FROM CRANKING AT SPEED.**

An almost identical example at the Musée d'Histoire des Sciences, Geneva, Switzerland is illustrated on p. 189 of Turner 19th c, where it is identified as a "French-type plate machine, sometimes called Ramsden's Pattern". Actually, French-type machines had a curved, or U-bracket, at the top of the yoke as may be seen in the photograph of Item 248 of Catalog 118 and Plate 10 of Vol. III of A. Liber, "Traité Elementaire de Physique", 1801. The square topped yoke as here, Item 214 of Catalog 112, and Plate CLXXXVII, fig. 6, Vol. VII, "Encyclopaedia Britannica", 4th Ed, 1810, are all typical of English design. Dibner in "Early Electrical Machines" writes, "Improvements in machine construction and detail came from experiments on both sides of the Channel. The change from a spherical or cylindrical element to a disc has been claimed independently for Ramsden, Ingenhauz and Sigaud de la Fond, between the dates 1756 and 1769. Jesse Ramsden was an English instrument-maker and optician and Fellow of the Royal Society, who built a machine having a 12-inch diameter glass disc and provided it with rubbing pads." The first form of Ramsden's machine had both U-shaped pick-offs attached to a single horizontal cylinder placed in the center behind the vertical yoke (looking for all the world like a brass lobster). (38 lbs UP) **$ 1,450**

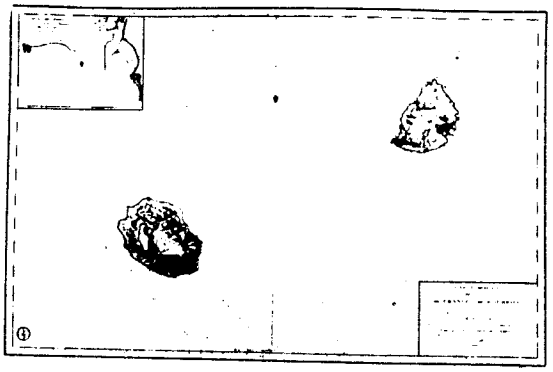


227. **CASED POCKET BAROMETRIC ALTIMETER** - English, early 20th c, signed "A. GALLENKAMP & Co. LTD LONDON EC2". Aneroid barometer in brass case 2" d x 7/8" thk with silvered dial. The altitude ring, graduated from 0 to 8,000 feet rotates by means of the outer bezel. The instrument is in operating condition (no guarantee of accuracy). The 2 1/2" sq x 1 1/4" thk original carrying case is covered in red fabricoid and, except for minor edge wear, is in fine condition. The barometer is fine to very fine. (3 lbs, UP, PS) **$ 95**

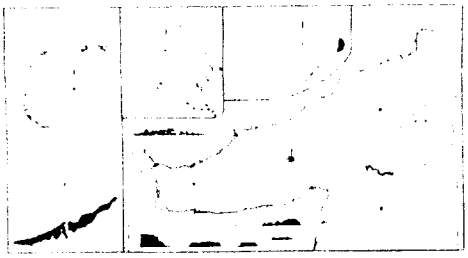




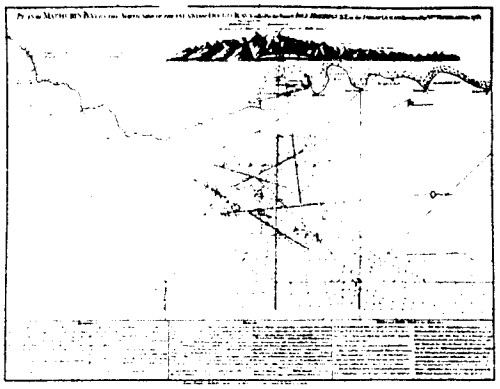
228. **THE WEST REACHES RUSSIA FROM THE NORTH DURING THE REGENCY OF SOPHIA ALEXEYEVNA, SISTER OF THE IDIOT TSAR, IVAN V** - "Paſkaart van de Rivier de DWINA of Archangel", Dutch chart, late 17th c, signed "IOHANNIS VAN KEULEN AMSTERDAM". Copperplate engraving 20 1/4" h x 23 1/4" w on paper 21" h x 24 3/4" w, with usual centerfold. Very fine condition. The central cartouche has fur-hatted Russians, a pet reindeer, and a muzzled bear. This extremely rare chart is no. 35 from van Keulen's "Zee Atlas" published from 1682-94. It was engraved during the period when both the idiot Ivan V and his half brother, the young Peter the Great were made joint Tsars, while Sophia actualy ruled the empire from 1682-89.
(postpaid in the U.S. only) **$ 395**



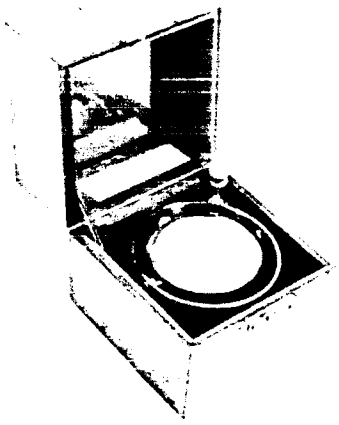
229. **COLORED CHART OF ISLANDS OF THE SOUTH INDIAN OCEAN** - "CARTE REDUITE DES ILES DE FRANCE et DE BOURBON . . . par Mr. Lislet Géoffrey . . . en 1798. Nouvelle edition . . . 1802". French Dépôt de la Marine edition with the paper so water marked. Printed area 22 1/2" h x 34" w on paper 25 3/4" h x 38 3/4" w with usual centerfold. Very fine condition with recent hand coloring to match that found on original colored editions. Jean Baptiste Lislet-Géoffrey (1755-1836), hydrographical engineer, Captain of the Corps of Military Draughtsmen, worked for the Dépôt and specialized in eastern Africa and the Indian Ocean.
(postpaid in the U.S. only) **$ 195**



230. **"A CHART OF THE ENTRANCE OF THE RED SEA Between THE COAST OF ARABIA Ascertained by the Obsevations of LIEUTT: GEORGE LEWIS in 1762; and THE OPPOSITE COAST OF AFRICA with THE ISLE OF SOCOTRA"** - English chart printed by Robert Sayer, April 20th, 1787, London. Centerfold engraved chart, with modern hand coloring following the original practice, 13" h x 24 3/4" w on paper 25 1/4" h x 36 1/4" w. Extremely fine condition. In addition to the main chart there are 4 detailed inserts: Road of Moka, Straits of Babelmandel, Harbor of Keshin, and the Watering Place on Socotra. (postpaid is the U.S. only) **$ 210**



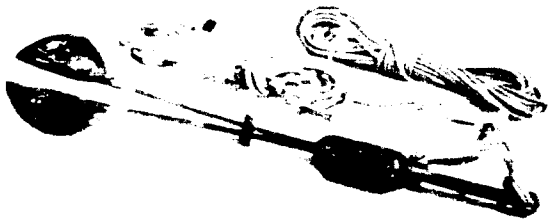
231. **"PLAN OF MATHURIN BAY, ON THE NORTH SIDE OF THE ISLAND OF DIEGO RAYS, called by the French, ISLE RODRIGUEZ, in the INDIAN OCEAN; Surveyed by WM. NICHOLSON IN 1761"** - English, signed and dated "London, Printed for ROBERT SAYER, Map & Chart-feller; No. 53 Fleet Street, as the Act directs 20 April 1787". Centerfold engraved chart with printed area 19 1/2" h x 25 1/4" w on paper 25 1/2" h x 37 1/4" w. Extremely fine condition. The text at the bottom of the chart provides reference information, tide data, and sailing directions for entering and leaving the harbor. (postpaid in the U.S. only) **$ 115**



232. **FATHER TIME FREE SPRUNG DECK WATCH** - American, 1918, signed "ELGIN NATIONAL WATCH CO." and engraved on the back plate, "Father Time ELGIN, ILL. U.S.A. 21869481 21 JEWELS ADJUSTED 5 POSITIONS". Original chronometer style 3 part mahogany box, 4 7/8" on a side, with the 2 3/4" d bright lacquered brass watch case mounted within a 3 5/8" d gimbal. The white enameled face has subsidiary seconds and 0 - 40 hours winding dials. The watch has been completely overhauled and adjusted giving a constant rate of 2.35 secs/day slow with no measurable variation outside the + or - 1/2 second measurement uncertainty. Overall (physical) condition is very fine. There is also the original padded mahogany shipping case, 7 1/2" on a side, in almost fine condition.

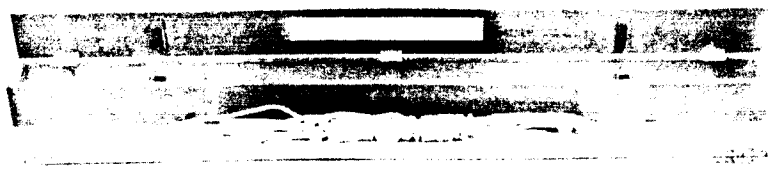
The total production of this grade watch was 13,000 and seems to have been made between 1911 and 1918 (or 19), and only for the United States government. The design was adapted from railroad watches and improved so as to cope with the vibration encountered in torpedo boat service. The reason for the free sprung (no timing adjustment) hairspring was that there is actually only one length, even in an overcoil design, which is truly isochronic. The original production was not large for this class of timekeeper and a relatively low survival rate has made it a rarity. (15 lbs UP) **$ 895**

233. **A MAJOR DEVELOPMENT IN OCEANOGRAPHY - IMPROVED FORM OF ROSS' "DEEP SEA-CLAMM"** - English, mid 19th c, unsigned. Blackened iron and lead apparatus 29 1/4" long, consisting of split iron rod with lead clam-shell scoops, 4 3/8" w x 5 1/2" long, at bottom end, a sliding square washer, and a sliding 2 1/4" d x 5" long cylindrical weight. A line with leather depth tags is attached to a ring at the top of the iron rod, and a second line attached to the sliding weight. Fine overall condition in terms of materials of construction. Original pine stowage box, 5 3/4" sq x 31 1/4" long, in so-so condition.

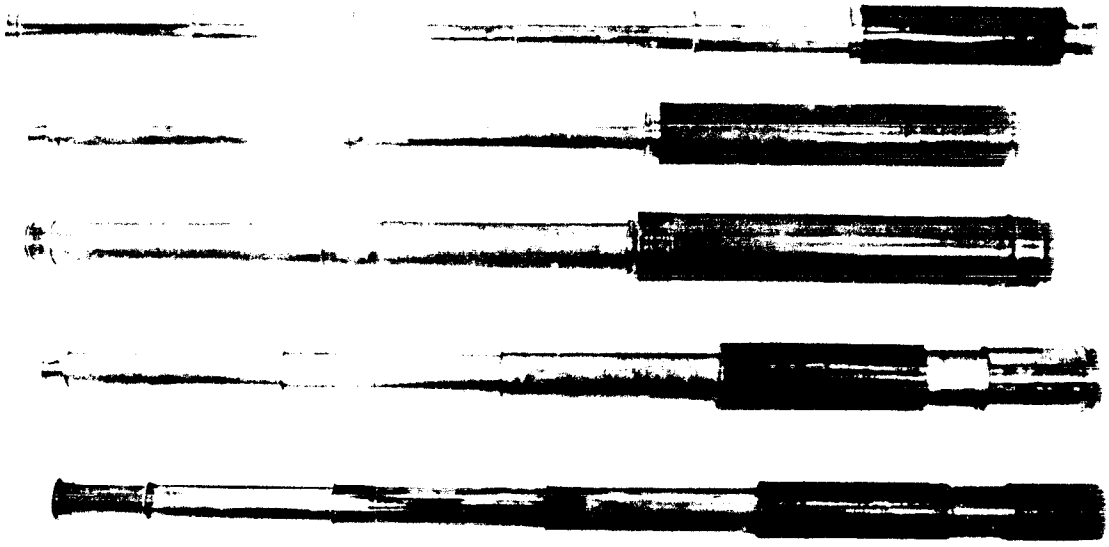


The original "deep sea-clamm", a sounding instrument in brass, was devised for and used on Sir John Ross' arctic expedition of 1818. An example of this instrument is at the Science Museum, London. It may have been the first such developed for scientific study of the sea bottom. It had several problems, though, the most important being that at times the jaws would jam open. The version here could be dropped to the bottom of the sea so that the scoop would really bite into the ocean floor. Then the weight which had been kept at the top of the rod by the second line would be let go and, in falling, close the two sides of the scoop. The sounder could then be hauled back to the surface and its contents examined. (35 lbs UP) **$ 550**

234. **NAVIGATOR'S SILVER-BOUND SHAGREEN POCKET CASE OF DRAWING INSTRUMENTS** - English, early 19th c, unsigned. Green shagreen covered case (some uneven fading) with silver banding, hardwear, and name pate on top, 3" w x 1" thk x 7" h, containing a complete set of instruments in brass, steel, ebony, and bone. The 9 items consist of a 6" bone scale, ebony & brass 6" parallel rule, large dividers, pencil and pen legs for same, small dividers, ruling pen, adjustment tool, and pencil holder. Fine overall condition with typical signs of age. The small dividers, although found with the set does not appear original, but all the other components do. In all, a rather attractive set for a ship's navigator. (3 lbs UP) **$ 465**



235. **"WILLIAM'S PATENT SOUNDING ROD"** - American, 1918 patent date, label in cover reads "JOHN E. HAND & SONS CO. . . . HADDONFIELD, N.J., U.S.A.". Bright brass tube in original lacquer finish 46" long x 3/4" d with internal, 9/16" w, graduated steel rod which can extend up to 42". A coiled rope is attached to the upper end of the brass tube. Original mahogany case, 3 1/2" sq x 4 ft long, in fine condition. The sounder is very fine. The label within the case cover states, "To be used in sounding ships holds and tanks principally in heavy weather. No directions for use required. Chalk the rod and read off in chart room."(22 lbs UP) **$ 175**



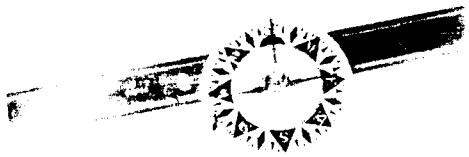
236. **FIVE DRAW SPYGLASS IN SHEFFIELD SILVER PLATE** - English, c. 1800, signed "Bancks, 440, Strand, LONDON". Green enameled barrel, 2 1/8" d, with rolled silver plate fittings and 5 draw tubes, 9 3/4" long (closed) extending to 40 1/4". The airspaced achromatic objective of 2" clear aperture produces Dollond quality, clear sharp images. There is no lens cap but the decorative engraving on the flaired lens housing suggests that there was none originally. The enamel finish is a modern restoration matching in color the deteriorated original and, except for showing some of the undersurface imperfections, the telescope is in very fine overall condition. Both Goodison and Taylor 2 list Robert Bancks (fl. 1796-1834), by himself at 440 Strand, then 441 Strand, from 1820 as Bancks & Son at 119 New Bond Street. He was Optician to the Prince of Wales, later George IV. This spyglass is of superb quality and originally must have been quite expensive compared to the usual instrument in brass. (5 lbs UP) **$ 445**

237. **DAY OR NIGHT SPYGLASS** - English, early 19th c, signed "T. HARRIS (& SON ?) LONDON DAY OR NIGHT". Leather covered barrel 2 3/8" d with bright lacquered brass fittings, 2 draw tubes, protective objective and eyepiece slides, 14 3/4" long (closed) extending to 35 5/8". Achromatic objective of 1 1/8" clear aperture, 4 element eyepiece. Very fine overall condition noting that the leather covering and lacquer finish are modern restorations. Reasonable image quality although there is some barrel distortion and loss of sharpness at the edge of field. Taylor 2 lists Thomas Harris & Son working from 1806-46 in London at various locations including Fleet Street and the Bloomsbury area. Because of wear to the draw tube it is difficult to tell if the signed name is just "T. Harris" or if there was once an "& Son" as is suggested by the spacing of the address. This firm seems to have been a popular maker of of spyglasses of reasonable (although not Dollond) optical quality. (5 lbs, UP, PS) **$ 275**

238. **WELL MADE TWO DRAW SPYGLASS** - English, 2nd qtr 19th c, unsigned. Mahogany barrel 2 3/8" d with bright lacquered brass fittings, lens cap with protective slide, 2 draw tubes, eyepiece slide, 15 7/8" long (closed) extending to 35 1/2". Generally very fine condition although there is helical dark streaking to the original finish on the brass parts and 3 small screws are not original. Clear and sharp images. Although unsigned, a well made spyglass. (5 lbs, UP. PS) **$ 295**

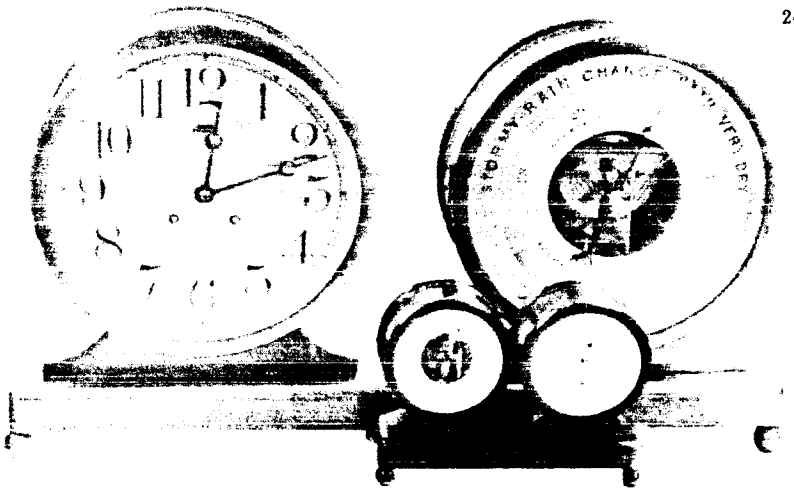
239. **SEA CAPTAIN'S GLASS WITH EXTENDING SUN SHIELD** - English, mid 19th c, signed (with 2 different sets of letter stamps) "J. FARRELL MANCHESR" and "DAY OR NIGHT WARRANTED". Leather covered barrel 2 1/4" d with bright lacquered fittings, extending sun shield, tripple draw tubes, and protective slides at either end, 11 3/4" long (closed) extending to 36 1/2". The achromatic objective of 1 1/8" clear aperture, and 4 element eyepiece, give clear sharp images. Very fine overall condition with restored leather covering and finishes. Farrell was not found in the standard references suggesting that he was only a retailer of this typically London telescope. (5 lbs, UP, PS) **$ 295**

240. **VARIABLE POWER MILITARY TYPE SPYGLASS** - English, late 19th c, signed "Dollond London 7437". Leather covered barrel & extending sunshield 1 7/8" d, 3 black oxidized brass regular draw tubes, power changing 4th draw tube with markings at 25, 30, and 35 power, 10 3/8" long (closed) extending to 34 3/4". Achromatic objective of 1 5/8" clear aperture producing clear sharp images at all powers, with a decrease in field size as the magnifiation increases. Original leather field case, with straps, 2 5/8" d x 11" long in very good condition. The telescope is very fine except for the black finish on the draw tubes, having been worn down to the brass in places, through use. The serial number, oxidized finish, and relatively high powers are typical of spyglasses made for army use (whereas naval telescopes would have had larger apertures and lower powers for night use and did not require non-reflecting surfaces). The maker is the same firm established by Peter Dollond in the 18th c, and continued by his heirs through the 19th, without any decrease in quality for over a century. (5 lbs, UP, PS) **$ 245**



241. **COURSE FINDER AND CONVERTER** - American, signed "C.A. POTTER", serial no. "B0918", with the following patent dates: U.S.A. - Aug. 25, 1914; Canada - Dec. 15, 1914; Gt. Brit. - July 28, 1914. Nickel plated brass rule, 30" long x 1 1/2" w (only part illustrated) upon which slides a 4 1/2" d compass rose disc. This disc has 3 sets of concentric rotating pointers. No case. Extremely fine overall condition.

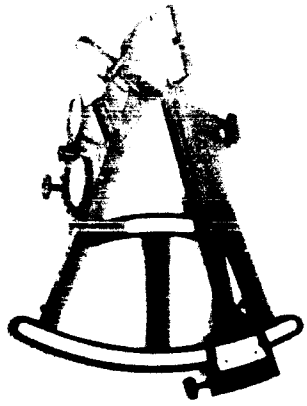
The British patent abbreviations describes this as "A course finder and converter for finding and shaping a sailing course from one point to another and for converting the geographical or true course to the magnetic or to the compass course, or vice versa, . . ." The illustrative example shows a boat sailing out of Port Huron, Michigan, on Lake Huron, heading for the Sault Ste. Marie locks. It is based on this that the invention is stated to be of American origin for we have been unable to find any biogaphical data on Mr. Potter (unless of course, he was the son of the Toronto instrument maker, Charles Potter, and then this could have been a Canadian invention). (7 lbs, UP, PS) **$ 165**



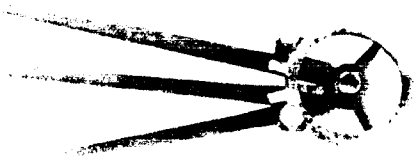
242. **BOARD ROOM SHIP'S BELL SET** - American, early 20th c, signed "TIFFANY & CO. NEW YORK", made by the Chelsea Clock Company of Boston. Large twin cast bronze drums, 9 1/4" d, mounted on a bronze base with ball feet, 21 1/4" w x 4 3/8" deep. Overall height of 1 foot and weighing 45 pounds. The silvered dial clock on the left strikes the 8-bell ship's watch sequence. The silvered dial holosteric barometer on the right has an elaborate, visible fusee chain mechanism and a semi-circular mercury thermometer. It is of French origin with the "PHNB" within a circle hallmark. Both the clock and barometer are in excellent working order. Original surface finish is very fine with slight wear on edges. This appears to be the largest set made by Chelsea. (Compare it with the desk set in front.) It is imposing. No wonder it was sold through Tiffany in New York. It is still fit for a major board room. (65 lbs UP) **$ 2,995**

243. **DESK CLOCK SET** - American, early 20th c, signed both "CHELSEA" and "ABERCROMBIE & FITCH CO. NEW YORK". Small twin cast bronze drums, 3 3/8" d, mounted on a bronze base with ball feet, 7" w x 2 1/4" deep; 5 1/4" h overall. The silvered dial non-striking clock is on the right in this model and the silvered dial holosteric barometer, with visible fusee chain mechanism, on the left. It has a semi-circular mercury thermometer and is a miniature version of the one above. This set is in excellent working order. The original dark bronze finish is in fine condition, showing slightly more wear than the board room set. (13 lbs UP) **$ 550**

244. **EBONY FRAME QUADRANT IN ORIGINAL NON-REFLECTING FINISH** - Probably English, for the American market, mid 19th c, signed "JOHN BLISS & Co., NEW YORK". Ebony frame, reinforced brass index arm with tangent screw slow motion, ivory scale and vernier reading to 1 arcmin at 8 3/4" rad, sight vane with single peep hole, sets of 3 index mirror and 3 horizon glass filters, and tangent screw adjust of index mirror. All the brass parts are in original low reflectivity black oxidized finish except for screw heads which are bright lacquered brass (some of which have darkened). The horizon glass and index mirror seem to be old replacements. The original hand dovetailed rectangular mahogany case, 12 1/4" w x 9 1/2" deep x 4" h, is in very good condition. The quadrant is fine.



The 1840 New York City Directory listed John Bliss and Frederick Creighton as watch makers at 42 Fulton St. The firm became John Bliss & Co. in 1845 at 26 Burlington Slip. According to Brewington, "An advertisement in the 1872 issue shows the firm had purchased the preceding year the entire stock of Blunt & Co. In addition to chronometers and probably other instruments, Bliss made and patented the taffrail log in 1864 with various improvements patented in 1878." Although brass and ebony & brass navigational instruments are known with black lacquered or black oxidized finishes (most often to reduce glare), they are not common and somewhat rare in the original condition of the one here. (11 lbs UP) **$ 795**

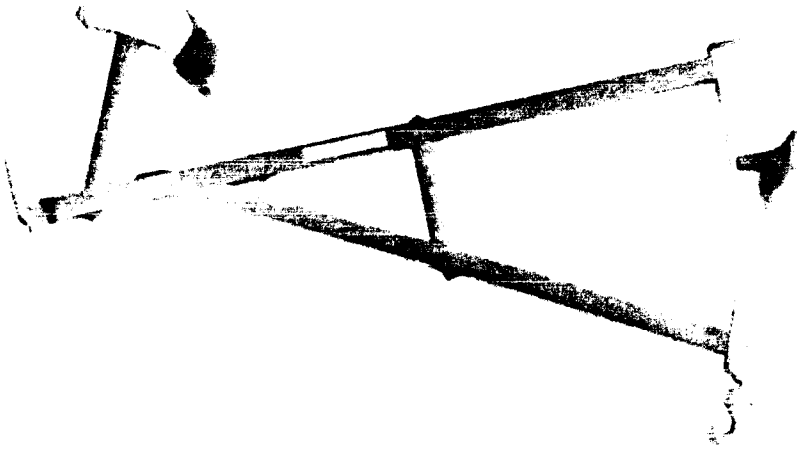


245. **MINIATURE STATION POINTER** - English, 2nd half 19th c, signed "H. Hughes & Son 59 Fenchurch St. London No 543". Brass construction in black oxidized finish with the 2 5/8" d readout circle and fittings in bright lacquered brass. The 3 arms are of 9" radius. The original mahogany case, 11 3/4" w x 5" deep x 1 1/2" h, has the trade label of Henry Hughes & Son Marine Opticians in its cover and is in almost fine condition, missing one internal fitting and the hand magnifier. The instrument is in very fine original condition.

A station pointer is used for locating one's position on a map or chart by setting in 2 landmark-landmark relative bearing angles between 3 landmarks and moving the instrument on the chart until the edges of the three arms each intersect one of the landmarks. The 2 angles can be measured with a peloris, sextant, or azimuth compass. See elsewhere in this section for a standard sized version of this instrument. Henry Hughes, son of the instrument maker and dealer, Joseph Hughes, moved into 120 Fenchurch St. about 1840, later to no. 59. We have not found when his son, Alexander, joined the firm, nor when it became a limited company. These two dates would place exact brackets on the date of origin of the item here. (6 lbs UP) **$ 495**

246. **CASED TAFFRAIL LOG OUTFIT** - American, c. 1900 or early 20th c, signed "JOHN E. HAND & SONS CO. PHILA - BALTO.". Original pine case, 8" x 20 1/2" x 5 1/4" h, containing the 9 3/8" long 4-vane spinner, connecting line, and 7 5/8" long cylindrical readout unit with its 7" long suspension yoke. The spinner and readout unit are bright brass with original lacquer finish, the yoke and window bezel black lacquered, and the 1" x 3 5/8" triple readout dial is white enameled. The case is in very good condition, the log very fine, retaining over 95% of its original finish, but with a small chip in the corner of the glass readout window.

John Bliss & Co. of New York patented a very similar instrument in 1876 (see Item 211 of Catalog 121) and indeed, the spinners and internal designs of both are quite similar. John Hand is first listed in the Philadelphia directories in 1875. A patent issued to him in 1890 lists him as a subject of Great Britain. Hand & Sons, nautical instruments, is listed in the 1906-12 directories and Hand & Sons Co. in the 1922 directories. It is not certain as to whether the '& Co' was a name change after 1912 or just not included in the earlier listings. (18 lbs, UP, PS) **$ 345**

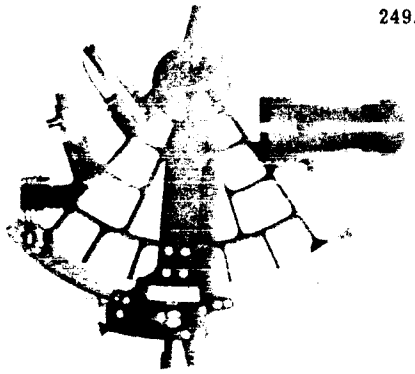


247. **FINE DAVIS QUADRANT** - Probably English, possibly 1st qtr 18th c, signed "Iohn Cranevelt Middelbur". Rosewood limbs, boxwood arcs and name plate, newly made boxwood vanes; 25" overall length. The solar altitude (so called 60° arc) of 7 1/2" radius, is graduated by degrees and numbered from 0 to 65 in 5° intervals, the last, 65, being on the rosewood bar. It is also graduated and numbered along the edge in 5° intervals. The long radius (so called 30° arc) has a radius of 22 3/4" and is 25° long. It has a scale at the edge numbered in degrees and graduated in 5 arcmin intervals. There is a 10's diagonal scale which subdivides 10 arcmin intervals to 1 arcmin. The hook at the bottom is well formed and undamaged, and has an elaborate pattern of stamped roses, fleur-de-lis, and 8-pointed asterisks. The 3 vanes are modern reproductions made to demonstrate the use of the quadrant, but not intended for accurate sightings. The instrument is in very fine overall condition.

The signed name has not been found on any other instrument nor in any lists of known instrument makers. In fact "Middelbur" runs off the name plate leaving no room for the final "g", suggesting that this is an owner's name applied by the actual instrument maker. Middelburg is the ancient capital of the province of Zeeland, Holland, on the island of Walcheren. It was a prosperous center of commerce until the end of the 18th century. During this period there was extensive trade with the East and West Indies, England, and Flanders. In our opinion the instrument could have been purchased in England by Cranevelt, a Dutch mariner from Middelburg. The instrument is quite similar to signed English work of the 1st qtr of the 18th c, particularly two by Benjamin Macy, Item 12 in Brewington dated 1719 and Item 126 in our Catalog 109 dated 1713. (Postpaid in the U.S., air freight, collect, elsewhere) **$ 5,600**

248. **DOUBLE BOXED, WATCH CASED MODEL 22 CHRONOMETER WATCH** - American, WWII, signed "HAMILTON LANCASTER, PA., U.S.A." on the silvered dial, with the back plate engraved, "HAMILTON WATCH CO. MODEL 22 - 21 JEWELS ADJ. TO TEMP. & 6 POS. MADE IN U.S.A. U.S. NAVY - BU. SHIPS - 1943". Silverish metal case 2 3/4" d, the face with subsidiary seconds and 2 day up-down dials. The inner mahogany box is 4 7/8" w x 5 7/8" deep x 2 1/8" h and the outer, 7" w x 8 1/4" deep x 3 3/4" h, the mounting base 9" w. The watch and the 2 boxes are in very to extremely fine physical condition. After a month of testing and adjustment, the watch was a rock-steady 0.44 sec/day fast. This will change with a restart under different environmental conditions.

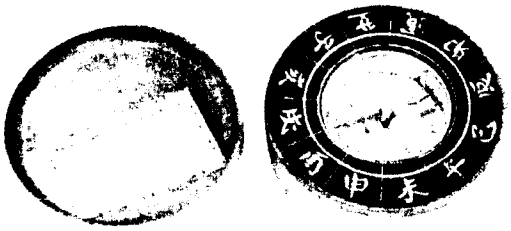
Hamilton placed the Model 22 mechanisms in 2 different cases, the one here and a small gimballed chronometer type mounting. Our own tests have convinced us that these were the most accurate production lever watches ever made, generally surpassing the performances of most spring detent true chronometers. (12 lbs UP) **$ 750**



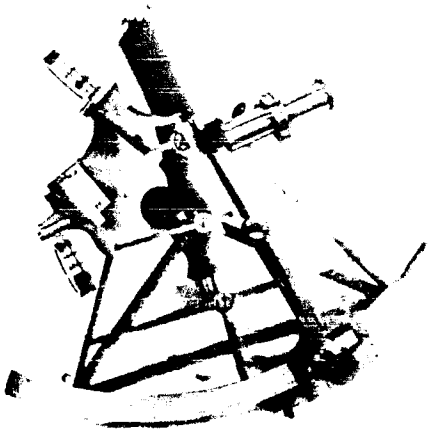
249. **MICROMETER SEXTANT** - German, original certificate dated 1956, signed "C. PLATH HAMBURG 35967 Germany". Black enameled brass frame of 6 1/4" limb radius, fitted with 2 1/4" d horizon glass, 4 power x 40 mm telescope, sets of 3 horizon glass and 4 index mirror filters. Micrometer drum graduated to 1 arcmin and can be read by eye to 1/4 of this or 15 arcsecs. The sextant appears to be in very fine and working condition, but has not been calibrated or aligned. Original mahogany case, 12" sq x 6 3/4" h, in fine condition. (20 lbs UP) **$ 550**

250. **"WALKER'S HARPOON II DEPTH FINDER"** - English, 1st half 20th c, signed "Thos Walker & Son Ltd. 58 Oxford St. Birmingham", with serial no. "AB 7419". Bright lacquered brass readout unit 6 3/4" long with 2" d 4-bladed rotor, appropriate gearing, 0 - 30 fathoms white enameled dial in red lacqered housing, attached by rope to 6" h, 4 1/2 lb sounding lead. Original wood and plywood stowage box, 2 3/4" w x 5 3/4" deep x 7 3/4" h, with original printed label, instructions, & tag. The entire unit is in mint, original condition, never having been used.

Thomas Walker was born in London in 1805, his mother the sister of Edward Massey, the inventor of the first successful mechanical logs and sounders. About 1850 he began making logs and sounders under the Massey patents. In 1861 his son, Thomas Ferdinand, patented the first "Harpoon Log". An early version of the sounder here is listed as Item 301 in Brewington (dated mid 19th c) and shown in Plate XLIX. (13 lbs UP) **$ 475**

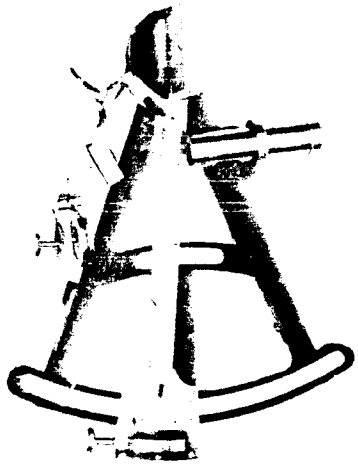


251. **JAPANESE MARINER'S COMPASS PRESENTED BY NOTED AMERICAN MARINE PUBLISHER** - 19th c (before 1869), probably signed. Wood case with push-on cover, 4 5/8" d x 2 1/8" h. The compass well is 2 3/8" d with a 2 1/4" south pointing needle. The 12 points of the compass are incised into the black painted face. The compass glass & retaining ring are a modern restoration, all else original. A label in the cover records the presentation to the American Geographical Society (in New York) on Mar. 10, 1869 by George W. Blunt, retired nautical dealer and publisher of Bowditch's "Navigator" & "American Coast Pilot". Very fine condition. (4 lbs UP) **$ 475**



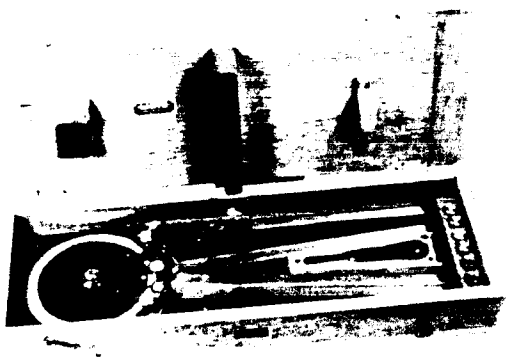
252. **RARE AND ENIGMATIC KINGS PATENT SEXTANT** - English, late 18th c, signed "Kings Patent GILBERT & Co. LONDON". Cast bronze frame with bright brass applied limb, index arm, horizon glass mounting plate, and other fittings, restored lacquer finish. The index arm is 10 1/4" long. The scale of 7 5/8" readout radius and the 1/2 arcmin vernier (positioned on the pivot side of the scale in the style of John Bird) are engraved directly in the brass. There are sets of 3 horizon glass and 4 index mirror filters, a swing-away readout magnifier, a shade tube, and a screw-on right angle handle extension. A short and a long telescope are missing. Zero scale adjustment is by a rotating index mirror platform. Ther is also an unusual triangular bracket attached to the rear of the frame. Original hand dovetailed mahogany keystone case, 12 3/4" w x 11 1/2" deep x 4 3/4" h, is in poor condition. The sextant is in very fine restored display condition even though the damaged frame has had to be repaired and 3 small screws are modern replacements.

The younger John Gilbert of Tower Hill formed several partnerships late in life: Gilbert & Gregory (1789-92), Gilbert & Wright (1789-94), Gilbert, Wright, & Hooke (1794-?), Gilbert & Gilkerson (1792-1811), and Gilbert & Son (?-1810). There is reason to believe that Gilbert & Co., possibly a catch-all of all the partnerships, may date from around 1795. Very few "Kings Patent" sextants are known although there is one at the National Maritime Museum, Greenwich signed "Gilbert & Wright" (date 1791), and Turner 19th c, pg. 265, illustrates one signed "Gilbert, Wright, & Hooke" at the Museum of the History of Science, Oxford. The one here is almost identical in appearance to the latter. Neither the Peabody Museum, Salem, nor the Whipple Museum, Cambridge, has such an instrument. Research by ourselves, and at Greenwich, have been unable to find any record of such a patent. In our opinion, the unique feature is not the frame reinforcing bracket (as believed by some), but the added index mirror platform on the index arm which rotates about the pivot center line, as adjusted by the pair of set screws at the upper edge. The complexity of this sextant is almost unbelievable. With just the single shade tube, there are 165 individual parts.
(12 lbs UP) **$ 1,750**



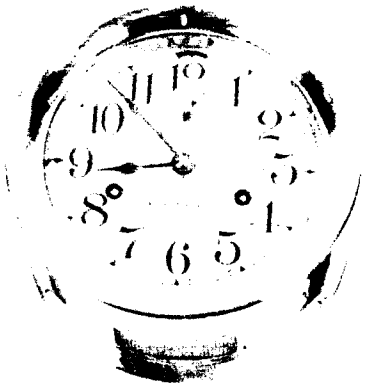
253. **NEW YORK MARINER'S EBONY FRAME QUADRANT** - English, mid 19th c, unsigned but "Savage, N.Y." scratched into the ivory name plate and the letter "H" marked on interior (hidden) surfaces. Ebony frame with bright lacquered brass reinforced index arm (tangent screw slow motion), screw-in shade tube, sets of 2 horizon glass and 3 index mirror filters, and tangent screw adjust of the horizon glass. The inlet ivory scale of 8 3/4" rad is read out by 1 arcmin vernier. Fine plus condition with restored finishes, but lacking a small piece from one end of the ivory vernier, a short telescope matching the shade tube, ivory pencil top, and one side of the index arm leaf spring (underside of instrument). The original mahogany keystone case, 11" w x 12" deep x 4" h, is in fair condition with several age cracks. The trade card of "Michael Rupp & Co" is within the case cover and on which is inscribed "Motor Yacht "Savage" N.Y.".

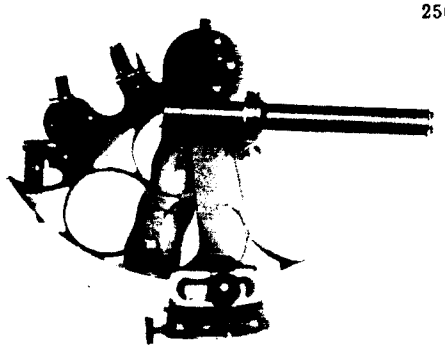
Design is typical of English work of the mid 19th century. The "H" could very well stand for either Henry Hughes or William Heath, both of whom were working during this period. Michael Rupp (1818-99) was the partner of William T. Gregg, 1844-53, and then on his own till his death in 1899. (10 lbs UP) **$ 765**



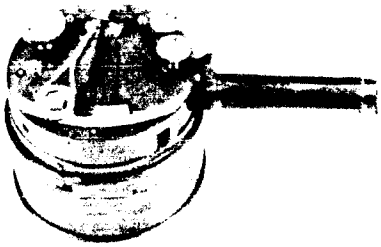
254. **U.S. NAVY STATION POINTER** - American, WWII, signed "THE A. LIETZ CO. SAN FRANCISCO; U.S.A." and marked "U.S. NAVY NO 1609 1942". Constructed of brass and German silver, with 6" d inlet silver readout scale, the 3 arms (1 fixed, 2 moveable and adjust by tangent screws) are of 18" radius. There are also 13 1/2" long screw-on extensions for each arm. There is a swing away magnifier for reading the silver 1 arcmin verniers on the moveable arms. Included are interchangeable centers and an adj screwdriver, but the hand magnifier is missing. The original oak case, 22 3/4" long x 8 1/4" w x 3 3/8" h is in fine condition. The instrument is in extremely fine, original condition. It looks as if it has never been used. (20 lbs, UP, PS) **$ 285**

255. **INSIDE BELL SHIP'S CLOCK** - American, early 20th c, signed "SETH THOMAS MADE IN U.S.A.". Bright lacquered brass case, 7" d x 4" h, with 5 7/8" d silvered dial, blued steel hands. The strike adjust lever is under the hinged bezel. The clock runs about 2 days on a winding, but for best time keeping, once a day is better. It strikes the 8 bell watch sequence which repeats every 4 hours. Extremely fine restored condition. (8 lbs UP) **$ 495**





256. **THREE RING VERNIER SEXTANT** - English, calibration chart dated 1920, signed "H. Hughes & Son LTD. 59 Fenchurch St. London E.C.". Brass construction in original black enamel finish, the screws and knobs in original bright lacquered brass, the limb is unlacquered brass, and the scale and vernier are inlet silver (reading to 10 arcsecs at 6 1/2" radius). The scale magnifier slides in a frame above the vernier scale. The 3 original telescopes are present, but one lacks a second eyepiece and 2 screw-on sunfilters are missing. Original mahogany case, 9 1/2" x 10 1/4" x 5 1/2" h, in fine condition. The sextant is in very fine original condition. Henry Hughes was in business in Commercial Road, London by 1835, moving to 120 Fenchurch St. by 1840, then to 59, where the firm remained until WWII. The sextant here is a superb example of the last of the vernier readout models, soon to be replaced by the micrometer. (14 lbs, UP) **$ 595**



257. **A GOOD BOX SEXTANT** - English, c.1900, signed "Stanley London". Black oxidized and lacquered brass with bright lacquered brass knobs, the 3" d x 1 5/8" h bayonet joint attached cylindrical case cover also serves as the handle when removed and attached on the other side. The inlet silver scale of 1 7/8" rad is read out by vernier to 1 arcmin when viewed through the swing-away magnifier. There are 2 pop-out index mirror filters and a peep hole which slides into place in lieu of the telescope. The 2 1/2" long telescope attaches by a screw-on bracket (just like the best quality Troughton & Simms version of a half century earlier) instead of pulling out of a stowage position in the body of the sextant. The telescope must then be stowed (with its screw-on solar filter) in the original, 4 1/4" x 3 1/2" x 2 1/8", leather carrying case. The case is in almost fine and the sextant in extremely fine original condition. (4 lbs UP) **$ 495**