

# Historical Technology, Inc.

SAUL MOSKOWITZ, President

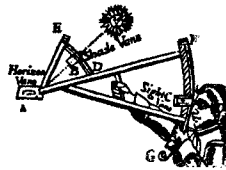
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ITEM 168  
SEXTANT BY  
JOHN BIRD



Catalog 122  
Fall, 1981  
Five Dollars

41. Edward Riddle, "A TREATISE ON NAVIGATION AND NAUTICAL ASTRONOMY," 1st Ed, Baldwin, Cradock, and Joy, London, 1824. Modern cloth binding 8 3/4" h, 5 3/4" w; pgs. vi, (2), 299, 252. Very fine condition. Riddle (1788-1854) was Master of the Mathematical School, Royal Naval Asylum, Greenwich, when he prepared this, the first of many subsequent editions. It was intended as a text for use at Greenwich and is pretty much restricted to the mathematical aspects of navigation, whereas "Bowditch" or "Mackay" were much broader in scope. This work of Riddle's and many of his other articles and actions were an attempt to upgrade the caliber of navigation in the Royal Navy. (postpaid) \$ 95
42. James South, "REFUTATION OF THE NUMEROUS MISTATEMENTS AND FALLACIES Contained In A Paper Presented To The Admiralty By Dr. THOMAS YOUNG, (Superintendent of the Nautical Almanac.)", J. Moyes, London, 1829. Modern cloth binding 8 3/4" h, 5 3/4" w; pgs. viii, 80. Very fine condition. The British Nautical Almanac started to slide down hill in the early 19th century under the direction of Dr. Thomas Young. In this book South notes that in the volume for 1818, fifty-eight errors were discovered and subsequent editions contained little or no improvement. "But, in addition to this circumstance, it is notorious that the Nautical Almanac has not kept pace with the improvements in astronomy and nautical science, and that it does not contain what is now requisite for the purposes either of navigation or astronomy." South and some of the other founders of the dynamic new Royal Astronomical Society made great effort to seek the needed improvements but were met by personal attack from Young. It was not until his death (in the same year in which this book was published) that they finally forced action. Item 99 of our Catalog 107 gives the results obtained by the special committee (membership included G. B. Airy, Peter Barlow, Sir William Hamilton, Sir John Herschel, Capt. W. H. Smyth, Edward Troughton and Charles Babbage) set up to propose revisions in the existing system. (postpaid) \$ 55
43. E. C. Ward, "NEW LUNAR TABLES, FOR CORRECTING THE APPARENT DISTANCE OF THE MOON FROM THE Sun, Fixed Star, or Planet, FOR THE EFFECTS OF REFRACTION AND PARALLAX, . . . WITH PLAIN AND EASY DIRECTIONS FOR TAKING A LUNAR OBSERVATION, AND SOME USEFUL REMARKS ON THE SEXTANT.", 3rd Ed, E. & G. W. Blunt, New York, 1834. Modern cloth backed boards (to match the original) 9" h, 6" w; pgs. 21, (20). Generally fine condition except for heavy staining along outside page edges. The preface dated 1823 (date of 1st Ed?) states that this book with its tables was prepared to correct for extensive errors to be found in the works of Turner and Elford. It is not surprising that Blunt issued this book since Turner's book was being published by Patten, the mortal enemy of the Blunts. (postpaid) \$ 60

#### LAND SURVEYING

44. George Adams (Jr.), "GEOMETRICAL AND GEOGRAPHICAL ESSAYS, CONTAINING A DESCRIPTION OF THE MATHEMATICAL INSTRUMENTS USED IN Geometry, Civil and Military Surveying, LEVELLING AND PERSPECTIVE;" 2 Vols, 1st Ed, R. Hindmarsh, London, 1791. Vol. I, old half leather binding, later rebaked, 9" h, 5 1/2" w; pgs. engraved frontis plate, (4), xvi, 500 (the last 15 being a priced catalogue of instruments for sale by the author; Vol. II, early full leather binding 8 1/2" h, 5 1/2" w; 32 folding engraved plates. Ex library copies in general fine condition (partially cracked but tight hinges for Vol. 2), but not an originally matched pair, although both from 1st editions. This work is the single most important book published on surveying instruments during the entire 2nd half of the 18th century and possibly the 1st qtr of the 19th c as well. It matches in breadth and detail the author's "Astronomical & Geographical Essays", "Lectures on Natural Philosophy", and "Essays on the Microscope". W. & S Jones later reprinted it several times with editions well into the 19th century. (postpaid) \$ 245

#### Early Pocket Map of Canada

45. "UPPER & LOWER CANADA", C. Smith & Son, 172 Strand, London, 1838. Engraved and hand colored folding map (dissected and mounted on original cloth backing), 15 1/4" h x 24" w, with original pocket case 8" h x 4 3/8" w. The case shows a little wear, the map is in very fine condition. R. V. Tooley, "Maps and Map-Makers" notes that Charles Smith was an excellent English cartographer, quite the equal of John Cary, in the late 18th and early 19th centuries. In addition to this one, his firm produced a series of pocket maps including "Roads of England and Wales" (1826). (postpaid) \$ 95

#### Early Italian Surveying Instrument

46. Octavio Fabri, "L'VSO DEL LA SQVADRA MOBILE", Andrea Gattella, Padova, 1673. Later board covers 8 1/4" h, 5 3/4" w, generally fine condition although trimmed too close on 3 pages just affecting the text. Engraved title page, 8" x 11" fold-out plate of instrument (dated 1670), 24 engraved plates within the text, pgs. (2), 9-100, with 2 different leaves numbered 13-14, the 12 pages of preliminary material in the 1st ed not printed in this ed but page numbering not corrected. A second state version of pgs. 85 and 86 (with the one plate which would have otherwise been missing from this ed) bound between pgs. 14 and 15. Thus the book is complete. The 1st edition of this work printed in 1598. The Squadra Mobile was a portable surveying instrument of Fabri's innovation. Level was determined by a plumb line and a pair of pivoted alidades with peep sights were used for sightings. Readout was on combined circular and rectified scales so that either angles or trigonometric functions thereof could be obtained directly. The quality of the engravings (many of them pictorial) is excellent. This is a beautiful as well as interesting book. (In Italian) (postpaid) \$ 225

47. Abel Flint, "A SYSTEM OF GEOMETRY AND TRIGONOMETRY: WITH A TREATISE ON SURVEYING, IN WHICH THE PRINCIPLES OF RECTANGULAR SURVEYING, WITHOUT PLOTTING, ARE EXPLAINED.", (8th Ed?), Belknap & Hamersley, Hartford, 1839. Original leather binding 7 3/4" h, 5" w; pgs. (4), 9-160, 62 (tables), 112 (tables). Very good plus overall condition with some light foxing and stains. The 1st edition of this work was published in 1804. An 8th ed with an 1835 copyright was published in 1835 and reissued in 1837 and 1838. A 9th edition was issued in 1839 according to Karpinski. However the one here appears to be the same as the 1838 issue with the title page dated 1839. Karpinski notes an edition dated 1854, so that this standard reference and text was issued over a full half century and used for even longer. (postpaid) \$ 30

First New York & Fifth American Edition

48. 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 (with some early hand coloring). General very good condition, lacking end papers, and showing signs of heavy use. Taylor 2 notes a 2nd edition of 1767, printed in London. The evidence suggests that Gibson was Irish and several editions are known to have been published in Dublin. The 1st American edition (called the 4th) was published in 1785 and by 1839 there had been 22 editions in this country. (postpaid) \$ 110

49. John Gummere, "A TREATISE ON SURVEYING, CONTAINING THE THEORY AND PRACTICE: TO WHICH IS PREFIXED A PERSPICUOUS SYSTEM OF PLANE TRIGONOMETRY.", 14th Ed. (. . . Enlarged By . . . Articles: On The THEODOLITE, LEVELLING, AND TOPOGRAPHY), Hunt & Son, Thomas, Cowperthwait & Co, Philadelphia, 1851. Modern full leather binding 9 1/4" h, 6" w; pgs. 266, 152 (tables with separate title page dated 1846), 11 folding plates, 7 (book catalog). Fine condition except for foxing. This treatise (1st ed in 1814) continued in use for over 100 years. Karpinski notes an edition as late as 1917. This is a particularly good book presenting both theory and practical instruction in the use of instruments. (postpaid) \$ 50

Second American Edition

50. John Love, "GEODAESIA: OR, THE ART of SURVEYING AND MEASURING LAND made Easy. . . . AS ALSO To lay out New Lands in AMERICA, or elsewhere: . . .", The 13th Ed adapted to American surveyors, Samuel Campbell, New York, 1796. Modern leather binding 8" h, 4 1/2" w; pgs. (14), 189, 53 (tables), 8 (appendix on surveying by chain only), many text woodcut diagrams. Contents generally fine with minor stains. The first edition of this work was published in London in 1688 just after Love returned from surveying in America. There were (obviously) at least 13 English editions and 2 published in America. The first published here (in 1793) was based on the 12th London edition. (postpaid) \$ 140

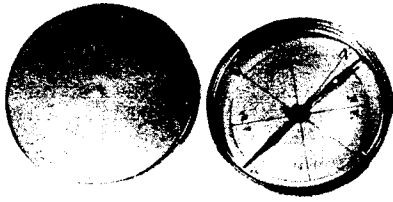
A Major German Treatise, Extensively Illustrated

51. Johann Freidrich Penther, "PRAXIS GEOMETRIAE, Worinnen nicht nur alle bey dem Feld-Messen vorkommende Falle mit staben, dem Astrolabio, der Boussole, und der Mensul, . . .", 5th ed, Jeremias Wolff, Augsburg, 1755; bound with Penther's "Zugabe zur PRAXI GEOMETRIAE,", same publisher, 1754. Early leather binding 12 7/8" h, 8 1/4" w; pgs. (somewhat misbound) engraved frontis plate, title, (8), 97, (5), title, 3-55, 39 foldout engraved plates, many of surveying instruments and maps prepared from field measurements. Fine to very fine overall condition with some wear to the binding. Penther (1693-1749) became Professor of Mathematics at Gottingen in 1736. The 1st edition of the first of these works was published in 1729, updated in 1738, with a 3rd edition in 1749. The second work here seems not to have been published until after the author's death. The overall intent of this book was the application of geometrical concepts to measurement. Practical instrumentation and techniques for land surveying and the remote measurement of structures follow the theoretical development and form a significant part of the complete work. (In gothic letter German) (postpaid) \$ 325

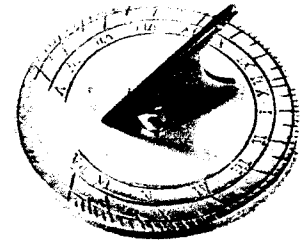
A Major Reference Work

52. Charles E. Smart, "THE MAKERS OF SURVEYING INSTRUMENTS IN AMERICA SINCE 1700", 2 vols bound in 1, Regal Arts Press, Troy, N. Y. 1962 & 67. Original red cloth binding 9" h, 6 1/4" w; pgs. xxiv, 182, xxv-xxvi, 183-282, many text illustrations. New condition. Long out of print and the best reference ever published on American instrument makers. (postpaid) Price to regular customers \$ 195. To all others \$ 245

53. Henry Wilson, "SURVEYING IMPROV'D: OR, THE WHOLE ART, BOTH IN THEORY and PRACTICE, FULLY DEMONSTRATED. . . . To which is now added, GEODESIA ACCURATA: OR, SURVEYING made EASY by the CHAIN only.", 3rd Ed, J. Wood & C. Woodward, London, 1741. Original leather binding (label on spine lacking) 8" h, 5" w; pgs. (14), 539, (6), 11 engraved plates; bound with William Hume, "SUMMARIUM STEROMETRIAE: OR A NEW ESSAY UPON SOLIDS; . . .", (1st Ed?), London, 1740. 78 pgs. Covers sound but beginning to show hinge cracks while the contents are in very fine condition. The author (1673-1741) was a teacher of applied mathematics including navigation and surveying. His attempt to replace Mercator (or Rumb-line) sailing by Great Circle sailing based upon a special two-dimensional chart of his own invention could have been a major advance over current practice. A proposed revised Marine Atlas was never published, most likely because of the opposition of others who had a vested interest in the status-quo. Wilson turned his attention to surveying with the 1st edition of this work published in 1731. The section on surveying by chain only was then issued in 1732. The 3rd edition, as revised by William Hume, was issued in the same year as Wilson's death. (postpaid) \$ 175

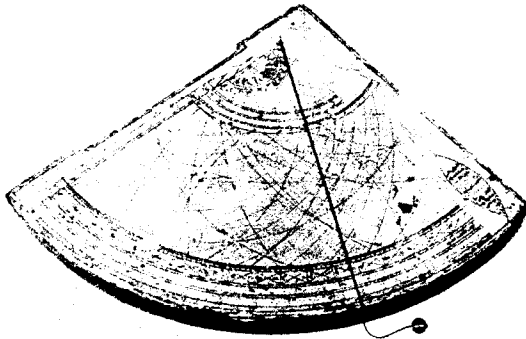


154. FINE POCKET COMPASS - English, 18th c, unsigned. Brass case and cover, with restored lacquer finish, 2 3/8" d by 1/2" h (covered), silvered dial with 8 compass points, and 2 1/8" needle. Quality workmanship and now in very fine overall condition.  
(2 lbs, UP, PS) \$ 135



155. SMALL BRASS HORIZONTAL SUNDIAL - Possibly American, 19th c, unsigned. The dial base is cast and turned brass 3 1/4" d, with a cast brass gnomon riveted in place. The lacquer finish has been restored. The measured gnomon angle of 46-47 deg could correspond to an origin in either northern Maine or any one of the mid and far western states which lie on the latitude 49 border between the U. S. and Canada. Of course, this latitude band also passes through parts of Ontario and Quebec as well as the middle of France. The example here, and the one other seen by us, both surfaced in this country, leading us to the possible American attribution.

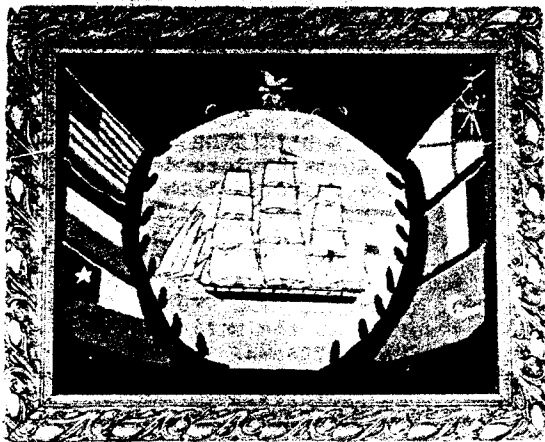
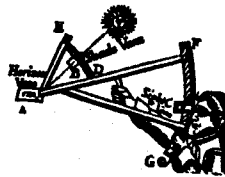
(3 lbs, UP, PS) \$ 140



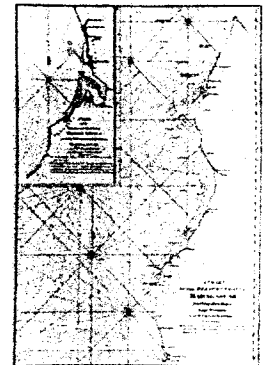
156. LARGE ISLAMIC ASTROLABIC QUADRANT - Turkish, 19th c, possibly signed. Painted and varnished wood 3/4" thick, 8 3/4" along one edge and 9 1/2" on the other. The scales, graduations, and markings are applied in black and red on the painted ground with an orange tinted varnish over each surface. On the back (not shown) is a sinecal quadrant and on the front, a so-called "Prophatius" astrolabe. Very good overall condition noting some chipping and rubbing of the surfaces, mostly on the front side (see illustration). The plumb line is a modern replacement.

Similar instruments are shown in Plates 81 and 82 of Seyyed Hussein Nasr, "Islamic Science", World of Islam Festival Publ. Co., 1976. The sinecal quadrant permits direct readout of the sine and cosine of observed angles. The astrolabic quadrant is said to have been the inventions of the 13th century Jewish scholar, Prophatius Judaeus of Montpellier. The theory behind its construction and use is given in Chapters 16 and 17 of Henri Michel, "Traité De L'Astrolabe", 1976 reprint. It is formed from the curves of the rete of a planispheric astrolabe by first folding the disc about the East-West line and then folding this half circle about the North-South line. Thus the 4 quadrants of the circle are superimposed and, in use, it is necessary to use the curves of the appropriate quarter.

(6 lbs UP) \$ 395

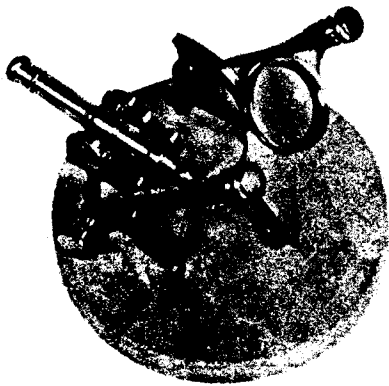


157. AMERICAN WOOL-WORK PICTURE - mid 19th c, unsigned. Canvas covered panel 20" w x 16" h in gilt frame 24" w x 20" h. Picture of 3-masted sailing ship flying American flag consists of woolen strands and threads stitched down to the canvas backing. Flags in red, white, and blue against deep red background. Ship in oval with blue and white background with green olive branches on either side, gold eagle with American shield at top, crossed swords to either side. Minor signs of moths but overall condition still very fine with virtually no fading of the original bright colors. British wool-work pictures of the period appear from time to time, but American ones of American ships are extremely rare.  
(20 lbs UP) \$ 465



158. "A CHART OF THE WESTERN COAST OF MADAGASCAR from St. Augustin's Bay to Cape St. Andrew. (from Mr. d'Anes de Manuevillette.)" - English, signed and dated, "London, Printed for ROBERT SAYER, Map & Chart-feller, No. 53 Fleet Street, as the Act directs 20 April 1787". Copperplate engraving, plate mark 19 1/4" h x 13 1/2" w on paper 25 1/2" h x 18" w. Extremely fine condition. Note the multiple compass roses and the soundings along the coast. The inset in the upper left is a detailed plan of the Road and River of Moroundava.

(postpaid in the U. S. only) \$ 55



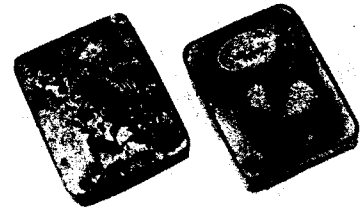
150. NOON GUN SUNDIAL - French, 19th c, unsigned but marked for 48°-50' latitude. Marble base 6 3/4" d x 3/4" h, upon which are mounted brass fittings consisting of an 1 3/8" h gnomon, 4 1/2" long muzzle-loading cannon, a 1 3/4" d mounting for a convex lens on 5 3/4" long pivoted arms, and the 2 1/4" h quadrants (one with a calendar scale) which support these arms. The sundial is in extremely fine display condition (under no circumstances should one attempt to set off the cannon), the brass surfaces have been cleaned and relacquered, the marble base has minor chipping and weather stains, and the iron screws and brass nuts which attach the parts to the base have been either repaired or replaced because of extensive rusting.

We have had other examples of this type of dial (Item 86 in Catalog 108 and Item 163 in Catalog 119). Plate 34 of Rohr's book "Sundials" shows one at the Museum in Liege. Two more are listed, one illustrated, in Horsky & Skopova, "ASTRONOMY/GNOMONICS". Almost all the known signed examples are of

French origin and we have every reason to believe that this one is too. The marked latitude falls within the city of Paris. At noon, the small bright image of the sun formed by the mounted lens moves to the touch hole of the cannon, setting it off (if it had been loaded with powder).

(12 lbs UP) \$ 1,445

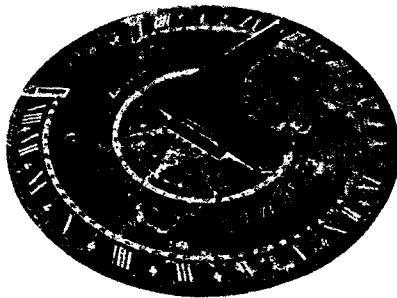
151. UNUSUAL SCAPHE POCKET DIAL - Japanese, 19th c, unsigned. Gilt brass (some loss of original finish), 1 1/2" x 1 7/8", the inset oval compass only 0.40" x 0.66", while the semi-hemispherical bowl sundial is 0.90" dia with a central vertical pin gnomon about 0.15" high. The cover is engraved with flowering plants. Fine to very fine overall condition with sufficient original finish that there should be no attempt at restoration.



Another example of this form of sundial was listed by us as Item 148 of Catalog 118. The Japanese seem to have made these scaphe form sundials (as they did verge and foliot clocks without balance springs) centuries after they stopped making them in Europe. Such portable sundials have the advantage of being useable in different latitudes without needing to know the latitude. However, the very limited number of graduations of the example here would severely limit its possible accuracy. We do not know the actual purpose or intent of such dials.

(2 lbs UP) \$ 485

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



A discussion of the work of John Bird (1709-76) is to be found with the description of the Cover Item of this catalog. It is possible that this dial dates from 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.

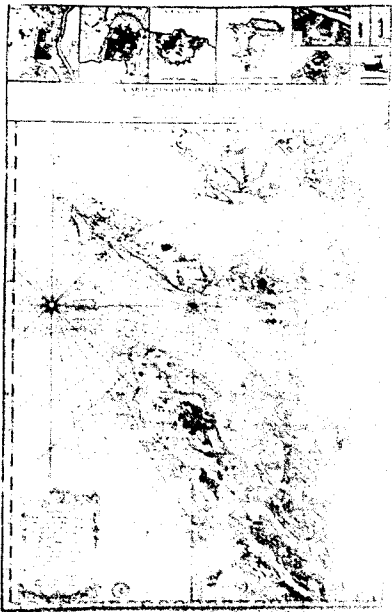
(18 lbs UP) \$ 1,520

153. ELEGANT AUGSBERG DIAL - German, c. 1800, signed, "Johan Schrettegger in Augsburg". Bright lacquered and silvered brass, 2 1/4" across the flats of the octagonal base. The inset compass with silvered dial 1 1/4" d and compass needle 1 1/8" long. The latitude quadrant and 2" d chapter ring are both silvered. The pin gnomon, one small screw, and the surface finishes are modern restorations, all else original. Extremely fine overall condition.



These pocket universal equatorial sundials (made for use between 10 deg north latitude and the North Pole) are characteristic of the Augsburg workshops of the 18th and early 19th centuries. Robinger discusses the work of Johann Nepomuk Schrettegger (1764-1843) on pgs. 206-9, 351-60, has photographs of 11 of his dials, and provides a very extensive listing of his instruments in known public and private collections. Almost all the museums of Europe and the U. S. with good scientific collections seem to have one or more examples of Schrettegger's work. Thus one may conclude that although his sundials are not extremely rare or unique, they are well made and quite elegant.

(3 lbs UP) \$ 985

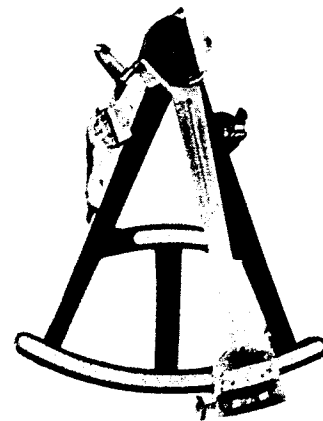


164. NAVIGATION CHART WITH GREAT INTERIOR DETAIL - French Admiralty chart, c. 1760, by Bellin. "CARTE DES ISLES DE RE ET D'OLLERON LES PERTUIS D'ANTIOCHE BRETON ET DE MAUMUSSON AVEC PARTIE DES COSTES DF POITOU AUNIS ET SAINTONGE". Copperplate engraving with double fold, printed area 34 3/4" h x 22 3/8" w, on paper 36 1/4" h x 24 1/2" w. Fine condition but weak at the folds. This is a very detailed chart and map of the west coast of France about the region of the city of La Rochelle. It contains soundings, topographical details in pictorial representation, roads, and even landmarks.

(postpaid in the U. S. only)

\$ 95

165. CHANNEL ISLES QUADRANT - British, early 19th c, signed "J. B. LE ROY \* JERSEY". Ebony frame with bright lacquered brass reinforced index arm (tangent screw slow motion), sight vane with pivoted filter holder (sun filter now missing), and set of 3 index mirror filters. The ivory scale of 9 3/4" radius reads out by vernier to 1 arcmin. Possible glare surfaces are finished in flat black. "E. Franklin/Boston/1886" has been scratched into the ivory note plate on the back of the frame. Very fine restored (surface finishes) condition, with 1 screw of modern origin, one prong of the horizon glass adj washer

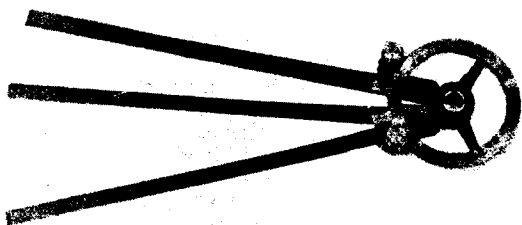


on the back broken off and missing, the ivory pencil top missing, and the locking thumb screw a very old replacement. The original mahogany key-stone case, 11 3/4" w x 13" deep x 3 3/4" h is in fair condition with age cracks and some old and new repairs. The trade label of F. W. Lincoln Jr. & Co. is pasted inside the cover.

The French instrument maker Jean-Baptiste Le Roy, son of the chronometer maker Julien Le Roy, member of the French academy of Sciences since 1751 and a maker of electrical machines, microscopes and telescopes, died in 1800. It may be that the maker (seller?) of this navigation quadrant was one of his relatives (often a name is repeated in a family from generation to generation). Although the Isle of Jersey off the French coast has been on English island since King John, its population is still French derived as may be established by just scanning a list of the names of old families.

(10 lbs UP)

\$ 675



166. MINIATURE STATION POINTER - English, mid 19th c, signed "H. Hughes & Son 59 Fenchurch St. London No 543". Brass construction, 2 5/8" d readout circle, thumb screws and other screws in original bright lacquer finish (some dark spots), the rest in black oxidized finish. The 3 adjustable arms extend only 9" from the center. The original mahogany case 11 3/4" w x 5" deep x 1 1/2" h has the Henry Hughes & Son Marine Opticians trade label in its cover. Case is in almost fine and instrument in very fine condition. Hand magnifier is missing.

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

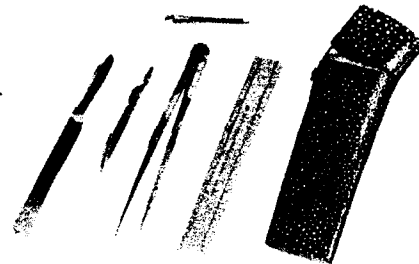
instrument on the chart until the 3 landmarks used all lie along the edges of the 3 arms. The 2 angles can be measured with a peloris, sextant, azimuth compass, or theodolite. See Item 213 of Catalog 121 for a standard size version of this instrument. Henry Hughes, son of the instrument maker and dealer, Joseph Hughes, moved into 120 Fenchurch St about 1840, later to no. 59. We have not been able to determine when his son, Alexander, joined the firm, nor when it became a limited company. These dates would enable one to place limits on the origin of this instrument.

(6 lbs UP)

\$ 430

167. SHAGREEN COVERED POCKET CASE OF DRAWING INSTRUMENTS - English, early 19th c, the ivory rule signed "W & S JONES \* 30 HOLBORN LONDON". The green shagreen covered case is 1 5/8" w at the top and 5" long. Its complete contents consist of the 4 1/2" long ivory rule, dividers/compass, pen leg for the former, pencil holder, and combination knife, file and adjustment tool. Very fine overall condition.

The firm of William & Samuel Jones was established in 1791 when their father, John, either retired or died. First they were at 135 Holborn but by 1802 had moved to 30 High Holborn where the firm remained for at least 50 years. They acquired the rights to George Adams' designs and books after his death in 1795, and over the years produced a wide variety of scientific instruments. Even though their microscopes were considered their finest work, all of their instruments were of particularly high quality, this cased set being no exception.

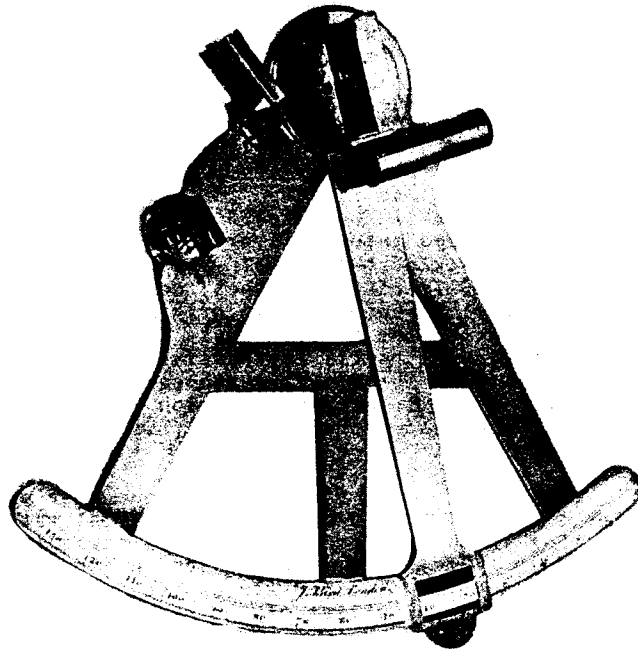


(3 lbs UP)

\$ 470

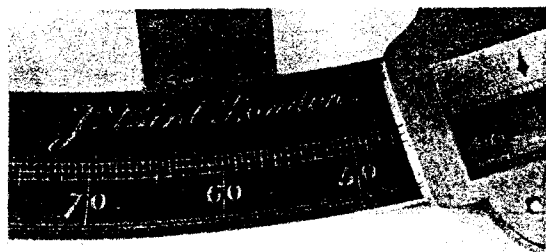
English sextant, probably before 1766, signed "J. Bird London." (with no other markings on any exterior or hidden surface). Construction is in bright brass with restored lacquer finish. The frame is made of flat plate about 1/10" thk which shows no variation greater than .005" (suggesting that it may have been lathe turned) with a max dimension of 8 9/16". The index arm is flat with a 10 space vernier on the pivot side of scale and was made without tangent screw or clamp. The frame has no reinforcing bars or feet. A pair of index mirror filters are in atypical Hadley quadrant mount which slides into a typical Hadley quadrant frame slot. The half-silvered horizon glass is mounted in a frame without an upper structure. Adjustment of the horizon glass is by a Hadley quadrant type thumb nut disc and lever, with locking screw. A hardened bronze disc provides the bearing for the index arm short axis. There is no provision for wear to this fitting. A fixed shade tube is provided with a rectangular aperture which just matches the horizon glass. A slip-on concave lens is provided (to correct for the near-sightedness of the original owner?). This lens is cracked. The ghost or "faint arc" divided scale is of 7" radius and located inside the readout scale. Divisions are spaced by .03" (.03054326" by calculation). Divisions are half degrees which by the vernier produce readouts to 3 arcmin. The readout scale marks are arcs of 3 1/2" radius scribed from a point outside the limb of the sextant. Divisions are numbered from 0° to 130° by 10° intervals. The readout scale extends from -5° to 135°. The ghost scale extends below zero by 1/2 degs to -6°, then by 1 degs to -12°, by 2 degs to -16°, and by 4 degs to -20°. It extends above 135° by 1 degs to 138° and by 2 degs to 140°. There are short cross lines at all points of the ghost scale, except at 0°, 32°, 64°, 96°, 120°, and 128° (which correspond to actual angular measure of 0°, 16°, 32°, 48°, 60°, and 64°) and are marked by points only. Overall condition of the sextant is extremely fine noting that the lacquer finish is modern, the slip-on lens has a crack, the top piece of the index mirror housing is a

modern replacement of the missing original, and there are faint etched spots on the index arm, possibly from handling. The sextant does not appear to have seen any major use. Its original mahogany case with hand dovetailed joints is keystone shaped, 11 1/2" w x 10" deep and has a cover which slides from back to front. It is in fine condition.



Taylor 2 calls John Bird (1709-76), a master of scale division". He was a cloth weaver by trade when he moved from Durham to London to enter the instrument makers profession. He worked for Jonathan Sisson and, with further instruction from George Graham, was able to set up his own business by 1745. The re-fitting of the Royal Observatory, which was initiated in 1748, led to contracts to Bird for: an 8 foot radius mural quadrant finished in 1750; a transit instrument, about 1750; a 40 inch moveable quadrant; 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, Tobias Mayer's in Gottingen, Radcliffe Observatory at Oxford (1771) and Harvard University. He was commissioned by the Board of Longitude to publish the short books "Method of Dividing Astronomical Instruments", 1767, and "Method of Constructing Mural Quadrants", 1768. He was paid the great sum (at that time) of £ 500 for these publications and for "taking an apprentice for seven years, and instructing him in his art and method of making Astronomical Instruments". He was one of the experts called upon to pass on John Harrison's chronometer and also on the accuracy of Ramsden's dividing engine (and found both more than adequate). Alan Stimson in his "The Influence Of The Royal Observatory At Greenwich Upon The Design of 17th and 18th Century Angle-Measuring Instruments At Sea" (Vistas in Astronomy, 1976, Vol. 20, pp. 123-130) describes Bird's work on navigation instruments and his construction of the world's first sextant. Bird made a reflecting circle upon Tobias Mayer's design of 1755 (first published in his "Theoria Lunae" of 1767) which was used by Capt. Campbell in 1757. This circle was 16" diameter. However, Campbell found it cumbersome when used as intended for multiple sightings, then making single ones on a section of the scale. He then had Bird make him a Hadley quadrant of 16" radius with scale extended to 120 degrees - the first sextant. This was evaluated aboard the Royal George in 1758 and 1759 and the results published in the appendix of Maskelyne's, Mayer, "Tabulae Motuum Solis Et Lunae" of 1770. This instrument may have been all brass. It does not seem to have survived. Stimson believes that the wooden frame-brass limb sextant of 20" radius made



Detail of Scale

for Nevil Maskelyne about 1761 was Bird's second sextant. The vernier read to 1 arcmin, there was tangent screw slow motion, and it was fitted with a 4 power telescope 6" long. The design of the slow motion was the same as used on his mural quadrant of 1750. This sextant does not seem to have survived either.

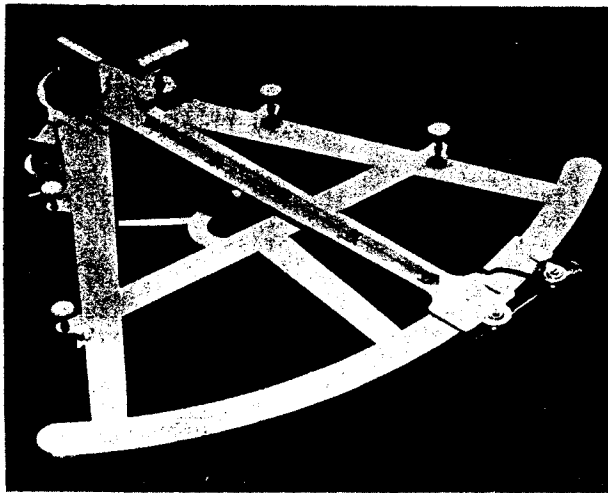
At the present time 5 (or 6) sextants by John Bird are known, as follows:

1. HISTORICAL TECHNOLOGY

Frame: All brass  
 Radius: 7"  
 Readout: 1/2 deg - vernier to 3 arcmin  
 Slow Motion: None  
 Ghost Scale: Yes  
 Pivot Wear Compensation: None  
 Sighting: Fixed shade tube

2. NATIONAL MARITIME MUSEUM

Frame: All brass  
 Radius: 18.25"  
 Readout: 1/3 deg - vernier to 1 arcmin  
 Slow Motion: Tangent screw  
 Ghost Scale: None  
 Pivot Wear Compensation: Spring washer  
 Sighting: Fixed shade tube



Captain Wallis' Sextant by John Bird - Courtesy National Maritime Museum, Greenwich, England

3. SCIENCE MUSEUM, LONDON

Frame: Wood, brass limb  
 Radius: 18"  
 Readout: 1/4 deg - vernier to 1 arcmin  
 Slow Motion: Tangent screw  
 Ghost Scale: Not visible on photograph  
 Pivot Wear Compensation: Spring washer  
 Sighting: Interchangeable telescopes

4. MARITIME MUSEUM, AMSTERDAM

Frame: Wood, brass limb  
 Radius: 18"  
 Readout: 1/3 deg - vernier to 1 arcmin  
 Slow Motion: Tangent screw  
 Ghost Scale: Not visible on photograph  
 Pivot Wear Compensation: Spring washer  
 Sighting: ?

5. PRIVATE OWNERSHIP (One sextant, photographed badly twice; or 2 different sextants)

Frame: Brass  
 Radius: Less than 4"  
 Readout: 1 deg - vernier to ?  
 Slow Motion: None  
 Ghost Scale: Not visible on photograph  
 Pivot Wear Compensation: ?  
 Sighting: Fixed shade tube

A picture of Sextant 2 is shown here. It is a large scale version of Sextant 1 with reinforcing bars screwed to the index arm and the bottom of the flat frame plate. It has a bracket (note 4 thumb screws) to be used with a supporting post or stand (as do Sextants 3 and 4). The horizon glass adj lever is driven by a tangent screw. This sextant is believed to have been made for Capt. Samuel Wallis (1728-1795) before he set sail on Aug 22, 1766, for his circumnavigation of the globe. Sextant 3 is believed to have been made for Capt. Cook in 1771 and taken with him on his second voyage (of 1772) to provide a means of comparison for the Ramsden sextant he was to evaluate. If these assumptions concerning the dating and ownership of Sextants 2 and 3 are correct (obtained from the museum staffs involved) we are able to reach some important conclusions concerning design developments and dating of Sextant 1:

1. The fixed mount shade tube, or telescope (of Sextants 1, 2, and 5), predated the interchangeable system (of Sextant 3).
2. The spring washer was a design improvement which appeared no later than 1766 and was used from then on.
3. Then Sextant 1 predates Sextants 2, 3, and 4 and so was made before 1766 and may be as early as 1761.

It is also interesting to note that Bird had also, much earlier, made 2 Hadley quadrants (in brass?) of exactly 7" radius according to Appendix XI (pg. cxxvii) of Maskelyne's, Mayer, "Tabulae Motuum . . .". This, a letter from Benjamin Robins to John Bird, dated 1750, states "YOUR two small Hadley's we observed with on board; they were much exacter than any in the ship. I have I believe forty observations made for two months together with both, where the greatest difference between them is no more than two minutes. If you could make one of the same construction, with a small short telescope (instead of the tube) which should magnify three times, by such a quadrant, of a size to be relied on to a minute, the longitude by Halley's tables may certainly be found to a degree". Could these actually have been sextants identical to the one here?

Bird's method of division is described in his booklet of 1767 and evaluated in the article "Graduation" in Vol. XVI of Rees'. He based his approach upon using computed chords to obtain an arc length equal to some power of 2 times the size of the minimum division. Bisection would then yield the complete scale. The first arc struck off would be 60° (= 120° on an instrument of double reflection such as a sex-

Completed on Following Page



tant) by means of the beam compass set to scribe the "faint arc". This angle would then be extended by 30° (a 2nd beam compass set to the chord of the bisected 60°). The power of 2 arc would then be obtained by 2 beam compasses (or dividers) set to calculate values of the chords from reference points above and below the desired point. Any error which would produce 2 lines would be corrected by marking the point half way between the two. Bird also remarks that if the graduation interval for nautical sextants and quadrants should be so chosen that a prime arc of 64° results, then a chord of 64° could be used and the bisections would follow accordingly. The dots and lines of the ghost scale show that this is exactly what was done here. The 60° arc was marked first. Then 64° (= 128°). We suspect that the divisions on the

upper and lower extensions of the scales were used as part of the process of generating the 64° point, but we have not yet established the exact method employed. Lastly, a question of accuracy. John Bird stated that he positioned his points to .001". On a sextant of this size, it would mean that he achieved a basic accuracy of 1 arcmin, or 3 times better than his least readout. This same ratio (approximately) holds for Sextants 2, 3, and 4. It is probable that no one could produce a scale by hand division which would be more accurate for the given radius. Thus this sextant represents the ultimate of its class. It may also be the earliest surviving sextant in the world.

Price upon request to qualified parties.



169. VERY LARGE MAHOGANY FRAME HADLEY QUADRANT - English, c. 1780-90, unsigned. Mahogany frame with bright lacquered brass flat index arm (no slow motion work), interchangeable set of 3 filters, back horizon assembly, forward two hole peep sight with pivoted cover and other fittings including lever adj of both horizon glasses. Ivory scale of 15 5/8" radius (index arm 18" long), readout by Type B vernier (0 to the right) to 1 arcmin. Ivory pencil ton missing, otherwise the instrument is complete; a crack in the frame under the back sight vane has been repaired with 2 small screws, and there is a crack in the back horizon glass. Very fine overall (restored surface finishes) condition. The early (original?) stepped keystone case, 17" w x 19" deep x 3 1/2" h is in unusually fine condition.

The 10 years between 1780 and 1790 seem to have been a period of transition for the vernier Hadley quadrant. Mahogany was replaced by ebony, wooden or part wooden and part brass index arms gave way to flat brass (the reinforcing bar was to start to appear about 1800), Type A verniers (center 0) gave way to Type B (0 to the right), and size began to decrease. The tangent screw was not used until about 1800 even though they had been used on sextants ever since their invention by John Bird in 1758. This quadrant combines both 1780 and 1790 features and could date from any time within this period depending upon the background of its maker. Interestingly, the scale engraving is typical of the 1770-80 period. We have been unable to identify the actual maker.

(18 lbs UP)

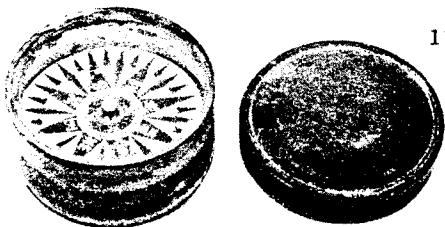
\$ 1,595

170. WELL-MADE, CASED MARKING PROTRACTOR - English, 20th c, signed "LAWES RABJOHNS LTD/LONDON". German silver with inlet silver scale and bright lacquered brass fittings, the full circle protractor is 5 3/4" d and the pivoted marking arms 3 7/8" long each. A clamping tangent screw provides fine motion control. There are opposing 1 arcmin verniers under each of the marking arms. The instrument is in excellent, like new condition. The original mahogany case 7 7/8" x 6 7/8" x 2 1/8" h is in fine condition and even has its separate hand held magnifier.

Such instruments were particularly useful at sea because they could be used to set a very accurate bearing or course line and then make a permanent mark (pin hole) on the chart even though there may have been rough seas. Surveyors found them valuable for similar reasons and examples were made from the late 18th well into the 20th centuries.

(6 lbs UP)

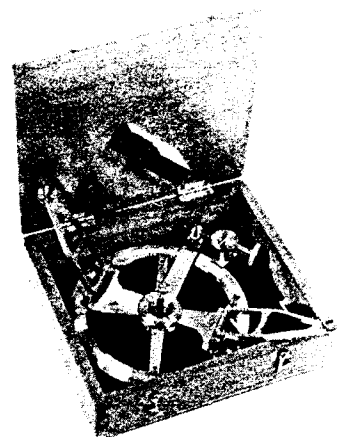
\$ 275

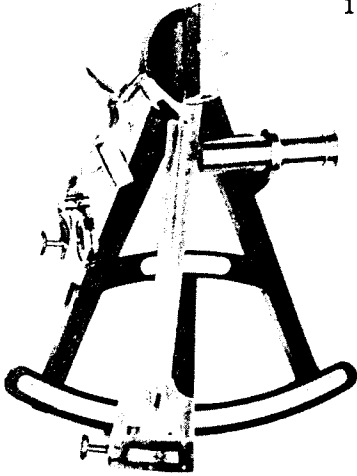


171. TIN-CASE LIFE BOAT COMPASS - Scottish, 19th c, signed "JOHN A. SMITH. PETERHEAD". Tin case and cover 4 1/2" w x 2 3/4" h closed, 4" d drycard compass within. Very fine overall condition with somewhat uneven oxidation of the tin surfaces. We have not found the maker listed in the standard references and so have not been able to be more precise in the dating.

(4 lbs, UP, PS)

\$ 135





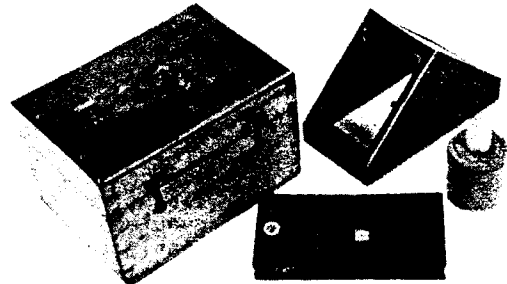
172. EBONY FRAME QUADRANT FROM THE MOTOR YACHT "SAVAGE" OF NEW YORK - English, mid 19th c, unsigned but "Savage", N. Y. scratched into the ivory name plate and the letter "H" marked on interior (hidden) surfaces. Ebony frame with bright lacquered brass reinforced index arm (tangent screw slow motion) screw-in shade tube, sets of 2 horizon glass and 3 index mirror filters, and tangent screw adjustment of the horizon glass. The inlet ivory scale of 8 3/4" radius is read out by vernier to 1 arcmin. Fine plus restored (surface finishes) condition, lacking one end of the vernier scale, a short telescope matching the shade tube, ivory pencil top, and one side of index arm locking spring. 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 its cover on which is written "Motor Yacht "Savage" N. Y."

Design is typical of English work of the mid 19th c. The "H" could very well stand for Henry Hughes or William Heath who were working during this period. Michael Rupp (1818-99) was a partner of William T. Gregg, 1844-53, and then on his own from 1853 til his death in 1899.

(10 lbs UP)

\$ 675

173. MERCURY POOL ARTIFICIAL HORIZON - English, c. 1830, signed "Crichton/London" although there is the trade card of George Lee & Son, Portsea inside the case cover together with a label of a prize medal from the Great Exhibition of 1851. The hand dovetailed mahogany case, 7 3/4" x 5 1/2" x 5" h, contains the 6 1/4" x 3 1/4" mahogany mercury tray, the boxwood mercury bottle with ivory cap/funnel 2" d x 3 3/4" h (with mercury), and the black oxidized brass 3 1/2" w x 6 3/4" long x 4 1/2" h wind screen cover with its two 2 1/2" x 3 1/4" optical windows. Case is in very good condition (missing brass insert in the cover) and the other items are fine to very fine.



Taylor 2 lists a John Crichton working in London from 1820-32 and that several instruments are known dating from this period signed "Crichton". She also lists a Joseph Crichton working from 1835-51 at 112 Leadenhall St. noting that the 1846 Post Office Directory has a John Crichton at this address as well, and that a Crichton Bros. ivory scale was sold at Sotheby in 1960. The boxwood bottle and mahogany tray point to an early origin since most known examples from the 1840's, onward, have iron bottles and trays.

(10 lbs UP)

\$ 270



174. YANKEE SEA CAPTAIN'S WINE GAUGING ROD - American, early 19th c, signed "T. Coffin maker Newburyport" and with the owner's name "G. P. Stone". Tight grained oak rod 1/2" x 5/8" x 48" long with a brass tip at the bottom end. Marked on the 4 sides with linear and logarithmic scales and computational tables. This rod was used to determine the depth of wine in a keg and then calculate the actual volume present. Very fine overall condition. In addition

there is the certificate of membership of Captain Gyles P. Stone in the Marine Society of Newburyport in New England numbered 170 and dated November 24, 1831. (Unfortunately the certificate is in relatively poor condition with a number of tears.) Included, as well, is Stone's 2 3/4" x 6" engraved brass name plate.

A wooden surveyor's compass by Coffin was listed by us as Item 143 of Catalog 120. Although there were Newburyport clock makers named Coffin and another Coffin wrote a history of Newbury, Newburyport, and West Newberry (1845) we have not yet been able to find out about the instrument maker here.

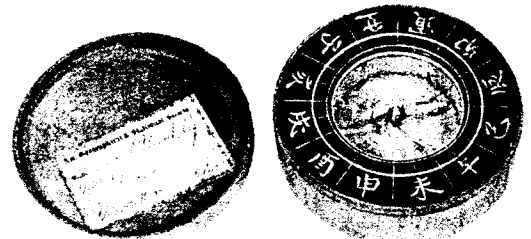
(15 lbs UP)

\$ 365

175. JAPANESE MARINER'S COMPASS - 19th c, 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 engraved into the black painted face. The compass glass and retaining ring are a modern restoration. A label in the cover notes that this compass was presented to the American Geographical Society (in New York) on March 10, 1869 by George W. Blunt, retired dealer in nautical instruments, charts, books, and former publisher of Bowditch's "Navigator" and the "American Coast Pilot". Very fine overall condition.

(4 lbs, UP, PS)

\$ 365





176. IRISH SPYGLASS - Late 18th c, signed "R. Spear, Instrument Maker to His Majesty's Crown (Rursers?) of Customs in Ireland" and with the owner's name "Lt. Royse, R. N./Walmar/Kent". Direct tapered conical mahogany barrel, 2 1/8" large dia, bright lacquered brass fittings and single draw tube, 25" long (closed) extending to 31 1/4". The achromatic objective has a clear aperture of 1 1/2"; 4 element eyepiece. The front lens slide is an old replacement and the eyepiece shutter is missing. Reasonably good images but with a somewhat narrow field of view; not of the quality associated with Dollond's telescopes of the period. Fine to very fine overall condition with some age cracks in the wood, wear to the brass draw tube and typical signs of use. The lacquer finish is a modern restoration. Richard Spear of Dublin was located on Capet St between 1791 and 1809, then on College Green. In 1818 the firm became "& Co." and, according to Goodison, was in business until at least 1860.

(6 lbs, UP, PS)

\$ 385

177. ACHROMATIC TRIPLET SPYGLASS - English, c.1800, signed "Dollond London/Day or Night". Wooden barrel in opaque red-orange finish, 2 1/4" d, with bright lacquered brass fittings, lens cap eyepiece shutter, and single draw tube, 20 3/4" long (closed) extending to 35 1/2". The achromatic objective of 1 5/8" aperture consists of 3 airspaced elements, as invented by Peter Dollond in 1763. The lenses are keyed in a screwed-together cell rather than a spun cell. This is highly unusual. The eyepiece is a 4 element system. Overall condition is very fine with only minor discoloring of the original lacquer finish and some rubbed areas on the wooden barrel (so that the base wood shows). Optical quality is superb. The achromatic triplet goes a long way in the reduction of curvature dependent aberrations even though it can not correct for secondary color. Telescopes with such objectives were priced at a premium and yet, according to King, Dollond could never produce enough to meet the demand. Our own examination of such telescopes (both those signed Ramsden and those signed Dollond) has shown them to be of better optical quality than those of all the other instrument makers.

(5 lbs UP)

\$ 495

178. TWO DRAW 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, 1 1/8" clear aperture, 4 element eyepiece. Very fine overall condition noting that leather covering and lacquer finish are modern restorations. Reasonable images although there is noticeable 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 we can not tell if the signed name is just "T. Harris" or if there was once an "& Son" as is suggested by the spacing of the remaining signature. This firm appears to have produced a great number of spyglasses of a somewhat average optical quality.

(5 lbs, UP, PS)

\$ 255

179. FOUR DRAW SPYGLASS - English, 1st half 19th c, signed "Dollond London". Leather covered barrel 2 1/4" d with bright lacquered fittings, 4 draw tubes, objective lens cap and eyepiece shutter, 11 1/2" long (closed) extending to 42". The 2 element achromatic objective has a 2 1/8" dia clear aperture; usual 4 element eyepiece. Very fine overall condition noting that the leather covering is a modern restoration and that there is some darkening and spotting of the original lacquer finish. Excellent optical imaging. Marks on the largest of the draw tubes indicate that there was once a clamp-on table tripod although the telescope was found by itself. The objective lens cell screws together which is not a common feature of Dollond telescopes. However, we have been unable to determine under what conditions spun cells and under what, screw together cells were used. We have found both throughout the 18th and 19th centuries with the spun cell much more common.

(5 lbs UP)

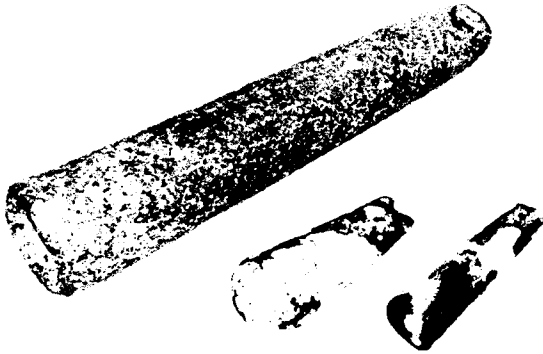
\$ 425

180. SEA CAPTAIN'S GLASS WITH EXTENDING SUN SHIELD - English, mid 19th c, signed (with 2 different sets of stamps) "J. FARRELL MANCHESR" and "DAY OR NIGHT WARRANTED". Leather covered barrel 2 1/4" d with bright lacquered fittings, extending sun shield, triple draw tubes, and protective slides to the objective and eyepiece, 11 3/4" long (closed) extending to 36 1/2". The 2 element achromatic objective has a clear aperture of 1 1/8"; 4 element eyepiece. Very fine overall restored (leather covering and lacquer finish) condition with optics producing rather good images. We have been unable to locate Farrell in any of our lists of instrument makers and believe that he retailed this typical London telescope.

(5 lbs, UP, PS)

\$ 265

THREE EARLY SOUNDING LEADS



These sounding leads are said to have been recovered from the wreck of the Spanish treasure ship, the San Ignacio, sunk off the Florida Keys in 1733. The largest was most likely used on the San Ignacio and the smaller ones on boats sent out from the San Ignacio to find safe channels.

181. THE LARGEST - Lead weight with hollow bottom (for holding the wax used to pick up bottom samples), 2 3/4" base dia x 12 3/4" long and weighing 19 lbs. Lightly encrusted.

(25 lbs UP)

\$ 295

182. SMALL LEAD - Weight without bottom hollow, 1 3/4" base dia x 4 1/2" long and weighing 3 lbs. Somewhat encrusted.

(6 lbs UP)

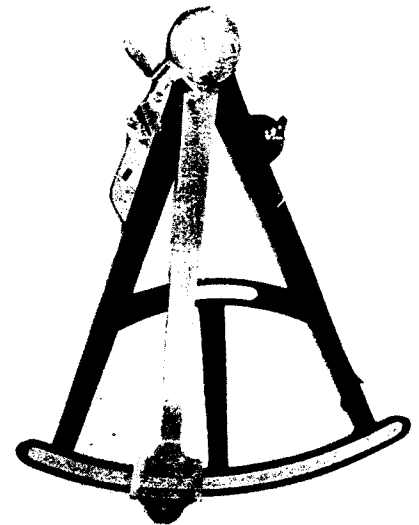
\$ 135

183. SMALLEST LEAD - Weight without bottom hollow, 1 1/4" base dia x 4 1/2" long and weighing 1 1/2 pounds. Somewhat encrusted.

(5 lbs UP)

\$ 125

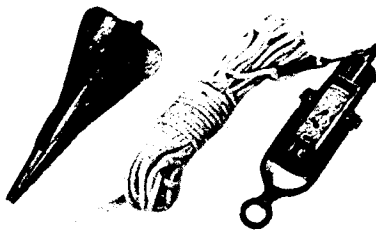
184. LARGE EBONY FRAME HADLEY QUADRANT - English, c. 1790, signed "I D" about an Anchor in the middle of the readout scale. Ebony frame with bright lacquered brass flat index arm (no slow motion work), double hole sight vane with pivoted cover and set of 3 removeable filters. The ivory scale of 13 3/4" radius is readout by a zero-to-the-right vernier to 1 arcmin. Originally there was a back horizon assembly, but it was removed a long time ago and the frame and accessory mounting plate were instrument maker reworked so that now only the lower filter slot and 2 holes in the frame remain. Fine restored (surface finish) condition noting age cracks (and repairs to them), some surface etching, missing ivory pencil top, and old, and not too careful cleaning of the brass surfaces. The index mirror silvering has deteriorated. The original stepped keystone case, 15" w x 17" deep x 3 3/4" h, in fair condition with age cracks and old repairs, has the later trade cards F. W. Lincoln Jr of Boston and Peter Walther of Baltimore. One or more earlier trade cards are now missing.



It was not uncommon to have an instrument maker remove the back sight assembly of an old Hadley quadrant since it was really rather impractical and just got in the way. We have had other quadrants which were so reworked such as Item 255 of Catalog 112. Identifying the maker presents some problems. Dring and Fage, a partnership founded about 1798, are known to have signed the scales of their early quadrants with a "D F" about a fouled anchor (see Item 64 of Brewington). It is possible that even earlier John Dring made quadrants while working on his own. We have been unable to identify any other likely makers with these initials.

(14 lbs UP)

\$ 945

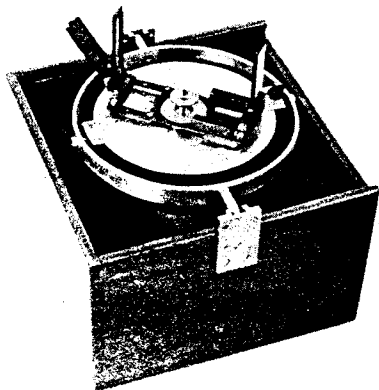


185. JOHN BLISS & CO. TAFFRAIL LOG - And so signed, American, with patent dates of 1876, 78, 84, 85 on readout dial and of 1878, 84, 85 on the spinner. The readout cylinder is stamped "88" on one end. The brass readout unit (restored bright lacquered finish) 10 3/4" long overall, 1 3/4" d x 6" long readout cylinder with 1 3/8" x 4" dial window housing, 3 dials scaled 1, 10, and 100. Four bladed brass spinner 9 1/2" long. Line and hook are modern replacements. The spinner shows extensive salt water etching, the readout unit is in fine plus condition.

This New York firm was established about 1840 becoming John Bliss & Co. in 1845. Bliss' first taffrail log with a circular readout housing and dial was patented in 1864. The design offered here was his second model which was patented originally in 1876.

(12 lbs, UP, PS)

\$ 235



186. WELL MADE CASED PELORIS - German, 1st half 20th c, signed "C. Plath Hamburg". Slide cover case 10 1/4" sq x 6 3/4" h serves both for storage and mounting of the 6 3/8" d pendulus weighted dial in its 8" d gimbal. The 5 1/4" long alidade has 3 1/2" h folding sight vanes including a solar mirror. Construction is in brass in bright lacquered, black, and nickel plated finishes. There is hardware for fixed mounting of the case. Very fine overall condition. The makers of this instrument are best known for their superb modern micrometer sextants.

(16 lbs, UP, PS)

\$ 225

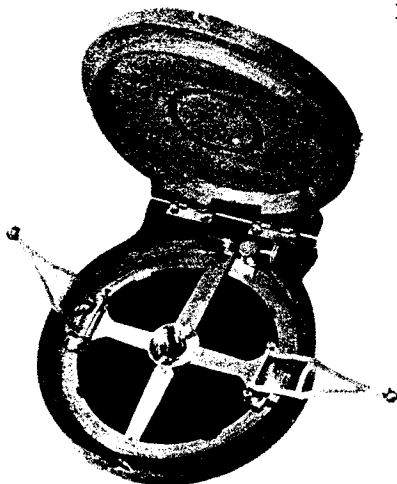
replacement and the compass card shows some salt water burning; otherwise overall condition is very fine.

(4 lbs, UP, PS)

\$ 110



187. FINE LITTLE SMALL BOAT COMPASS - English, 2nd half 19th c, unsigned. Bright lacquered spun brass compass bowl 2 1/2" d, with 2 1/4" compass card, suspended in 3" d brass gimbal ring to 4" sq x 3" h hand dovetailed dark oak box. The bottom of the box seems to be a later replacement. The makers of this instrument are best known for their superb modern micrometer sextants.
188. EXCEPTIONAL, CASED MARKING PROTRACTOR - English, 1841-45, signed "Abraham & Dancer, Manchester". Bright brass, original lacquer finish, circular protractor 6 1/16" d, pivoting marking arms 3 5/8" long each. There is a clamping tangent screw for fine motion and a vernier at each marking arm which reads to 1 arcmin. Except for some darkening of the lacquer and wear on the protractor scale, overall condition is very fine. The oddly shaped mahogany case is 7 1/8" x 6 7/8" x 1 3/8" h. It is in very good condition with an age crack across the bottom and is missing 2 of the 3 original closure hooks.

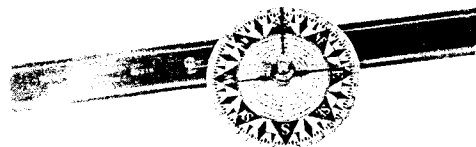


John Benjamin Dancer is best known for his original microscope designs, his invention of the microphotograph (see the microscope section of this catalog) and his other original work during the early days of photography. His partnership (1841) with Abraham Abraham, a Liverpool optician enabled him to establish his own reputation so that by 1845 he had his own firm at the same address, 43, Cross St., King St., Manchester. An example of his earliest microscope was listed by us as Item 85 of Catalog 121. Because of the short period of the partnership (only 4 years), very few instruments with the joint signature are known.

(5 lbs UP)

\$ 445

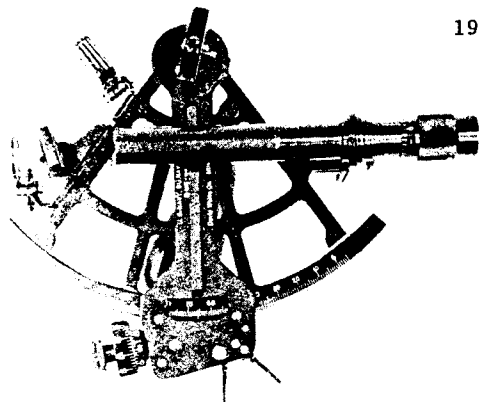
189. COURSE FINDER AND CONVERTER - American (?), signed "C. A. POTTER", serial no. "B0918", with the following patent dates: U.S.A. - Aug. 25, 1914; Canada - Dec. 15, 1914; Gt. Brit. - July 28, 1914. Nickel plated brass rule, 30" long x 1 1/2" w (only part illustrated) upon which slides a 4 1/2" d compass rose disc. This disc has 3 sets of concentric rotating pointers. 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. Thus we have assumed that this invention is of American origin although we have no biographical data on Mr. Potter.

(7 lbs, UP, PS)

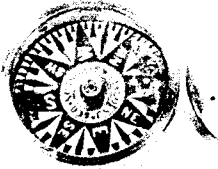
\$ 135



190. U. S. NAVY MICROMETER SEXTANT - American, marked "U.S. NAVY. BU. NAV. MARK II No. 3321-1941" and signed "David White Co. Milwaukee, Wis.". Black finish brass frame of 6 1/4" rad, original 8 3/4" long telescope, sets of 3 horizon glass and 4 index mirror filters, micrometer readout drum divided in minute increments with .1 min (6 arcsec) vernier. Wooden carrying case, later repainted, 11 1/4" sq x 5 1/2" h in good condition, made for this model sextant but not original to the one here. The sextant has seen use but has been well maintained and is in fine condition. There are no replacement mirrors. This early WWII instrument, although certainly not an antique, is a fine example of the last major advance in sextant design; the replacement of the vernier system by the micrometer.

(14 lbs UP)

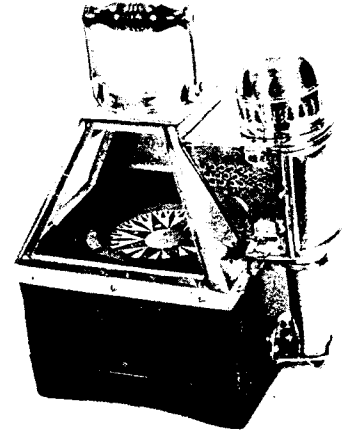
\$ 475



191. BRASS CASED LIFE BOAT COMPASS - American, between 1858 and 1883, signed F. W. LINCOLN JR. & CO/BOSTON". Bright brass case, restored lacquer finish, 3" d x 1 3/8" h (cover on), 2 3/4" d compass card. Generally fine condition, some dents, rust stains at the north and south ends of the compass card. Frederick W. Lincoln (1817-98) was a grandson of Paul Revere and mayor of Boston during the Civil War. In 1858, one of his apprentices, Charles C. Hutchinson, became his partner and the firm became "F & Co.". In 1883 Hutchinson became sole owner and changed the firm's name to his own

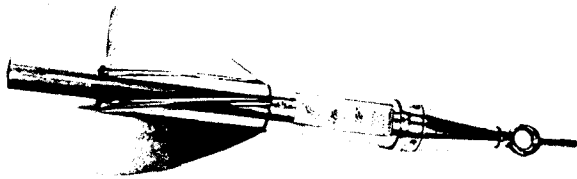
(3 lbs, UP, PS) \$ 135

192. PYRAMIDAL HOOD BINNACLE - English, late 19th c (?), signed "E. DENT & CO. LONDON" and "PATENT/No. 49419". Mahogany lower case 8 5/8" sq with front door 8 5/8" w x 4 1/4" h upon which sets a brass truncated pyramid, with a 3" d window on top (with brass protective cover) and a folding handle; 15" h overall. A brass light housing, for an automatic feeding candle, can slide onto either side and a dark slide is included to cover either side window. It stows within the mahogany case or on the rear of the brass hood. The original gimballed fluid-floated compass has an outside dia of 6" and can be locked into position by the same method used for chronometers. The binnacle and compass are in very fine overall condition, the lacquered finish on all the brass parts is a modern restoration. It appears complete except for a knob on the door of the lower case.



Edward John Dent (1790-1853), a good watch and clock maker formed a 10 year partnership with John Roger Arnold from 1830-40. After his death the firm was E. Dent & Co. (according to Brewington) and, according to our own researches, was in business at least through 1913. We have been unable to find a patent relating to such a binnacle in our records. Through 1915 patent numbers began anew each year. In no year can we find a navigational instrument patent above 30,--- and in 1916 the system was changed so that all patents followed in sequence from 100,001 without consideration of date of issue. Thus 49,419 should not be a patent number but certainly can not be a conventional serial number either.

(35 lbs UP) \$ 495



193. "T. WALKER'S/PATENT/HARPOON/SHIP LOG/A. 2./LONDON" - English, c. 1875, and so signed. Bright lacquered brass 19 3/4" long, 4-blade propeller, white enamel triple readout dial plate 1" w x 3 1/2" long. A cylindrical cover can be rotated over the dial. Generally fine to very fine condition with restored finish and showing deep saltwater etching in places.

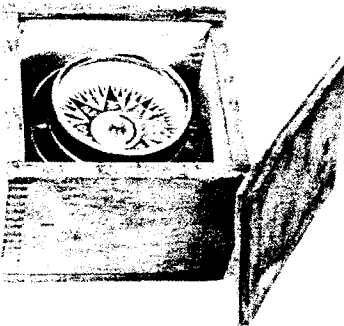
Thomas Walker (1805-73) started making logs and sounders under the Massey patents about 1850 (Edward Massey was his uncle). In 1861 a son, Thomas Ferdinand joined the father as Thomas Walker & Son and in the same year patented the original "Harpoon" log. In 1863, a new model, the "A 1" was produced to be followed by the "A 2" in 1866.

(8 lbs UP) \$ 275

194. FISH SKIN CASED COMPREHENSIVE SET OF DRAWING INSTRUMENTS - English, c. 1800, unsigned. Pocket case 3" w x 1 3/8" thk x 6 3/4" long, complete with 11 separate items including 6" ivory rule and sector, 6" ebony parallel rule, brass protractor, and brass large dividers, large pen, large compass, pencil and pen arms which interchange with its divider leg, small ink compass, and pencil holder. Very fine overall condition. Such a set would have been owned by a ship's captain and used by him for his navigational work. This is about the largest pocket set we have had yet.

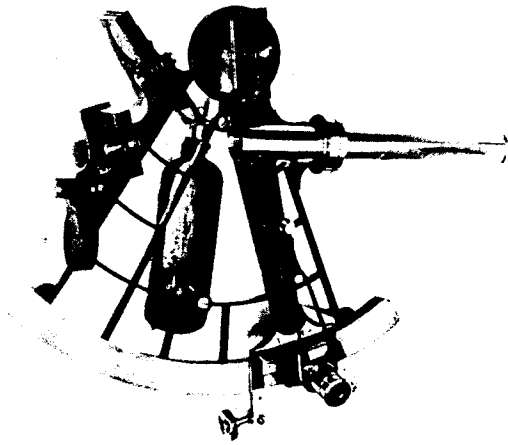


(3 lbs UP) \$ 395



195. SMALL BOAT COMPASS - American, c. 1900 (?), signed "E. D. Durkee & Co./New York". Bright lacquered spun brass compass bowl 3" d, with 2 3/4" compass card, suspended in 4" d brass gimbal to 5" sq x 4" h pine box with sliding cover. Generally very fine condition except that some one has inked out the maker's name. We can find no reference to the maker in our books.

(4 lbs, UP, PS) \$ 65



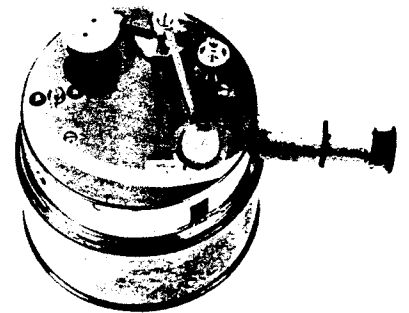
196. SUPERB VERNIER SEXTANT - English, WWI, signed "Heath & Co. LTD. Crayford, London", with a calibration chart dated 18 Dec. 1917 within the case cover. Brass construction with black oxidized frame, index arm, mirror and filter mountings, and bright lacquered telescopes and various fittings. The inlet silver scale of  $7 \frac{3}{8}$ " radius is read out by vernier to 10 arcsecs. There are sets of 3 horizon glass and 4 index mirror filters, a swing-away scale readout magnifier, a  $7 \frac{1}{4}$ " long telescope, and a wide field short telescope, but missing the original shade tube and hand magnifier. Original mahogany case  $11 \frac{1}{4}$ " x  $10$ " x  $5 \frac{1}{8}$ " h in fine condition. The sextant is in exceptionally fine restored (surface finishes) condition.

Brewington notes that Heath & Co Ltd state in a 1910 catalog that the firm was established in 1845. Their modern day trade mark is "Hezzanith". This sextant is a fine example of a high quality early 20th century instrument made when English instrument making was still the best in the world.

(14 lbs UP)

\$ 655

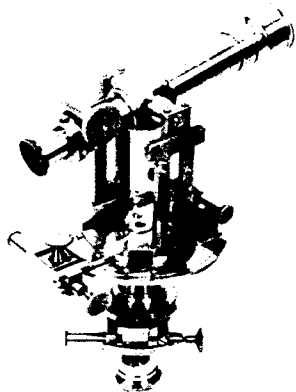
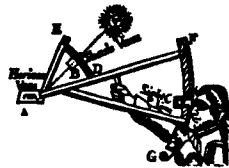
197. TELESCOPE MODEL BOX SEXTANT - English, c. 1900, signed "J. H. Steward Ltd., London/3349". Black oxidized brass construction with inlet silver 1 arcmin vernier and  $1 \frac{7}{8}$ " radius readout scales, bright lacquered brass knobs, swing-away scale magnifier; 3" overall dia and  $1 \frac{5}{8}$ " h with the cover in place which, when unscrewed and screwed onto the other side, acts as a handle. The sighting telescope extends up to  $2 \frac{1}{2}$ ". There are also 2 pop-out filters and a sliding shutter with peep hole which may be used in place of the telescope. Some wear to the cover but, overall condition still very fine plus. Remains of original leather case in so-so condition.



These pocket or box sextants seem to have been a late 18th century invention, possibly by W. & S. Jones. (P. 44 of Wheatland shows one by W. & S. Jones purchased by Harvard in 1797.) They were made throughout the 19th and into the 20th centuries. They were used both for navigation and surveying (on difficult expeditions). A very similar example was offered by us as Item 223 of Catalog 121. J. H. Steward was established in 1856 and made mathematical instruments and sold microscopes. (See Fig. 100 of Billings.)

(4 lbs UP)

\$ 425



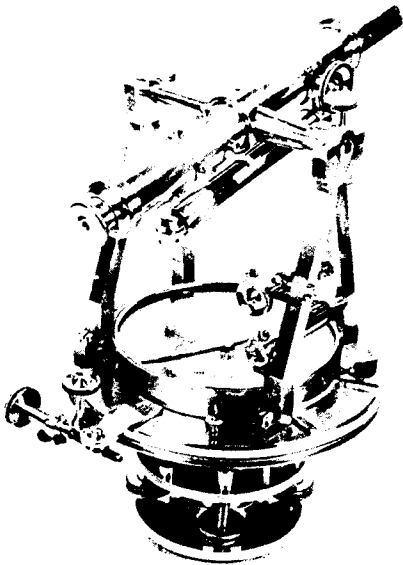
198. EXTRAORDINARY SEMI-MINIATURE THEODOLITE - French, possibly late 19th c, signed "H. Morin 11, rue Dulong/ Ateliers H. Morin & Gensse/à Paris". Constructed all in German silver, it stands 9" h including mounting post socket, the rack focussing telescope is  $6 \frac{1}{2}$ " long, and the azimuth table 4" d. The  $3 \frac{1}{4}$ " d azimuth scale reads out by opposing verniers to 1 arcmin. There are two (cascaded) azimuth tangent screw systems but only one bubble level. We have been unable to determine the purpose of the small rectangular box on the right hand trunnion which seems to consist of a small lens for viewing a vertical line with a ground-glass disc behind it. The original walnut case  $7 \frac{3}{4}$ " x  $10 \frac{1}{2}$ " x  $5 \frac{1}{2}$ " h is in good condition although heavily wormed. The theodolite is excellent - like new.

Item 266 of Catalog 115 was a larger and much more involved instrument by the same maker, possibly of later origin, but incorporating the same type of tangent screw systems. The example here is certainly not a simplified builder's instrument showing far too high a level of workmanship and accuracy of readout, and yet it is a design of the utmost simplicity. We suspect that it may have been intended for use by an explorer in one of the remote regions of the world where accuracy had to be coupled with reliability, and both achieved under strict weight and size limitations.

(12 lbs UP)

\$ 995

PLEASE REFER TO "TERMS OF SALE" BEFORE ORDERING



199. RARE NEW YORK TRANSIT - American, c. 1850, signed "E. Brown & Son. New York". Bright brass, restored lacquer finish, 11 5/8" h including 4-screw leveling base, 7 3/4" d azimuth table fitted with 5 1/2" d silvered dial compass (4 3/4" needle), opposing 1 arcmin verniers, and 3 5/8" long orthogonal bubble levels. The rack and pinion focussing telescope is 9 5/8" long and fitted with a 5 1/8" long bubble level. A few small screws are modern replacements, the windows over the verniers are not original and the cross hairs are defective. General very fine display condition. Found with a case, 11 1/8" x 9 1/8" x 13 5/8" h, with a Gurley trade card, which fits but may or may not be original, and is in very good plus condition.

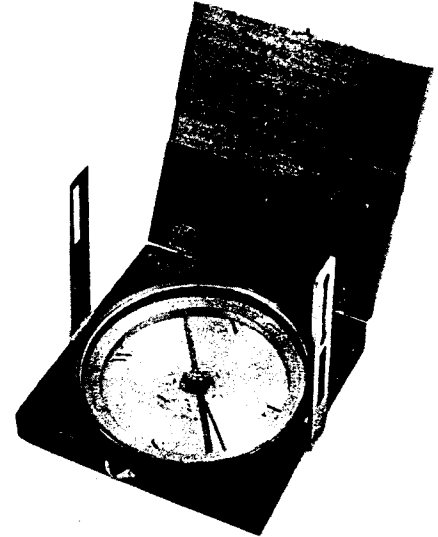
Edmund Brown (1800-67) was listed as an instrument maker from 1821-33, and as a member of the firm Brown & Hunt starting in 1834/35. The partnership lasted only until 1837. In 1841 the firm became Brown & Son, going out of business when Bush G. Brown died in 1863. It seems that Edmund Brown apprenticed to Richard Patten in 1815 and remained in his employ for about 20 years, which, if correct, means that his first independent work started with the Hunt partnership. Relatively few instruments by this maker seem to have survived and this is the only transit known to us.

(35 lbs UP)

\$ 845

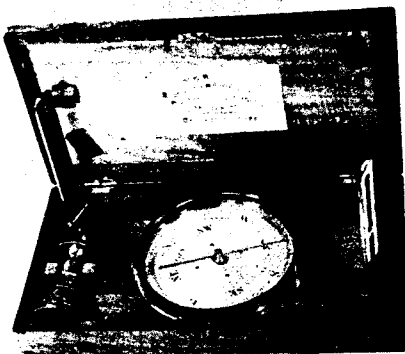
200. EARLY SURVEYOR'S FOLDING COMPASS - English, c. 1760-70, signed "COLE Maker Fleet Street LONDON". Mahogany body and hinged cover 5 3/4" sq x 1 1/8" thk (closed), 5" d inlet compass with silvered dial and 4" compass needle and bright lacquered brass 4 1/4" h folding sight vanes. Very fine overall condition, the finish on the sight vanes has been restored, otherwise the instrument is complete and original.

The second Benjamin Cole (1695-1755) was a noted maker and several exceptional signed instruments by him still survive. In 1748 he succeeded to the business of the famous orrery maker, Thomas Wright, located at "The Orrery", 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 Goodison places them in the period 1751-66, although one would think that 1755 would be a more logical end date. John Troughton acquired the firm in 1782. In our opinion, "Cole, Fleet, St." is the signature of the 3rd Benj. Cole and would have been used between 1755 and 82. Thus we have here one of the longest existing continuous firms of instrument makers in the history of the world, stretching from the late 17th century well into the 20th: beginning with John Rowley (about 1698), Thomas Wright, Benjamin Cole (2nd), Cole & Son, Benjamin Cole (3rd), John, then John and Joseph, then John and Edward, and then Edward Troughton, Troughton and Simms (1826), Cooke, Troughton, & Simms (1922), finally to become part of Vickers.



(5 lbs UP)

\$ 755



201. FOLDING SIGHT VANE SURVEYOR'S COMPASS - English, 2nd half 19th c, signed "T. B. Winter Newcastle" no. "201". Bright brass, original lacquer finish, 5 3/4" d compass housing on 12" long base, folding vanes 6" h, overall ht 10 1/4" when mounted on original ball and socket joint. The silvered compass dial is graduated by degrees along its edge; 4 3/4" needle. Original hand dovetailed mahogany case, 7 1/8" x 13 1/8" x 2 1/8" h, in very good condition with some age cracks and missing 1 hook. The compass is very fine with slight darkening to the lacquer finish except on the ball and socket joint which has lost most of its original finish.

The trade card within the cover (with illustrations of late 19th c theodolite and sextant) places Winter at 21, Grey St. The Science Museum, London, collection of Trade Cards has one for Winter (no. 451) with an address of 55, Grey St, corner of High Bridge, but without a dating. Our other references do not list

him so we have been unable to determine the date in his career which would correspond to serial no. 201.

(10 lbs UP)



SURVEYING CHAINS



202. FOUR POLE - 100 LINK CHAIN - American, 2nd half 19th c, unsigned. Brass handles marked "4P". Brass tally markers every 10 links except at the center where there is an anti-twist joint. The links are of hot galvanized heavy iron wire .165" thk with each of the long links connected by 3 short oval links. Some age darkening and obvious signs of use, but still very good overall condition.

(15 lbs, UP, PS)

\$ 185

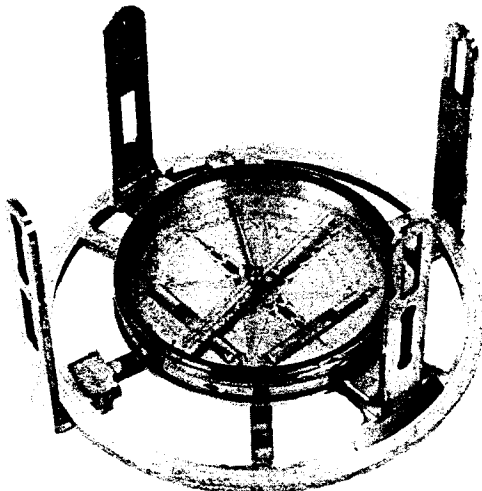
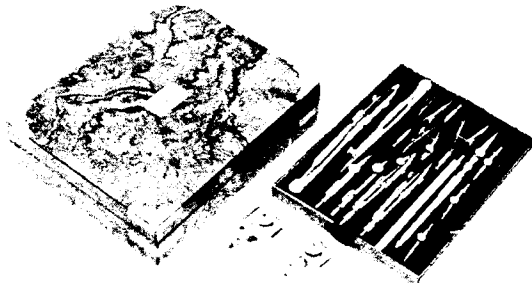
203. "J. M. GRUMMAN PATENT 100 FT STEEL" CHAIN SHORTENED TO 4 POLES - American, 4th qtr 19th c, marked as above and signed "W. & L. E. GURLEY TROY, N. Y.". One foot long out as a 100 ft engineer's chain but at some point 34 links were removed, reducing it to 66 ft, or 4 poles, in length. Generally very good condition. The 1873 Gurley catalog lists these relatively expensive chains noting that they have just purchased the patent rights. Our next earlier catalog (1869) does not list them so that we know that none were made earlier than 1870.

(7 lbs UP)

\$ 135

204. NICELY CASED DRAWING INSTRUMENTS - English, c. 1900, signed "J. A. REYNOLDS & CO. LIMITED BIRMINGHAM". German silver bound burl walnut case 6 1/2" x 8" x 2" thk with lift-out tray containing 14 separate items in German silver and steel (missing only a pencil file and 1 of 2 ruling pens). There are also the fittings for a beam compass, an ivory scale and an ivory rule (the last 2 not shown). Very fine overall condition with most pieces marked by the maker.

(6 lbs, UP, PS) \$ 185



205. SUPERB CIRCUMFERENTOR - English, early 19th c, signed "Bradford Maker. 136/Minories London". Brass, original lacquer finish, silvered compass dial and outer scale of 7 3/4" d, the compass of 5" d, 4" needle, with crossed bubble levels inserted in its face. Inner and outer sight vanes 4" and 4 3/4" h respectively, instrument 5 3/4" h overall. Original dovetailed mahogany case 8 1/2" sq by 3 1/2" h contains original 6" d 360 deg brass protractor as well as circumferentor but appears to be lacking ball and socket joint. Case in very good, instrument in extremely fine condition with outer ring resilvered.

This instrument appears to be the work of the brothers Isaac and John Bradford. Taylor 2 places them at 87 Bell Dock, Wapping 1795-1800, 69 Bell Dock, Wapping 1805-15, and finally at 136 Minories, London 1817-22, the address above. The 4-vane circumferentor is a relatively rare instrument, obviously quite costly to make because of its complexity and the need to achieve accurate alignment of both pairs of vanes. Indeed, it was a design hold-over from earlier times, apparently made and bought for its impressive appearance than a practical need. The graphometre in France and 2-vane compass instruments in England were significantly less complex and could perform the same measurements.

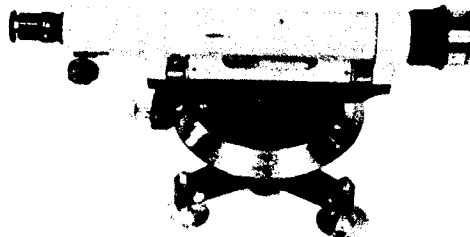
(12 lbs UP)

\$ 1,640

206. CONTINENTAL LEVEL - German, 1st half 20th c, signed "ERTEL-WERKE A. G. MUNCHEN/32209". Brass construction in white and black enamel, nickel plated, and bright lacquered 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 tangent drive thumb screw, a few worn spots on the telescope, and lacking cross hairs. This form of dumpy level could be used on either a tripod or plane table.

(10 lbs, UP, PS)

\$ 165



207. SMALL CASE OF DRAWING INSTRUMENTS - Possibly English, late 19th c, unsigned. Leather covered case 2 1/2" x 7" x 7/8" thk containing 5 instruments in brass and steel. The case shows considerable external wear, but is sound, and the instruments are in very good condition (one screw missing, otherwise the set is complete).

(2 lbs, UP, PS)

\$ 35

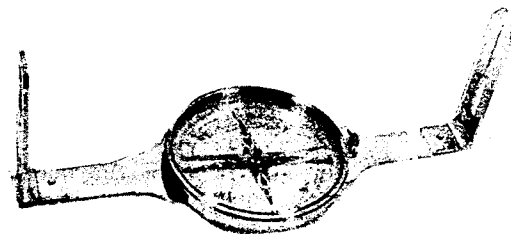


208. RARE COMPLETE SET OF VOLUMETRIC MEASURES - American, early 20th c, each and every piece signed "W. & L. E. GURLEY, TROY, N.Y.". Original wooden case, 8 3/4" x 11" x 6 1/2" h holds the one gill, half pint, pint, and quart lacquered brass flasks, and glass graduate. The separate half gallon and gallon brass flasks are 8" and 10" high, respectively. The case and its contents are in fine to very fine condition with the original finish on the flasks, clean and bright. The two largest flasks, however, seem to have been unprotected and so have lost much of their finish and show some scratches and dents.

About the turn of the century Gurley appears to have tried to diversify their surveying instrument operation by setting up a Standard Weights and Measures department, or division. The portable balance, listed as Item 135 of our Catalog 119, was another example of this effort. However it must have met with but limited success and items such as these are now quite rare.

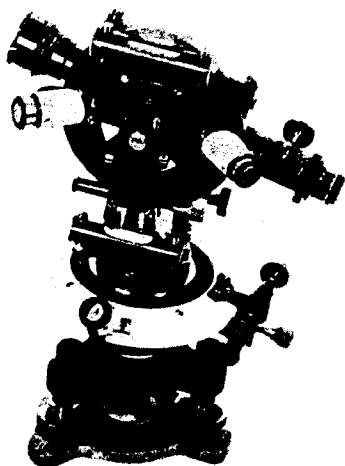
(25 lbs UP) \$ 395

209. EXPORT MARKET SURVEYOR'S COMPASS - English, possibly late 18th c, signed "Proctor, Beilby & Co/LONDON" with the name "JAMES CORNWALL" on the inside of the cover. Bright brass, restored lacquer finish and silvered compass dial, base 15 3/8" long, compass housing 6" d (5" needle), 5 5/8" h screw-on sight vanes, 7" overall ht. Ball joint and socket lacking. Original mahogany case 6 3/4" x 15 1/2" x 2 3/4" h, in about good condition with age cracks and damage to the ends of the case bottom. The compass is very to extremely fine.



The only reference we have to the maker of this instrument is a Culpeper microscope by them sold at auction in London by Sotheby's which they dated as 18th century. Taylor 2 lists several instrument makers named Proctor in Sheffield in the 18th and early 19th c. However, there is no way to connect them with a London Proctor. We find no reference to a Beilby anywhere. The compass itself offers dating problems. The needle is easily mid 19th c. The needle lifter, sight vanes, sight vane screws, and machining details are c. 1800 at the latest. The lack of bubble levels is typical of English instruments made for export to America (maybe that is why we developed such an extensive surveying instrument industry). Since the compass was found here we suspect that it may have been imported when new, also suggesting an earlier, rather than later dating. It is possible that the needle was a mid or late 19th c replacement.

(10 lbs UP) \$ 685

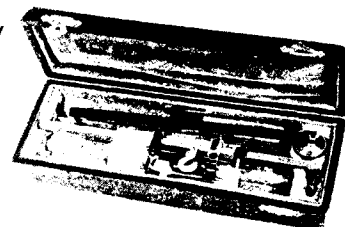


210. SMALL PRECISION THEODOLITE - German, 1st half 20th c, unsigned on the instrument, but the original case with the name plate of "SARTORIUS-WERKE GOTTINGEN", serial no. "4736". Brass construction in black and white enamel finish with screws, knobs, some fittings in bright lacquered brass, 10 1/4" overall ht including 3-screw leveling base. The azimuth table is 4 1/2" d with beveled circle reading out by opposing verniers to 1/2 arcmin. The beveled vertical circle readout by opposing verniers is to 1 arcmin. There are individual magnifiers for each vernier. The telescope, with elaborate reticle grid, is 7 1/4" long, and fitted with a 3 1/2" bubble. The main structure has a circular bubble level in the center and a longitudinal 2 1/2" bubble level. A 2 1/2" precision bubble level is mounted on the frame of the vertical circle which has a fine tangent screw. There are also horizontal and vertical tangent screws which act on the telescope. The original hand dovetailed pine case, 9" sq x 14 3/8" h is in fine condition. The transit in its original (and typical for its period and origin) finish, is in extremely fine condition.

(25 lbs UP) \$ 825

211. CASED INTEGRATING "ANVIL" PLANIMETER - German, early 20th c, signed "K. & E. Co./GERMANY" and model no. "4240 1/2". The 4" x 10" x 1 3/4" h cloth covered case

contains the complete instrument and its calibration chart. The case is in sound condition but shows external wear. The planimeter is in very good, operating condition but has not been checked for performance. Keuffel & Esser's 1921 catalog illustrates the model 4240 version of this instrument on p. 256 and notes that it is a compensating design capable of a much greater range than the usual planimeter.



(4 lbs, UP, PS) \$ 75

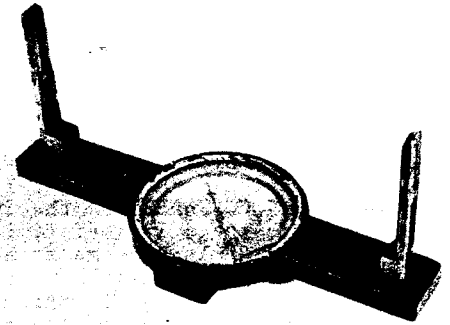


212. THE T-12 COMPACT EXPLORER'S POCKET THEODOLITE - Swiss, mid 20th c, signed "WILD/HEER BRUGG/SWITZERLAND/No. 30727". The 2 9/16" d x 7" h instrument fits into its original 2 3/4" d x 7 3/4" h stowage case resulting in about the most compact precision theodolite ever made. After leveling with its 3-screw base, both vertical and horizontal angles may be measured. The azimuth circle is graduated in 10 minute increments and may be read to about 1/4 of this, or 2 1/2 minutes. Vertical angles in a range of ± 30 degrees about the horizontal may be read to the same accuracy. The instrument is in very fine physical and operational condition although it has not been checked for accuracy. Formerly the property of the American Geographical Society of New York. It appears to have been discontinued before 1956 and cost over \$ 500 at that time. We are led to believe that a present day Kern equivalent costs 7 times as much.

(7 lbs UP)

\$ 495

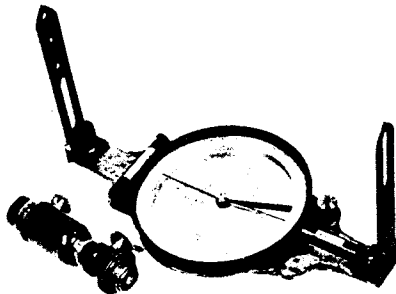
213. EXTREMELY RARE ANGLO-AMERICAN WOODEN SURVEYOR'S COMPASS - 18th c, engraved compass card signed "MADE BY G. ADAMS IN FLEET STREET, LONDON". Mahogany body with center section 5 5/8" d; 2" w x 3/4" thk arms extending to both sides for overall length of 14 3/8", slip-in sight vanes 5 1/2" h giving overall ht of 7 1/4". The compass well with early, probably original, glass cover contains a brass ring of 4 7/8" OD divided to degrees, an engraved paper compass card of 4 1/4" d and a 4 1/8" long compass needle. The mounting bar on the bottom has its original wooden thumb screw. One sight vane (on the right in the picture) has very old white paint on the sides and back, possibly for marking elevation sightings. Generally fine condition noting that there is a 2" crack in the glass along one edge, some of the original putty around the glass has chipped off, an age crack in the wooden frame, and one sight vane is probably an early replacement (the two don't match).



The wooden surveyor's compass has often been considered an uniquely American instrument. Yet here is one signed by George Adams of London; the younger instrument maker of this name having died in 1795 and his father in 1772. In our opinion, we do not believe that either of these two made the complete instrument. Rather that the compass card, needle, glass, and (highly unusual) graduated brass ring came from one of their instruments, possibly a globe, which had been damaged beyond repair and converted in America to its present form. It is difficult to equate the sophisticated workmanship of the interior of the compass with the remainder of the item, which while of good quality (typical of the better American wood instruments) is not what we would expect from the Instrument Maker to George III.

(6 lbs UP)

\$ 645

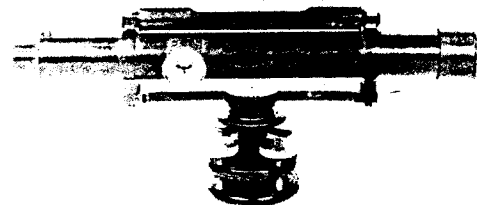


214. BOSTON SURVEYOR'S COMPASS WITH TRIPOD - American, 4th qtr 19th c, signed "J. E. Moody, BOSTON". Brass construction with the 10" long base plate and some fittings in original bright lacquer finish, the 5 1/4" h folding sight vanes, 4 7/8" d compass housing, bubble levels and ball and socket joint black oxidized. The compass has a silvered outer ring, bright lacquered brass face, and 3 7/8" needle. The original hand dovetailed mahogany case, 5 3/4" x 10 3/4" x 2 3/4" h is in very good condition with 1 age crack and without its lock. The original tripod with 55 1/2" mahogany legs is in fine condition and the compass very fine except for some dark spotting of the exposed portion of the base plate.

James E. Moody (1848-1913) was born and died in Milford, N.H. His first listing as an instrument maker in Boston was 1872 and it is known that he first worked for John H. Temple. When Temple died in 1877, Moody assembled and sold his uncompleted instruments, but it is not clear as to whether Moody was working for Temple just before his death. Moody retired to New Hampshire in 1909.

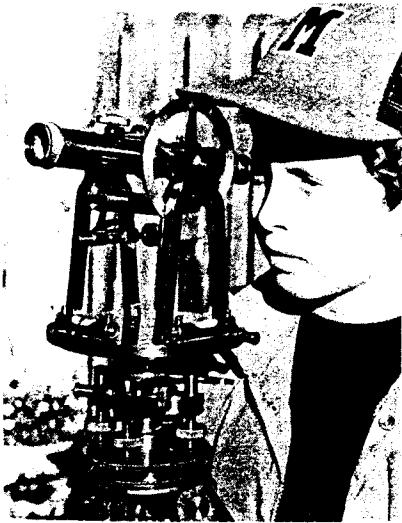
(2 UP packages, 10 lbs & 8 lbs) \$ 670

215. THE ENGLISH DUMPY LEVEL - 4th qtr 19th c, signed "Stanley, Gt. Turnstile, Holborn, London./345". Black oxidized finished brass 12" long, 5 1/4" h including 4-screw leveling base, 5 1/2" long bubble level, rack and pinion focussing eye-piece. Original dovetailed mahogany case 13" long, 4" w, 6 1/2" h. Case in fine, level in excellent condition. This form of English Dumpy level seems to have been one of the basic designs used by Stanley since we find it in various sizes, both smaller and larger. This one is a fine example of English instrument making of the period.



(12 lbs, UP, PS) \$ 235

When ordering, Please remember to add insurance charges to shipping costs.



216. THE "STERLING" TRANSIT - American, c. 1916, signed "WARREN-KNIGHT CO. PHILA. U.S.A.", serial no. "955". Brass construction, primarily in black oxidized finish with bright lacquered brass fittings, knobs, screws, etc. with 6 1/8" d azimuth table, 8 5/8" long rack focussing telescope with 4 1/2" long bubble level, standing 11 1/2" h (top of vertical circle) including 4-screw leveling base. Needle-less model with crossed bubble levels azimuth readout by single vernier to 1 arcmin and elevation readout on 3 3/4" d circle by single vernier to 5 arcmin. Also includes sunshade and plumb bob. Very fine plus condition with original finish throughout. Original mahogany stowage case, 7 3/4" x 10 3/4" x 13" h, in very good condition. Original tripod, with 56" oak legs, in very good plus condition.

The Warren-Knight Co. was founded in 1912 (and is still in business) by J. Henry Warren (1877-1961) and Henry R. Knight (1874-1945). Smart states that their transit no. 1606 was made in 1919, upon which we arrive at the above dating for this instrument.

(2 UP packages, 25 lbs & 12 lbs)

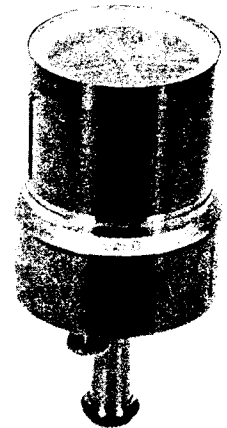
\$ 695

217. IMPROVED SURVEYOR'S CROSS FOR THE RUSSIAN MARKET - Possibly French, late 19th c, unsigned. All brass in blue-black oxidized finish with bright lacquered brass fittings, silvered compass, 8" h and lower sighting cylinder 4" d. Sighting slits 90 deg apart on upper rotating cylinder and 180 deg on lower fixed cylinder. Azimuth readout by vernier to 2 arcmin. Original walnut case 4 3/4" sq x 8 3/4". Case in very good, instrument in almost mint condition.

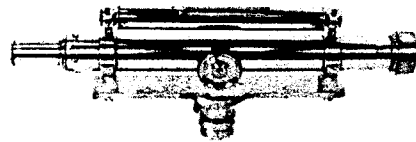
The original version of this instrument was developed by William Jones of W. & S. Jones about 1800. It too had a beveled readout scale which was soon replaced by one directly on the cylinder body, reducing the cost of fabrication. This is the only late 19th century example of this form of instrument we have had which returns to the beveled scale. The Cyrillic lettering on the compass dial suggests that it was intended for use in Russia.

(8 lbs, UP, PS)

\$ 285



218. FINE LITTLE DUMPY LEVEL - English, 1st qtr 19th c, signed "John King Maker Clare Street Bristol No. 603" and in the same script, the name of the owner "J. Stone Summer Hill Academy". Bright brass with restored lacquer finish, telescope 10 1/2" long (min) extending by draw eyepiece and rack focussing objective to 12 1/2", 5 3/4" level bubble, 7 1/4" long base, 4" ht overall. Extremely fine restored condition. No case.



Goodison lists J. King in Bristol in 1822 and in partnership with a son (J. King & Son) by 1830. Later in the first half of the 19th century there were other maker(s) in Bristol with the name King (see p. 21 of Catalog 117), all of whom may have been members of the same family. A surveyor by the name of John Stone is known to have worked between 1778 and 1813 in the vicinity of Upton-On-Severn which is not too far from Bristol.

(5 lbs UP, PS)

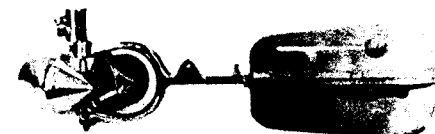
\$ 295

219. EXCEPTIONAL BUBBLE LEVEL - English, c. 1825, signed "Thomas Jones Charing Cross, London" with a later government inventory no. "3888" which is also marked on the case with a "W. D." under the Admiralty arrow. Bright brass with original lacquer finish, 18 1/8" long, 1 1/8" w, with 3 1/4" h fixed sight vanes at either end. Generally very fine condition with a few dark spots. Original hand dovetailed painted pine case 19 1/2" long x 2 1/2" w x 4" h in sound condition but with somewhat worn surfaces.

Thomas Jones (1775-1852) worked for Jesse Ramsden until the latter's death in 1800. Then, like Benj. Stancliffe, he set up his own firm which, according to Goodison, remained in business until 1850 (at 62 Charing Cross Rd from 1816-50). His work was of typical "Ramsden" quality and so recognized during his own lifetime. He was elected a Fellow of the Royal Society in 1835. This level may have been intended for setting up machinery but what purpose it served for the War Department, we do not know.

(12 lbs UP)

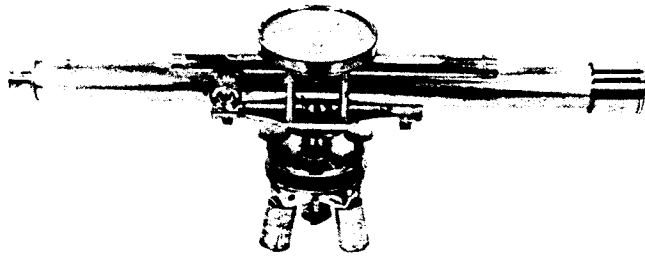
\$ 365



220. GURLEY ELECTRICAL READOUT CURRENT METER, - American, early 20th c, unsigned. Constructed of German silver and nickel plated brass, 15 3/4" long overall with 7" long vanes and water wheel consisting of 6 conical buckets with 2" d bases. Very fine overall condition. No case. A suspension rod and electrical register would complete the system. The 1921 Gurley catalog illustrates a current meter which varies from the one here only in minor details (see Fig. 108) and describes its use to measure water flow.

(6 lbs, UP, PS)

\$ 65



221. TROUGHTON'S "IMPROVED LEVEL" - English, c. 1820, signed "Troughton London". Bright lacquered brass, the telescope 20 3/4" long with an 1 1/2" bubble level, achromatic objective of 1 5/8" aperture, and 4 1/4" d compass (3 1/2" needle) mounted above on 4 turned tapered columns. The 4-screw leveling base includes the sockets for tripod legs resulting in an 8 5/8" overall ht. Interchangeable eye-pieces for direct and right angle viewing. Generally very fine condition except in that the cross hairs seem to be poor replacements, the teeth at the extreme end of the focussing

rack are worn, and some of the original finish (about 10%) has been rubbed off or worn thin. The original hand dovetailed mahogany case, 5 1/4" w x 26 1/4" long x 5" h, is in almost fine condition with a few age cracks. No tripod legs are present but it would not be difficult to make up new ones from hickory rods if needed for display purposes.

According to Rees' article on Levels (written c. 1816) this improved level was invented "recently" by Edward Troughton. It is illustrated in Surveying plate V which is dated 1817. Thus we suspect that the original design dates from between 1805 and 15. The one here could not be later than 1826 because this is when Troughton took in William Simms as his partner and the firm became Troughton & Simms. Later, shorter, versions by Troughton & Simms were listed by us as Item 133 of Catalog 104 (15") and Item 144 of Catalog 105 (14"). The latter has the same type tripod leg sockets as this one. This model replaced Troughton's 18th century design, an example of which was listed as Item 129 of Catalog 113 (it was 21" long). The Rees' article compares this instrument with the last form of level made by Jesse Ramsden and states that Troughton's is the better of the two.

(22 lbs UP)

\$ 1,355

222. FULL CIRCLE PROTRACTOR - American, c. 1800, possibly 18th c, unsigned. Bright brass, restored lacquer finish, 10" d, divided by degrees and numbered every 10 degrees. There is considerable variation in the thickness of the hand beaten and worked brass. The numbered scale shows signs of having been re-engraved in places to correct for errors of initial division. Further, the back of the protractor is also engraved with an inaccurately graduated scale. Very fine overall condition in terms of the original.

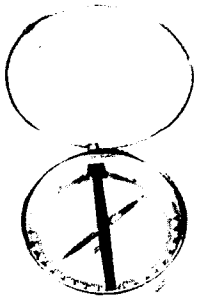


This is the work of someone without a proper dividing machine, possibly using an existing protractor as reference. It is also obvious that brass was in great shortage and quite valuable at the time it was made. Otherwise it would not have been turned over for another try after the errors on the first side. The second side was also in error and had to have some of the engravings worked out and redone. These factors point to its fabrication either during the colonial period of only shortly after the Revolution.

(4 lbs, UP, PS)

\$ 195

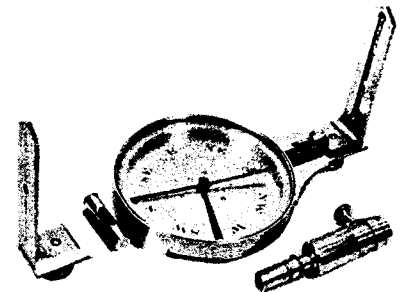
223. MINER'S DIPPING NEEDLE - English, c. 1900, signed "SHORT & MASON/LONDON/"Tycos". Bright lacquered brass case 3 3/8" d with 4 1/8" d folding loop handle. The 2 1/2" compass needle is suspended in a 2-degree of freedom yoke and reads off on a silvered scale graduate from 0° through 90° to 0°. Original cloth covered case 4 5/8" sq x 1 1/2" thk in sound condition with some external edge wear. The instrument is extremely fine. These were intended for tracing veins of iron ore which would cause variations in the local magnetic field. The unusual suspension yoke prevented binding of the pivot axis due to improper north-south alignment.



(3 lbs, UP, PS)

\$ 140

224. FINE NEW YORK SURVEYOR'S COMPASS - American, 3rd qtr 19th c, signed "J. Prentice, 66, Nassau St. N.Y.". Bright brass with restored lacquer finish, silvered compass dial, base 10" long, compass housing 4 3/4" d (needle 4"), screw-on sight vanes 4 1/4" h yielding an overall ht of 5 5/8" not including the 3 7/8" long ball joint and socket.



The orthogonal bubbles are 1 1/2" and 1 3/4" long. Original hand dovetailed mahogany case 6" x 10 1/2" x 2 1/2" h in fine condition with a repair to one end. The instrument is in extremely fine condition.

James Prentice (1812-88) was born in England where he served a 7 year apprenticeship to John Beal of London. He came to the United States in 1842 and established (or at least first listed his instrument making business in 1846. The firm became " & Son" in 1883, incorporated in 1897, and dissolved in 1924. His son, Dr. Charles F. Prentice was the first president (1896) of the Optical Society of New York.

(9 lbs UP)

\$ 675



225. CASED SURVEYOR'S SMALL POCKET COMPASS - French, for the English speaking market, late 19th c, unsigned. Bright lacquered brass compass 3" d with 2 1/8" h black oxidized folding sight vanes and silvered dial. A flat base on one side combined with a pendulous pointer within the compass dial enables the instrument to be used as a clinometer as well. Also included is the 2 3/4" h staff mount. Original mahogany case, 3 7/8" x 4 7/8" x 1 3/8" thk, in fine condition. The compass is in very fine condition with its original finish; a chip in the edge of the compass glass being its only defect.

(3 lbs, UP, PS) \$ 165

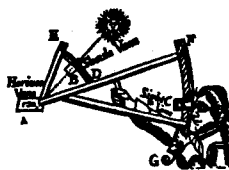
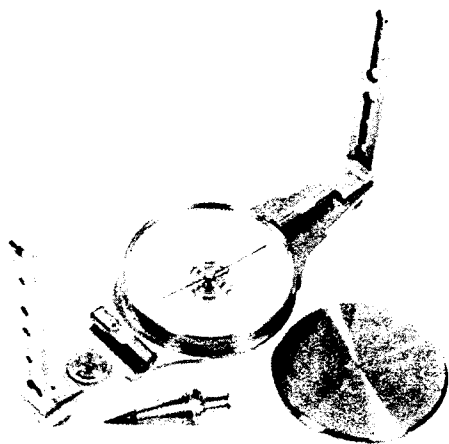
226. FACTORY REFINISHED SURVEYOR'S COMPASS WITH TRIPOD - American, c. 1900?, signed "W. & L. E. Gurley, Troy, N.Y.". Bright lacquered brass, 4 7/8" d compass housing (with cover) on 12 1/2" long base plate, bubble levels, counter, and 6 7/8" h screw-on sight vanes.

Silvered compass dial graduated by half degrees; 4" needle. Exceptional condition. Original mahogany case, 6 5/8" x 13 3/4" x 4 1/4" h, with plumb-bob, in fine condition, except for age cracks, contains Gurley trade card with notation "REFINISHED". The ball and socket joint is fitted to the original tripod (52" mahogany legs) which is in almost fine condition, lacking one of its brass and steel leg ends.

Gurley compasses are difficult to date since they are un-numbered and did not change in design over many years. Identical illustrations of instruments are found in their 1862 and 1921 catalogs. We do not even know when this compass was restored to new condition, although subsequent aging points to a date quite a while ago. This is a very nice outfit by one of America's leading makers of surveying instruments.

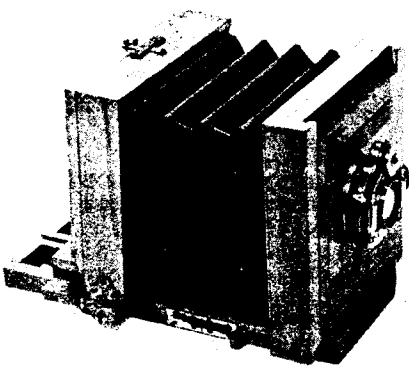
(2 UP packages, 15 lbs & 11 lbs)

\$ 745



227. 4" x 5" PLATE VIEW CAMERA - American, late 19th c, the Unicom shutter signed "ROCHESTER CAMERA CO.". The serial no. "376" is found in 4 locations. This square bellows camera is 6 1/4" w x 7" h x 10 1/2" deep with the folding bed locked in place. The front and back frames and bed are of a light mahogany. Original pine stowage case 5 3/4" x 8" x 8 1/2" h, is in poor condition. The camera is very fine, lacking only the locking nut for the rising front panel. The bed locking plates are marked "PATENTED OCTOBER 20, 1885", but this may not apply to the rest of the camera. We have been unable to identify the maker and how they were related, if at all, to either Rochester Camera & Supply or Rochester Optical & Camera. The design is typical of American view cameras of the 1880 and 90 period.

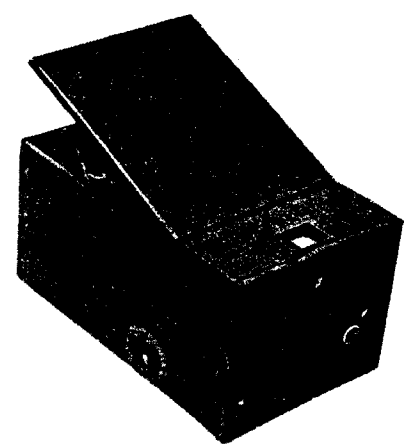
(10 lbs, UP, PS) \$ 210

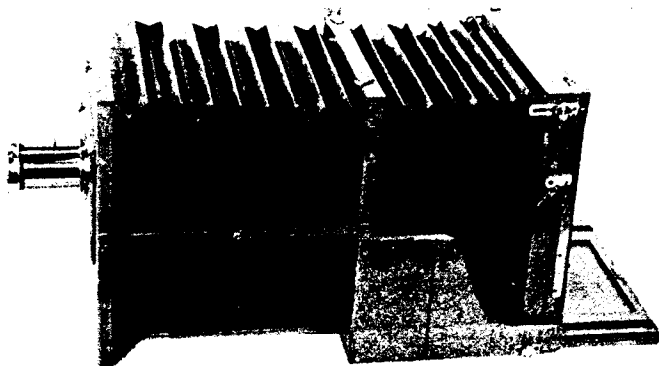


228. AMERICAN PLATE CHANGING DETECTIVE CAMERA - Name plate reads "VIVE No. 4/VIVE CAMERA COMPANY/CHICAGO. U.S.A./PATENTS DEC 14, 1897". Black leatherette covered box 5 3/4" w x 9 1/4" long x 5" h, multiple aperture lens with single speed shutter, focussing by internal movement of plate magazine. One 4" x 5" metal plate holder (of original 12?). Some tears in changing sleeve. Fine to very fine overall condition and in working order.

Figure 1113 of the Auer Collection catalog shows the somewhat smaller, and simpler, VIVE No. 1. Several ads for various models of the VIVE are to be found on pgs. 182-4 of A-to-Z. These ads for 1899 and 1900 emphasize the mechanical plate changing models whereas the example here requires that the photographer reach in and move each plate by hand. We suspect that this did not really work very well and that the No. 4 had a very short life.

(7 lbs, UP, PS) \$ 135





229. EXTREMELY RARE DOUBLE-EXTENSION SIDE BRACKET TAIL-BOARD CAMERA - English, late 19th c, unsigned, but most likely by Meagher. Constructed of hand dovetailed figured mahogany with lacquered brass fittings, 28" long extended (plus 3 3/4" long lens) x 12" w x 13 1/2" h, 5" thk folded, taking 8" x 10" plates. The f8 lens with iris diaphragm is signed "Smedley & Co./Blackburn/12 x 10 Rapid Rectilinear", and because of plugged holes in the lens board is believed to be an early replacement. Rack and pinion focussing of the tilting back. Three original plate holders. The camera is in extremely fine plus condition; just as elegant as can be.

The major problem with the basic tail-board design is that it does not lend itself to double-extension work. Here, a relatively

unique design overcomes this problem by means of a double front board, the forward section sliding on a base board through the rear frame. Folding and locking brass struts are used to maintain rigidity. The rear of the camera is of normal design and operation. The camera can also be used in a single extension mode with the front board and frame locked together. R. C. Smith in "Antique Cameras", in discussing P. Meagher's invention of the double side bracket camera as an improvement on Captain Shaw's design remarks, "Later Meagher made smaller cameras with a single side wing and he designed a front extension, carrying the iris panel forward on a sliding base. With brass side struts this formed a fairly rigid extension for copying. His design continued until the end of the century, the long screw later being replaced by double rack and pinion focussing."

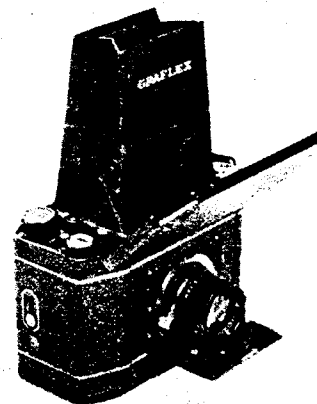
(28 lbs UP)

\$ 485

230. THE "NATIONAL GRAFLEX" SERIES II - American, 1932 copyright date, signed "FOLMER GRAFLEX CORPORATION/ROCHESTER, N.Y., U.S.A.". Single lens reflex camera taking 120 film, covered in black leather, 5 3/8" w x 2 1/2" deep x 3 5/8" h when closed, 7" h with hood open. Focal plane shutter with 8 speeds from 1/30 sec to 1/500 sec. The lens is an f3.5 Bausch & Lomb Tessar. Found with an original close-up copying lens and the original printed instructions. Very fine physical condition and operating, although the shutter hangs up at the lower speed spring tensions and it is probably no longer accurate at any speed. The same model is shown in Fig. 1315 of the Auer Collection Catalogue and is dated c. 1934.

(6 lbs, UP, PS)

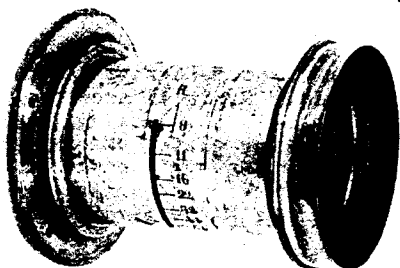
\$ 350



231. LONG FOCUS CAMERA LENS - Possibly American, late 19th c, unsigned. Symmetrical element, probably rapid rectilinear design of 24" back focus, in brass barrel 4" d at lens shade, 5 5/8" long, with 4 3/4" d flange. There is an iris diaphragm with the largest aperture marked "8". Measurements show the lens to be an f11 thus indicating that the markings are in the U. S. stop system. On the back of the flange, there is the pencil notation 15" x 12", which most likely was the working plate size for this lens. Fine overall condition with the original lacquer finish on all the bright brass surfaces.

(7 lbs, UP, PS)

\$ 70

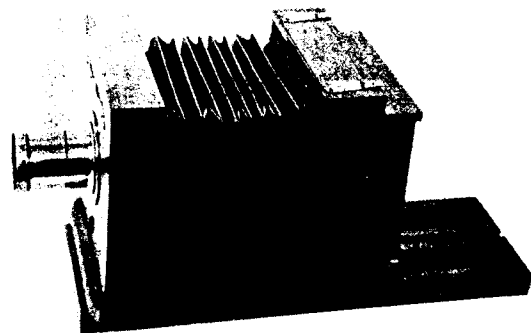


232. RIGID BED STUDIO CAMERA - American, late 19th c, unsigned. Mahogany finish hard pine with machine-cut joints, bed 20 1/2" long, camera 9" x 11" h, square black bellows, and unusual back (designed without tilting motions) takes 5" x 7" plates (1 double plate holder included). The Waterhouse stop lens (no stops however) is in Extra Rapid Symmetrical No. 6 by The Scientific Lens Co. of New York and although not original equipment is of the period of the camera and was found with it. The bright lacquered brass finish of the lens is a modern restoration, all else original, and in fine plus condition.

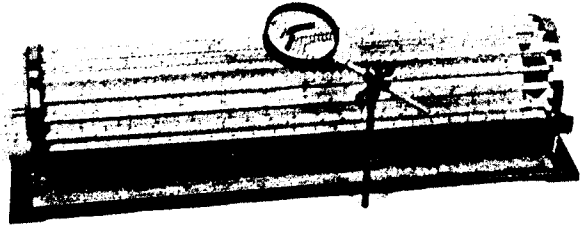
The long non-folding bed of this tailboard camera is convincing evidence that it was not intended to be portable. It is surprising, however, that a camera like this, intended for studio use, would have no lens or back movement (except, of course, slide focussing). We have been unable to locate a similar example in any of the standard references and so can not provide additional background information.

(20 lbs UP)

\$ 260



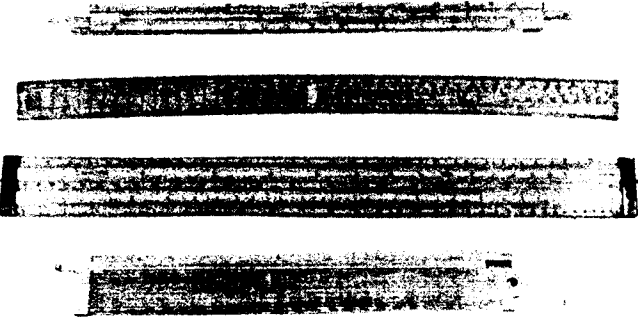
233. MOUNTED MAGNIFIER MODEL (NO. 4013) OF THACHER'S CALCULATING INSTRUMENT - American, c. 1810, marked on the central cylinder "Patented by Edwin Thatcher, C.E. Nov. 1st 1881. Divided by W. F. Stanley, London, 1882. Made by Keuffel & Esser Co., New York." and the base marked with the serial no. "2590". Original instruction book dated 1910. Mahogany base 5 5/8" w x 21 1/2" long. The fixed grid of scale rods is 4 3/4" d x 19 1/4" long with unknurled end rings, and the inner rotating and sliding cylinder is 4" d x 19 1/2" long plus end knobs. The magnifier (modern replacement of lost original) mounts on a fixture which slides along a bar on the front of the instrument. Original mahogany case, 8 3/8" w x 23 7/8" long x 7 1/4" h, is in fine condition with a few age cracks. The calculator is very fine. This is the most impressive of all the "super" slide rules. In 1910 this model cost \$ 45, \$ 10 more than the one without the magnifier, possibly the reason for its greater rarity.



SLIDE RULES

(25 lbs UP)

\$ 675



234. EARLY 4-SIDED, 3 SLIDE GAUGING RULE - English, signed "RIX" and with an early owner's ink signature and date "Josiah Lakin 1766". Boxwood, 1 3/16" x 11/16" x 18" long with a total of 13 scales on the 4 sides, brass insets at points of great use, and tables of constants on the back of two slides. Generally fine to very fine overall condition with a few stains and a splinter on one edge. This slide rule, as were many others, was intended for use in the alcoholic beverage industry; several of the constants refer to Ale, Wine, Malt, Spirits, and Cyder. Taylor 2 lists J. (or I.) Rix (fl 1750-60) in Shrewsbury Court, Cripplegate London and notes that his name has been found on a watch (1750), a clock (1760) and an excise rule. We have found no reference to the owner.

(4 lbs, UP, PS)

\$ 375

235. NAVIGATOR'S GUNTER RULE - English, c. 1800, unsigned. Darkened boxwood 1 3/4" w x 24" long with 16 computational scales, a 10" diagonal scale, and a 24" tenths-inch rule; brass insets at zeroes and points of great usage. Generally fine condition with a nick in the bottom edge, a slight curve to the entire rule due to age shrinkage. The use of this form of computational device (consisting of the standard set of linear and logarithmic number and functional scales for navigation) is described in Mackay, Bowditch, Moore, etc. Computations were performed by working back and forth on the scales with a pair of dividers (in lieu of the slide and cursor of the modern slide rule). It was derived from the earliest form of computational device using logarithmic scales as invented by Edmund Gunter between 1610-20.

(5 lbs, UP, PS)

\$ 170

236. DOUBLE SLIDE ULLAGE & PROOF SLIDE RULE - English, mid 19th c (?), signed "J. LONG 43 EASTCHEAP LONDON". Boxwood with brass end plates, 2 3/8" w x 24 1/2" long (the 2 slides are 25" long), with a total of 12 scales on both sides and 3 more along one edge. Very fine overall condition. This too is an example of a calculator to be used to determine how much tax could be squeezed out of alcoholic beverages. Dating is a bit difficult because of a clear contradiction between Taylor 2 and Goodison. Taylor places Joseph Long first at 20 Little Tower St and then, by 1829, at 43 Eastcheap, while Goodison has him on Eastcheap first and then on Little Tower St from 1820 through, at least, 1860.

(5 lbs, UP, PS)

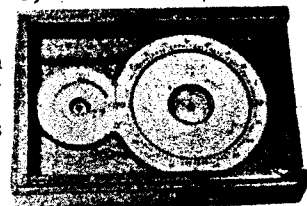
\$ 135

237. TIME TABLE SLIDE RULE - English, late 19th c, signed "DRING & FAGE MAKERS 56 STAMFORD ST. LONDON". Boxwood 2 5/16" w x 17" long with a nickel plated brass slide. Generally fine condition. Two full yearly cycles are marked upon the wooden part of the rule and the slide has corresponding numbers from 1 through 105. Thus this is a form of calendar to be used to calculate due dates for contracts, etc. for a specific number of days. All our references place Dring & Fage on Tooley St as late as 1870. The Science Museum, London, has 2 of these slide rules (nos. 481 and 482) which they date c. 1840 and c. 1855.

(4 lbs, UP, PS)

\$ 98

238. NICELY CASED ADDER - American, late 19th c, signed "C. H. WEBB" with the serial no. 1091 on the back. Construction appears to be of German silver, the larger wheel 4 1/4" d and the smaller, 2 1/4" d. The original stylus also included. The (cherry ?) case, 5 3/8" x 7 5/8" x 1 1/4" thk, is in fine condition as is the adder. This calculator was patented in 1889. The large wheel does digits and tens and the small one, hundreds, up to 4999. Every turn of the large wheel shifts the small by one.



(5 lbs, UP, PS)

\$ 110



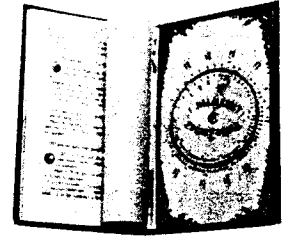


239. PALMER'S COMPUTING SCALE & FULLER'S TIME TELEGRAPH With Original Book - American, with dates 1843, 44, and 45, engraved by George G. Smith of Boston, the book by Aaron Palmer. Double sided cardboard circular slide rule 11" sq, each rotating disc 8 1/2" d, the book, 3 7/8" w x 6" h, with 50 pages. Generally very good condition showing typical rubbing and edge wear, and lacking the two brass thumb holes in the discs.

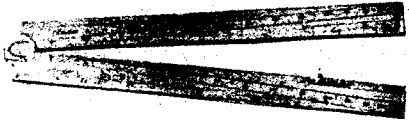
This is the first edition of the combined Palmer and Fuller calculators. Palmers Scale appeared by itself, in 11 3/4" format, in 1843. There was a second edition of the combined scales in 1847. The 1st edition of the book "Key To Palmer's Computing Scale" was published in 1842, the 2nd (the one here) in 1844.

(4 lbs, UP, PS) \$ 165

240. RARE "PALMER'S POCKET SCALE" - American, 2nd ed of 1845, published by Aaron Palmer in Boston. Cloth covered book 4 3/4" w x 6" h of 48 pgs with the circular slide rule of 2 1/2" d attached within the back cover. Generally very fine condition although the text pages are foxed. The 1st ed was published in 1844 using Palmer's basic text of 1842 but with a new title page and, of course, the small circular slide rule fixed within the book cover. There were also 1845 eds issued in Rochester, N.Y. and Warren, Ohio. These pocket versions seem to have had a much lower survival rate than the large calculators.



(1 lb, UP, PS) \$ 185



241. BRASS COMPUTING SECTOR - French, 18th c, unsigned. Brass pivoted sector 6 3/8" long x 1 1/16" w (closed) x .11" thk. A total of 10 scales on both sides (parties egales, les Polygones, les Metaux, and Cordes). Very fine overall condition with restored lacquer finish. This computational device is intended for basic operations based upon ratios of proportional triangles since it does not have trigonometrical or navigational scales.

(3 lbs, UP, PS) \$ 245

242. CONVEX LENS ON STAND - American, early 19th c, (?) signed "H. W. JOHNS, Sole Manufacturer, 78 William St., New York". Convex lens of 3 1/4" aperture and 5" FL mounted in wooden ring 5 3/4" d attached to stand with 6 1/4" d base for 14" overall ht. Very fine condition with original paint. We have no listing of the maker of this optical device nor a very strong indication of its intended purpose.

(5 lbs, UP, PS) \$ 145

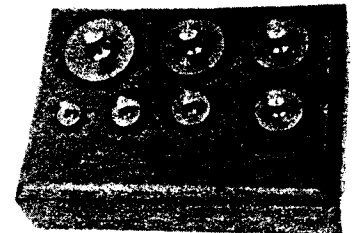


243. NICELY CASED COMPLETE SET OF TROY WEIGHTS - Possibly American, marked with certification date of July 1882, unsigned. Cherry case 6 3/4" x 9 1/4" x 4 3/8" h fitted with 10 brass weights ranging from 1/4 troy ounce to 50 troy ounces. Very fine overall condition. This set was found in the attic of the Howe Scale Co. of Rutland, Vermont and, obviously, used by them as one of their calibration standards.

(18 lbs, UP, PS) \$ 225

244. TRAY OF COMPLETE SET OF METRIC WEIGHTS - Possibly American, 4th qtr 19th c, unsigned. Cherry tray 6 1/2" x 9" x 2 3/8" h cut out for 8 brass weights ranging from 20 grams to 1 kilogram. Fine overall condition. This set was also found in the attic of the Howe Scale Co. of Rutland, Vermont and, again, used by them as one of their calibration standards.

(14 lbs, UP, PS) \$ 135

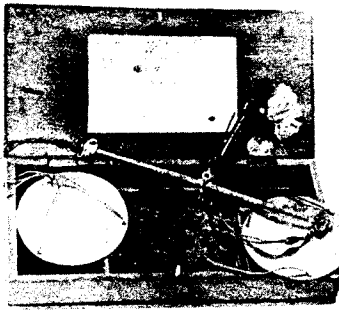


245. NESTED NURNBERG WEIGHTS - Early 18th c, marked with the stork within shield and initials "LA". Cast brass "2" (German) pound lidded master cup with 5 nested cup weights, missing the "1 Lot" center weight. Very fine overall condition with dark brown patina to the master cup.

This set was made by Hans Lönhart Abend of Nurnberg who started work in 1707. His weights are well represented in museum collections including Cologne, Zurich, Wellcome Medical Museum in London, Musee d'Art et d'Histoire of Geneva, Streeter Collection of Yale University, and Brussels.



(5 lbs, UP, PS) \$ 325



246. CASED HAND-HELD TWO-PAN 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 3 7/8" x 7 3/4" x 1 1/4" h. Balance with 6 3/8" long iron beam and 1 7/8" pointer, 2 1/2" d brass pans, and early (if not 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 16 St Martin le Grand.

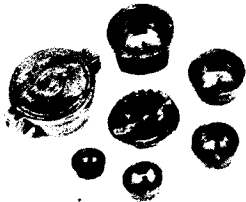
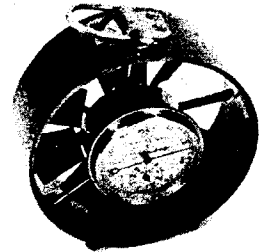
(4 lbs, UP, PS) \$ 195

247. ANOTHER IDENTICAL TO THE ABOVE - (not illustrated) - English, probably c. 1780, with the earlier trade card of "Cha. De Grave SCALE MAKER the Corner of St Ann's Lane" but no mention of being scale maker to the King. Same dimensions and condition except that the strings are somewhat shorter, probably having broken off at their ends and then reattached.

(4 lbs, UP, PS) \$ 185

248. CASED POCKET ANEMOMETER - English, late 19th c, signed "1105/J. J. HICKS. MAKER/LONDON. ENG.". Black oxidized brass outer ring 3" d x 1 1/4" deep with 8 bladed fan and 1 1/2" d silvered readout dial within. The dial has 2 readouts, one in ft from 0 to 100 and the other in hundreds of feet. Original case 3 1/2" x 3 3/4" x 2" thk in sound condition, but some external wear, contains original calibration chart. The instrument is in very fine physical and working condition although we can not make a statement of accuracy.

(3 lbs, UP, PS) \$ 125

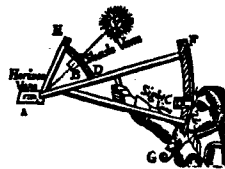
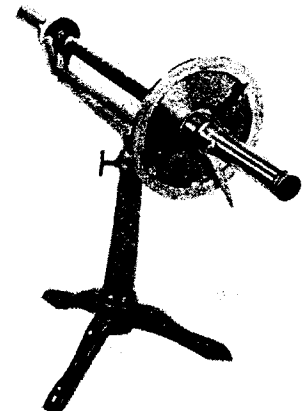


249. A VERY SMALL SET OF LIDDED, NESTED WEIGHTS - English, probably 18th c, unsigned but the lidded cup marked "TROY 1 OZ". Six brass weights, (missing the center one), the 1 ounce lidded cup 1 1/8" d x 3/4" h, the others decreasing in size and weight. Very fine overall condition.

(1 lb, UP, PS) \$ 125

250. CONCENTRIC FIELD POLARISCOPE - French, c. 1900, unsigned. Cast iron stand and frame finished with gray enamel, bright lacquered brass optics tubes (either end) and readout dial, 4 3/4" d, with silvered scale and verniers(1/10 degs) 16 1/2" long x 12 1/2" h. The sample tube is 8 1/2" long. Generally fine condition with working optics but noting that the gray enamel finish is chipped in a number of places and one window of the sample tube is cracked and needs replacing. Such instruments were used to measure the optical rotation of polarized light in various liquids, primarily sugar solutions, and using the results for determining chemical composition. This model has concentric rings of opposing polarization, producing an equal intensity null when the analyzer is oriented accordingly.

(11 lbs, UP, PS) \$ 155



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