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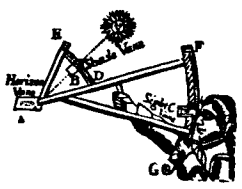
ITEM 152
LARGE SANSKRIT
ASTROLABE



Catalog 119
Fall, 1979
Five Dollars

CONDITION OF INSTRUMENTS

All the instruments in this catalog are intended for display purposes only. However, they are generally functioning although almost certainly not to their original accuracy. (When they are, please do not worry. We will be the first to let you know.) After all, some wear does take place over the years. Condition is given as accurately as possible although old repairs are usually not noted. Missing parts from cased instruments are noted, except for pocket magnifiers, small tools, etc. which are almost always lost. All instruments in this catalog are in nice condition. Where necessary, they have been properly restored. None are offered in an "as is" condition. Descriptions of condition may even tend to be slightly pessimistic.

REFERENCE BOOKS

The following have been employed in the researching of the items in this catalog:

(A-to-Z) (Gilbert, Ed), Photographic Advertising From A - to - Z", Yesterday's Cameras, Riverdale, New York, 1970.

(Baillie) G. H. Baillie, "Watchmakers & Clockmakers of the World", 2nd Ed., N.A.G. Press, London, 1947.

(Bedini) S. S. Bedini, "Early American Scientific Instruments and Their Makers", Smithsonian Institution, Washington, D. C., 1964.

(Billings) Blumberg, Smith & Leeper, "The Billings Microscope Collection", American Registry of Pathology, Washington, D. C., 1967, and (2nd Ed., 1974)

(Bion) E. Stone, trans. & ed. "M. Bion, The Construction and Principal Uses of Mathematical Instruments", London, 1723.

(Bobinger) Maximilian Bobinger, "Alt-Augsburger Kompassmacher", Hans Rosler, Augsburg, 1966.

(Bradbury) S. Bradbury, "The Evolution of the Microscope", Pergamon Press, London, 1967.

(Brewington) M. V. Brewington, "The Peabody Museum Collection of Navigating Instruments", Peabody Museum, Salem, Massachusetts, 1963.

(Campbell) J. F. Campbell, "History and Bibliography of The New American Practical Navigator and The American Coast Pilot", Peabody Museum, Salem, Massachusetts, 1964.

(Checklist) Gibbs, Henderson, & de Solla Price, "A Computerized Checklist of Astrolabes", Dept. of History of Science and Medicine, Yale University, New Haven, Connecticut, 1973.

(Daumas) M. Daumas, "Les Instruments Scientifiques Aux XVII^{e} Et XVIII^{e} Siecles", Presses Universitaires de France, Paris, 1953.

(Clay & Court) R. S. Clay & T. H. Court, "The History of the Microscope", reprint ed, Holland Press, London, 1975.

(Gray) G. J. Gray, "A Bibliography of the Works of Sir Isaac Newton", Dawsons reprint, London, 1966.

(Goodison) N. Goodison, "English Barometers 1680-1860", Potter, New York, 1968.

(Gould) R. T. Gould, "The Marine Chronometer", London, 1923, reprint, The Holland Press, London, 1960.

(Gross) Harry I. Gross, "Antique & Classic Cameras", Amphoto, New York, 1965.

(Gunther) Robert T. Gunther, "The Astrolabes of the World", 2 Volumes, Oxford University Press, Oxford, 1932.

(Holmes) Edward Holmes, "An Age of Cameras", Fountain Press, Kings Langley, England, 1974.

(Karpinski) L. C. Karpinski, "Bibliography of Mathematical Works Printed in America Through 1850", University of Michigan Press, 1940.

(Lothrop) Eaton S. Lothrop, "A Century of Cameras", Morgan & Morgan, Dobbs Ferry, New York, 1973.

(Mayer) L. A. Mayer, "Islamic Astrolabists and Their Works", Geneva, 1956.

(Padgitt) Donald L. Padgitt, "A Short History of the Early American Microscopes", Microscope Publications, London & Chicago, 1975.

(R. M. S.) Disney, Hill, & Watson, "Origin and Development of The Microscope, As illustrated by . . . Collections of the Royal Microscopical Society,", R. M. S., London, 1928.

(Rees) A. Rees, "The Cyclopaedia or Universal Dictionary of Arts, Sciences, and Literature", London, 1819.

(Smart) C. E. Smart, "The Makers of Surveying Instruments in America Since 1700", Regal Art Press, Troy, New York, Volume I 1962, Volume II 1967.

(Taylor 1) E. G. R. Taylor, "The Mathematical Practitioners of Tudor and Stuart England", Cambridge University Press, Cambridge, 1968.

(Taylor 2) E. G. R. Taylor, "The Mathematical Practitioners of Hanoverian England", Cambridge University Press, Cambridge, 1966.

(Thomas) D. B. Thomas, "The Science Museum Photography Collection", Science Museum, London, 1969.

(Thorndike) Lynn Thorndike, "A History of Magic and Experimental Science", 8 Volumes, Columbia University Press.

(Wheatland) David P. Wheatland, "The Apparatus of Science at Harvard 1765-1800", Harvard University, Cambridge, Massachusetts, 1968.

(Zinner) Ernst Zinner, "Deutshe und Niederlandisch Astronomische Instrumente", C. H. Beck, Munchen, 1972.

(Bedini T & T) S. A. Bedini, "Thinkers And Tinkers, Early American Men of Science", Scribner's, New York, 1975.

(Ricardi) Pietro Ricardi, "Biblioteca Mathematica Italiana", Gorlich, Milano, 1952.

(Tardy) Tardy, "Dictionnaire des Horlogers Francais", Tardy, Paris, 1972.

21. William Whiston, "ASTRONOMICAL LECTURES, Read in the PUBLICK SCHOOLS AT CAMBRIDGE.", 2nd ed Corrected, J. Senex, W & J Innys, J. Osborne and T. Longman, London, 1728. Original leather binding recently rebacked 8" h, 5" w; pgs. 368, 134 (astronomical tables), (2), engraved frontis plate, some text figures. Generally fine condition with minor edge wear to the covers, an owner's name cut out of the title page (now repaired) and occasional minor foxing. Whiston (1667-1752) was a curious sort of person. He considered himself a Newtonian and indeed (or at least according to E. G. R. Taylor) had, at times, some influence over Isaac Newton. Whiston (together with Ditton) played a role in the passage of the Longitude Act of 1714. The pair then tried to claim the prize for themselves by a somewhat impractical method, expecting Newton to go along with them, which he did not. Later Whiston was to advance other schemes, but none were practical enough to meet the requirements of the law. This book is based upon a series of lectures given at the University of Cambridge (1st ed 1714). The approach followed is that best described as geometrical astronomy wherein a physical picture of the solar system is presented without the use of mathematics. (postpaid) $ 145

LAND SURVEYING

22. Charles Davies,"ELEMENTS OF SURVEYING, WITH A DESCRIPTION OF THE INSTRUMENTS AND THE NECESSARY TABLES, INCLUDING A TABLE OF NATURAL SINES.", 4th Ed, A. S. Barnes & Co, etc., Hartford, 1839. Original leather binding 8 1/4" h, 5 1/4" w; pgs. 170, 73, 91, 6 engraved folding plates (4 of instruments). Generally fine overall condition except for some foxing and fraying of the outside edges of the plates. This book was initially intended for use at West Point (1st ed in 1830), but became so generally popular that many editions were printed. Karpinski lists 15 issues between 1830 and 1850 with the 1st issue of the 4th edition appearing in 1838. (postpaid) $ 40

Early Italian Surveying Instrument

23. 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) $ 185

24. Octavio Fabri, "L'VSO DEL LA SQVADRA MOBILE", 2nd state of 1673 edition, Andrea Gattella, Padova, 1673. Original vellum binding 8 1/2" h, 6" w; pgs. (2), 9-100, folding engraved plate of instrument and engraved title page, 24 engraved plates within the text. This is the complete second state with all pages in correct order. However two of the text engravings were printed on the wrong pages (plates XIX and XX, XXI were interchanged) and, to correct this, separate copies of these plates were pasted on the correct pages right over the misprinted ones. Fine condition except for worming where pages attach to spine.(In Italian)(postpaid) $ 175

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25. Abel Flint, "A SYSTEM OF GEOMETRY AND TRIGONOMETRY, WITH A TREATISE ON SURVEYING: Comprising Various Methods of Taking The Survey of a Field, With Directions For Protracting and Finding Areas: In Which, Also, The Principles of RECTANGULAR SURVEYING, By Which Areas May Be Accurately Calculated Without Plotting, Are Fully Explained: · · · With Improvements BY GEORGE GILLET, Surveyor General of Connecticut.", 6th Ed, Cooke & Co., Hartford, 1830. Original leather binding 8" h, 5" w; pgs. iv, (2), 9-112, 10, 62, 100, many text figures. Very good overall condition, covers in good shape but some patches of foxing on most pages. The 1st ed of this work was printed in Hartford in 1804 and Karpinski records a 10th ed in 1844 and a much revised issue in 1854. The changes and improvements from edition to edition are an indication of the increasing sophistication of American surveyors. (postpaid) $ 25

26. Robert Gibson, "THE THEORY AND PRACTICE OF SURVEYING: Containing All The Instructions Requisite For The Skilful Practice of This Art.", (17th American Ed), J. & J. Harper, New York, 1828. Modern leather binding 9" h, 5 1/2" w; pgs. frontis plate of instruments, v, (3), 9-251, 184, 14 engraved foldout plates. Very good overall condition with noticeable foxing of many pages and frayed outside edges of most plates. Robert Gibson appears to have worked in Ireland and the earliest editions of this book appeared in Dublin about mid 18th century. Taylor 2 lists a 2nd London ed in 1767. The 1st American ed (called the 4th) was published in 1785 and by 1839 there had been 22 editions in this country. (postpaid) $ 65

27. John Gummere, "A TREATISE ON SURVEYING, CONTAINING THE THEORY AND PRACTICE: TO WHICH IS PREFIXED A PERSPICUOUS SYSTEM OF PLANE TRIGONOMETRY.", 14th ed, Thomas, Cowperthwait, & Co., Philadelphia, 1846. Original leather binding 9" h, 5 1/2" w; pgs. (6), 9-266, 152, 11 foldout plates. Fine plus overall condition and appears complete despite initial page numbering. This treatise, 1st published in 1814, continued in use for over 100 years, Karpinski noting that there were editions as late as 1917. Edition numbering is somewhat strange with this work. There was no 7th ed after the 6th, but an 8th was issued in 1833 and again in 1837. A very much revised 14th ed, enlarged by the addition of articles on the theodolite, levelling and topography, followed the very next year (1838). This 14th edition was then issued in 1839, 40, 43, 46 (the one here), and 50. This is a particularly good book presenting both basic theory and practical instruction in the use of instruments. (postpaid) $ 45

28. John Gummere, "A TREATISE ON SURVEYING", another copy of the above but with some foxing, fraying at edges and folds of plates, and lacking front flyleaf and Plate 6 (supplied in Zerox copy). (postpaid) $ 18

29. (Gurley Catalog), "Souvenir Catalogue. World's Columbian Exposition." W. & L. E. Gurley, Troy, N. Y., 1893. Original paper covers 7" h, 10" w; 64 pgs with a great many illustrations of instruments then in production as well as photographs of various sections of the Gurley factory. Generally very good overall condition although the covers are worn and a bit soiled with some edge tears, as is the title page. It is our opinion that this publication is quite a bit rarer than Gurley's regular catalogs of the same period. (postpaid) $ 45

Early edition of One of the Great English Treatises

30. William Leybourn, "THE COMPLEAT SURVEYOR, Containing the whole ART of Surveying of Land. BY THE Plaine Table, Theodolite, Circumferentor, Peractor, and other Instruments · · · Together with the taking of all manner of Heights and Distances, · · · Hereunto is added a new way of Surveying of Land, by which a man may be satisfied whether his plot will close before he begins to protract the same, · · · ", 2nd Ed, R. & W. Leybourn for G. Sawbridge, London, 1657. Original leather binding (rebacked many years ago) 11 1/4" h, 7 1/2" w; pgs. frontis portrait of Leybourn, title in red and black, (10), 92, 177-244, 247-308, many woodcut figures (including instruments) within the text, and complete despite misnumbered pages and defective overall pagination. A generally fine crisp copy although the edges of the covers are badly worn, the inside cover papers to the covers were lifted in rebacking and not reattached, and water stains on the top edge of most pages. Leybourn (1626-1716) was a noted teacher and writer on astronomy, navigation, mathematics, surveying (he was one of the surveyors of London after the Great Fire of 1666), and dialling. This book was first published in 1653 with editions in 1657 (this one) 1674, 1679, and 1722. There were significant changes from edition to edition; yet at no time were they ever able to get the page numbering corrected. Engraved plates did not appear until the 3rd ed of 1674 (5), then there were 6 in the 4th ed and 14 in the posthumous 5th ed. This is one of the major works on Surveying in the English language and quite rare in its earlier editions. (postpaid) $ 375

31. John Love, "GEODAESIA: OR THE ART OF SURVEYING AND Measuring of LAND Made EASY. · · · A more Facile and Sure Way of Surveying by the CHAIN, than has hitherto been taught, AS ALSO, How to lay out New Lands in AMERICA, or elsewhere: And how to make a Perfect MAP of a River's Mouth or Harbour; with several other Things never yet publish'd in our Language.", 4th Ed, Bettesworth, Hitch, & Innys, London, 1731. Original leather binding 8" h, 5 1/4" w; pgs. (18), 196, (16), 4, 36, 7, (1), with many text woodcut illustrations and figures. A well used copy, a number of pages with light staining, fly leaves missing, and a long tear in the title page (repaired) but binding very good (minor edge wear) and contents quite sound. Overall, a surprisingly good copy for its age. The 1st ed was published in 1688 just after Love had returned from surveying in America. Taylor 1 lists a 2nd edition of 1715 and suggests that Love had died before this date. The 3rd edition was published in 1720. The popularity of this work is attested to by the number of editions issued throughout the 18th century in England and 2 at the end of the century in the United States. (postpaid) $ 150

32. John Love, GEODESIA: OR THE ART of SURVEYING AND MEASURING LAND made Easy. · · · A more Facile and Sure Way of Surveying by the CHAIN than has hitherto been taught. AS ALSO To lay out New Lands in AMERICA, or elsewhere: · · · ", 9th ed, "corrected and improved by Samuel Clark", J. Rivington, G. Keith, and Robinson & Roberts, London, 1771. Original leather binding (slightly weak at hinges) 8 1/2" h, 5 1/4" w; pgs. (18), 196, (16), 4, (36), 7, (1), many text woodcut illustrations and diagrams. Very fine plus overall condition. The first American edition was based upon the 12th London edition and the 2nd American on the 13th London. Thus the serious scholar will find that this edition becomes a bridge between the earlier and later ones. (postpaid) $ 105

33. (Jacques Ozanam), "METHODE DE LEVER LES PLANS ET LES CARTES DE TERRE ET DE MER, Avec toutes sortes d'Instrumens, & sans Instrumens.", Nouvelle Edition, Charles-Antoine Jambert, Paris, 1750. Early half leather binding 6 1/2" h, 3 3/4" w; pgs. (10), 244, (7), 16 unusually fine foldout engraved plates, a number of which illustrate various surveying and plotting instruments. Overall very fine condition. This book is derived from the earlier publications of the French mathematician, Ozanam (1640-1717) and in particular from his extensive 5 volume "Cours de Mathématiques". It is a good example of the French approach to surveying during the 1st half of the 18th century. (In French) (postpaid) $ 95

34. (Jacques Ozanam), "METHODE DE LEVER LAS PLANS ET LES CARTES DE TERRE ET DE MER, Avec toutes sortes d'Instrumens, & sans Instrumens.", Nouvelle Edition, Charles-Antoine Jambert, Paris, 1755. Early leather binding 6 1/2" h, 3 3/4" w; pgs. (10), 244, (6), 16 folding engraved plates, many of instruments. Very fine overall condition except that pgs. 51 & 52 and plate 5 are supplied in facsimile, the originals now missing. There is no difference between this issue and that of 1750 except for the few pages of advertisement at the end. (In French) (postpaid) $ 45.

A Major German Treatise, Extensively Illustrated

35. 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) $ 265

Altitude Determination by Ramsden's Barometer

36. Colonel William Roy, F. R. S., "EXPERIMENTS AND OBSERVATIONS MADE IN BRITAIN, IN ORDER TO OBTAIN A RULE FOR MEASURING HEIGHTS WITH THE BAROMETER.", Author's reprint from the Philosophical transactions, J. Nichols, London, 1778. Early (original?) half leather binding 11 1/2" h, 9" w; pgs. 142, (1), 2 full page plates of instruments and 2 double page plates. Some edge wear to the binding, contents fine to very fine. Colonel, later Major-general, Roy (1726-90), director of the Royal Engineers from 1783, is best known for the first successful triangulation across the English Channel using Jesse Ramsden's Grand Theodolite. Ramsden designed and provided the mountain barometer used by Roy on this earlier program. Indeed, Ramsden's instrument was such an improvement that, according to Middleton, "This construction was copied or reinvented with changes in detail by J. B. Haas and Friedrich Korner. Gehler wrongly ascribes the tripod construction to Nicolas Fortin, who indeed made use of it." One of the important results of Roy's work was the development of improved compensation equations and an accurate relation between pressure and altitude. (postpaid) $ 130

37. Butler Williams, "PRACTICAL GEODESY: Comprising CHAIN SURVEYING AND THE USE OF SURVEYING INSTRUMENTS; Together With TRIGONOMETRICAL, COLONIAL, MINING, AND MARITIME SURVEYING; Also LEVELING AND HILL DRAWING; And A DESCRIPTION OF THE METHODS OF DETERMINING LATITUDES AND LONGITUDES.", John W. Parker, London, 1842. Original leather binding 8 5/8" h, 5 1/2" w; pgs. xvi, 273, folding frontis plate and large foldout colored plate opposite pg. 1. Generally fine condition with some wear to binding and small chips out at bottom of the spine, minor tears at the edges and folds of the folding plate. Ex library, Trinity College, Dublin. Various sections on the description and use of English surveying instruments of the period.(postpaid) $ 35

38. Henry Wilson, "SURVEYING IMPROVED: OR, THE WHOLE ART, BOTH IN THEORY and PRACTIVE, FULLY DEMONSTRATED. . . . To which is now added, GEODESIA ACCURATA: OR SURVEYING made EASY by the CHAIN only. . . . By WILLIAM HUME", 5th Ed, T. Longman, C. Hitch, & L. Hawes, J. Rivington, etc., London, 1762. Original leather binding (cracked at hinges but still sound) 8 1/4" h, 5 1/8" w; pgs. (10), 555, 11 foldout plates, many text figures. Generally fine condition although a few stained pages and edge wear to the binding. Taylor 2 lists Wilson (1673-1741) as a teacher of applied mathematics who moved in the circle including James Atkinson, James Hodgson and John Senex. At one point he was involved with a project to publish an atlas of sea charts for great circle sailing. After much controversy the project was dropped and Wilson turned his efforts to surveying. The 1st edition of this book seems to have been published in 1731 with the 1st Hume revision in 1741. The number of editions suggest that it was quite popular in its time. (postpaid) $ 135

EARLY ANALOG COMPUTATION

Computation By Sector

39. Paolo Casati, "FABRICA ET VSO Del Compasso di Proportione.", 2nd Ed, G. Longhi, Bologna, 1685. Original vellum binding 8 1/2" h, 6" w; pgs. (6), 250, 4 folding woodcut plates and many woodcut diagrams in text. Minor worming of binding, very fine overall condition. The first edition of this elaboration of Galileo's book was published in 1664. The author (1617-1707), a member of the Jesuit order, a professor of both mathematics and theology in Rome, later a leading post in the University of Parma, wrote other well received books including ones on mechanics, hydrostatics, and optics. He was characterized by the English scientist Boyle as a "famous mathematician". In the preface, Casati notes the rarity of books on this instrument, Galileo's being the only other one known to him. This 2nd edition has been enlarged from the first and changed somewhat in format. (In Italian) (postpaid) $ 220

125. FOUR-DRAW TABLE STAND REFRACTOR - late 19th c, marked "FRANCE" on lens cap but otherwise unsigned. Overall length 36", ht 13 3/4", walnut barrel 2 1/4" d; tripod, draw tubes, and fittings in bright brass with restored lacquer finish. The objective is an airspaced achromat of 1 7/8" aperture and the erecting eyepiece results in clear, sharp images. Very fine overall condition. The tripod comes apart and the legs fold thus leading us to believe that this telescope once fitted into a portable case which now, however, is lost. The tripod clamping screw appears to be a later replacement. The mechanical work is well done and the telescope is quite nice looking as well as useful.

(9 lbs UP) $ 475

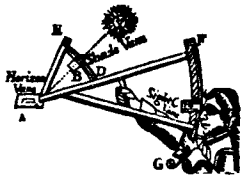
126. 8-DRAW PROSPECT GLASS - English, 1st half 19th c, unsigned. Brass construction with applied outer surface of Sheffield silver plate, horn covered body tube of 2" d; 1 3/8" long closed, extending to 4 3/8". Optics: simple objective of 1 9/16" clear aperture, negative eye lens, 2 1/2 x's magnification. Very fine overall condition with an age crack in the horn body tube and edge wear to the silver showing the copper base. These little pocket telescopes were made more as displays of mechanical design than as examples of optical innovation. Each additional draw tube was just that much more machining and so that much more expensive to produce. We have never had a glass with as many draw tubes as the example here.

(3 lbs, UP, PS) $ 165

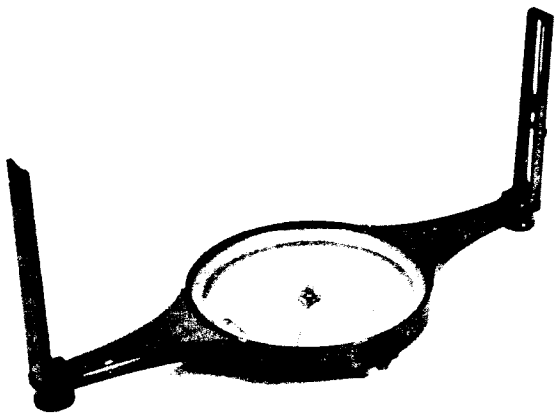
127. GREGORIAN REFLECTING TELESCOPE - English, 3rd qtr 18th c, signed "B. MARTIN. LONDON.". Bright brass with restored lacquer finish standing 22" h with the 2 3/4" d x 14 3/4" long telescope barrel horizontal; the eyepiece extends another 3 1/4". Original lens cap. Focussing rod extends along outside of barrel. Original optics consist of speculum metal 2 1/2" d parabolic primary and 5/8" d elliptical secondary, conventional 2 lens eyepiece. Extremely fine overall condition. The optical system has been aligned and now yields sharp bright images, the original mirror surfaces still relatively untarnished.

Benjamin Martin (1714-1782), lecturer and author, was one of the most inventive of the mid 18th c instrument makers and possibly the finest craftsman of them all. He provided Harvard University with its first good instruments (now mostly lost). Even his more conventional designs such as this telescope) had an elegance of detail rarely found in the work of other makers (except perhaps for the George Adamses). The quality of his work is demonstrated by this telescope which is still in perfect operating condition after more than 200 years.

(15 lbs UP) $ 2,150

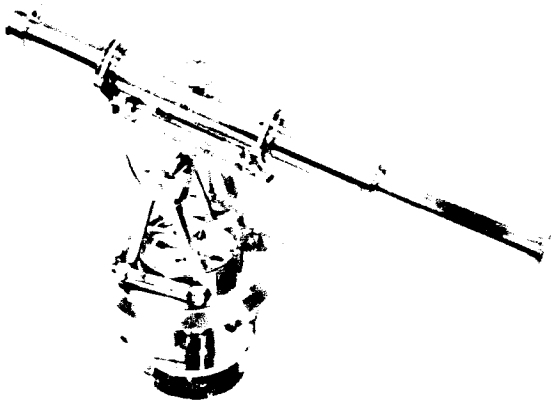


128. THE MODEL 5302 SURVEYOR'S COMPASS - American, c. 1918, signed "KEUFFEL & ESSER CO./NEW YORK" with serial no. 36298. Cast and machined brass in bronzed lacquer finish, silvered dial compass 5 3/4" d with 5" needle, 14" long base with 5" h screw-on sight vanes. Half the ball swivel joint is missing. Original mahogany case 15" x 7 1/4" x 2 1/2" h with name plates of K + E and the U. S. M. A., Department of Practical Military Engineering at West Point. Case in very good, compass in extremely fine condition.



Keuffel & Esser, founded in 1867, first manufactured surveying instruments in 1885. Their 1913 catalog states: *"The Surveying Compasses No. 5300 to 5310 represent the latest construction of these instruments, which we have improved in many features. The compass box is sunk flush with the plate instead of projecting above it. The graduations, to half degrees, are on a raised ring and the needle is of our improved pattern, as described on p. 327. One of the detachable sights is graduated and provided by a sliding cross-piece for measuring vertical angles".*

(12 lbs UP) $ 265

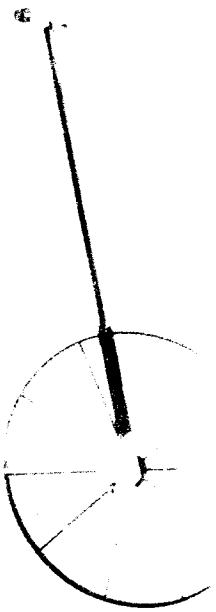


129. RAMSDEN TYPE THEODOLITE - English, 2nd qtr 19th c, signed "Braham Bristol". Bright brass, with restored lacquer finish, standing 10 5/8" h including its 4-screw leveling base. The aximuth plate is 5" d with its beveled silver scale and opposing 1 arcmin verniers, 3" d silvered dial compass with 2 1/8" needle, crossed 1 7/8" bubble levels and fine motion tangent screw. The elevation semi-circle is 4 1/2" d, its inset silver scale reading out by vernier to 1 arcmin. The 15 3/4" telescope with rack and pinion objective and draw tube eyepiece focussing reverses in "Y's" of 5" separation and has a 3 3/8" longitudinal bubble level. Original lens caps. Original hand dovetailed mahogany case 12" x 6" x 9 1/2" h which is in terrible condition. The theodolite is in excellent restored condition.

Taylor 2 lists John Braham (c. 1839) at 42 College Green, Bristol. Goodison has him working in the 1830-56 period located at various times, and even simultaneously, in both Bristol and Bath: 1830 in Bristol, 1833 in Bath, 1833-42 in Bristol, 1837 in Bath, and 1856 in Bristol. The Webster index locates instruments by him both at Oxford and the Science Museum, London. Interestingly, not until the elevation circle was removed from its traditional location (such as on the instrument here) could a transiting theodolite evolve. That is why most English instruments (even through the end of the 19th c) had to have the telescope mounted in "Y's" for purposes of reversal.

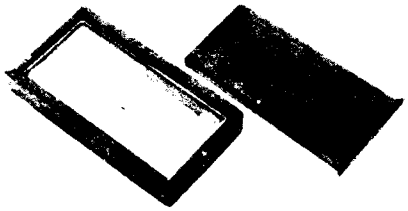
(22 lbs UP) $ 985

130. GREAT IRON WAYWISER - English, 1st half 19th c, unsigned. Ten spoked iron wheel 22 3/4" d rolls 6 ft in one revolution. Wrought iron frame 36" long with wooden handles gives 4 ft overall length. Brass case 3 3/4" sq, 1 3/4" thk with 2 3/4" d window contains differentially geared revolution counter dials. Top edge of box and glass window, replacements, all else original. The top dial turns once for every 100 wheel revolutions and the bottom one with one gear tooth more (driven by the same worm) moves one division for each complete revolution of the upper dial. Some loss of original black enamel finish on the iron, still fine overall condition.



This is a rare form of a rare instrument; the waywiser is virtually unknown in America. It was used for measuring lengths of roads and perimeters of land where the actual distance traveled was needed rather than lengths projected upon the horizontal plane.

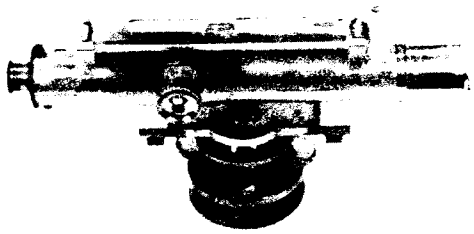
(Air Freight) $ 685



131. WALNUT CASE BOX COMPASS - French, early 19th c, trade label inside cover of "VT. CHEVALIER aîné" while the section of the engraved paper compass card in the bottom of the box is marked "Ing. Opn. Quai de l'Horloge". Walnut box 5 5/8" x 2 7/8" x 7/8" h, sliding cover, silvered end scales ±30 deg divided in 1 deg intervals, 4" needle, and operating needle lifter. Fine overall condition except for age crack in bottom and broken off top edge of one end of walnut box.

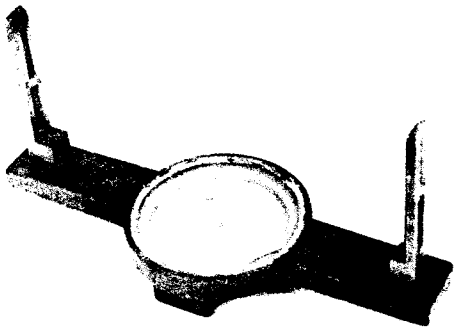
Compasses such as this would have been used to set up a plane table. The maker, Jacques Louis Vincent Chevalier (1770-1841) was (according to the Webster Index) the middle son of Louis-Vincent Chevalier (1734-1804); added aîné to his name after the death of his elder brother, Louis in 1807. He was the father of Charles Louis Chevalier (1804-59), forming a partnership with him which lasted until 1832. Both claimed to be the inventor of the achromatic microscope and neither seemed to think much of the other's approach to instrument design.

(3 lbs UP, PS) $ 195



132. FINE COMPACT LEVEL - English, c. 1805, signed "Troughton & Simms, London". Bright brass, original lacquer finish except on repaired sunshade where it has been restored, 6 1/2" h overall including 4-screw leveling base. Telescope is 11 1/2" long (closed) with 1 5/8" d objective, 6 1/2" longitudinal bubble, 2 3/8" transverse bubble, and rack and pinion focussing of eyepiece. The longitudinal bubble vial and the objective lens are modern replacements. Original dovetailed mahogany case 15 1/2" long, 5" w, 4 3/4" h. The case is in very good, the level in very fine condition with some rubbing of the lacquer finish on the base. This is a good example of a typical English design produced by one of the "great" firms of instrument making. Troughton & Simms was established in 1826 when Edward Troughton (1753-1836) took William Simms (1793-1860) in as a partner so that the firm could continue (which it did, well into the 20th century), since he had no family and his brothers had died years earlier. This is important when we note that Jesse Ramsden and Edward Troughton were (and are) considered by many as the two greatest of English instrument makers.

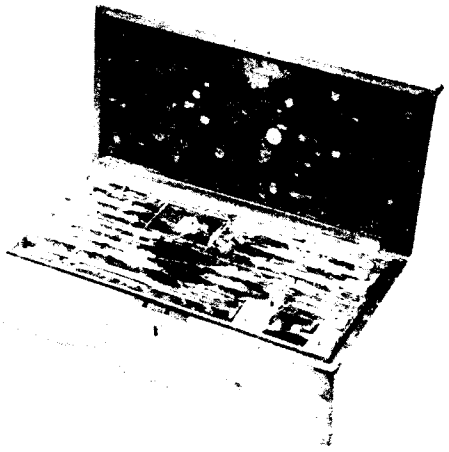
(15 lbs, UP, PS) $ 275



133. 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 for the two don't match (but which one we can not determine).

The wooden surveyor's compass has often been considered a 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) $ 545



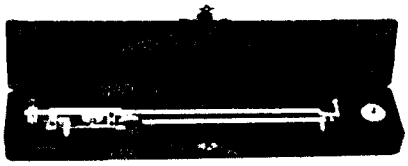
134. LARGE CASED SET OF DRAWING INSTRUMENTS - Possibly German made for the American market, c. 1900, unsigned. Mahogany case 6 3/4" x 13 3/4" x 4 1/2" h. Purple velvet lined lift-out tray is complete, with 20 separate items in German silver, steel and ivory, including 8 1/2" proportional divider, beam compass fittings, 3 ruling pens (1 broken), large compass with many interchangeable parts, dividers, bow dividers and small compass with many parts. The bottom of the case contains only 2 items, a protractor and a French curve. Very fine overall condition except as noted. The 1902 Gurley catalog illustrates virtually identical instruments and calls them their "Best German Drawing-Instruments". They also bear a striking resemblance to the best offered by K + E during the same period.

(9 lbs, UP, PS) $ 195

135. ELABORATE PORTABLE BALANCE - American, case cover marked "MET. '11" (for 1911), card of "W. & L. E. GURLEY - Civil Engineering & Physical Instruments" inside cover, and set of weights with name plate "GURLEY STANDARD WEIGHTS AND MEASURES TROY, N. Y., U.S.A.". Mahogany case 6 1/2" x 19" x 6" h (closed), 23 3/4" h with lid locked in open position. The cast aluminum balance beam is 13 1/4" long, the 5" d pans suspended by 12" chains, and the pointer of 5 1/8" radius. Various adjustments are provided on the beam and knife edges. The entire balance stows within its fitted case. The original mahogany cased set of weights is missing some of the smaller flat grain weights but has all 6 of those of cylindrical shape. Very fine overall condition.

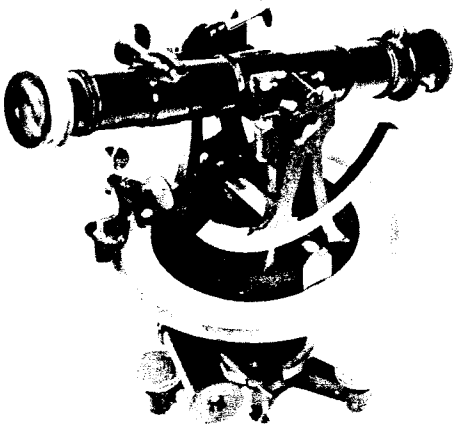
This aspect of Gurley's business is relatively little known. No balances were listed in their 1902 catalog and only one (a large "Precision Balance") is shown in their 1921 catalog. Thus, we suspect that the model here was made for but a short time and surviving examples are somewhat rare.

(16 lbs UP) $ 325



136. VARIABLE RATIO POLAR PLANIMETER - Swiss, c. 1900, signed "J. Amsler" and also "The A. Leitz. Co., San Francisco U.S. A.". German silver and steel, major arm 10" long, in fitted black cloth-covered case 12" x 2 1/ " x 1 3/4" h. Instrument and case in fine condition. An integrating planimeter is used to obtain the area of of an irregular shape on a map by tracing around its perimeter. This model may be set to different mapping scales (there are also simpler fixed ratio versions). It was invented by Prof. Jacob Amsler about 1856. See Plate 24 of the (London) Science Museum's publication "Calculating Machines and Instruments" and the textual description where it is stated that over 12,000 examples had been made by 1884.

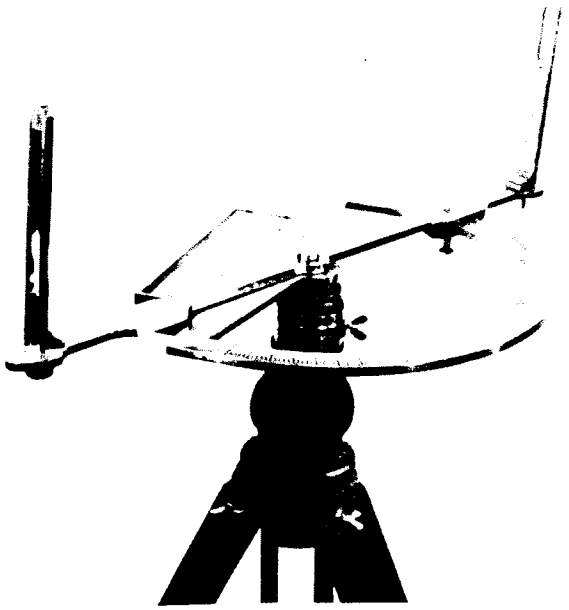
(4 lbs, UP, PS) $ 85



137. A VERY SMALL THEODOLITE - French, 4th qtr 19th c, unsigned, with the trade label of "Mon. RICHER/GUYARD & CANARY aîné succrs./15 Rue de la Cérisaie, près la Bastille, PARIS" within the lid of the case. Brass construction with silvered scales, much in original black lacquered finish, various screws and knobs in bright lacquered brass, standing 7 1/4" h on 3 leg leveling base. Horizontal scale 4" d with dual vernier readouts to 100 parts of 1 metric degree (400 to the full circle) and tangent screw fine motion. Vertical sector scale with vernier reading to 50 parts of 1 metric degree. The telescope is 8" long and without bubble level although there is a single traverse one located on the azimuth table between trunnions. The 4 5/8" long tube below the azimuth table contains an optical readout north orienting compass needle. Original wooden case with machine cut joints 9 1/2" x 7" x 7 3/4" h in fine condition. The theodolite is very fine plus although no attempt has been made to determine how well it now works. The basic design of this instrument is quite similar to that of the Morin surveyor's transit offered by us in Catalog 115 but we do not have sufficient information to identify the actual maker.

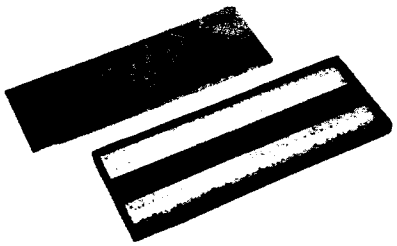
(18 lbs UP) $ 465

138. VERY LARGE CASED BRASS SEMICIRCUMFERENTOR ON TRIPOD - American, 18th or early 19th c, unsigned. Bright lacquered brass, the pivoted arm 25" long with 7 3/8" screw-on sight vanes and ivory indicator plate, the divided semicircle is 15 3/4" d, and the box compass 2 3/8" w x 9" long with 8" needle. The center post extends 4" below the bottom of the semicircle. The scale is divided to degrees. The darkened pine tripod has 49" long legs below a 7" head with brass clamping ring. The strangely contoured stowage case (not pictured) is 26 3/4" long, 13" w, 2 3/4" h and stands on 3 turned legs 2 1/2" h each. A turned wooden fitting for the instrument post on the bottom of the case is badly damaged. The instrument is in extremely fine display condition with the lacquer finish a modern restoration and some of the screws early but not original. The tripod is in very fine condition and although found with the instrument and in our opinion used with it at some point in time, is of later origin. A ball and socket joint which would have properly mounted the instrument on the tripod was not found and in our opinion should be considered missing. The case which clearly was made for the instrument is, in our opinion, by the maker of the tripod, and hence not original either, although of 19th c origin. It is in very fine condition except as noted.



The American semicircumferentor should not be confused with the classical European graphometre which has a pair of fixed vanes along the diameter of the semicircle as well as the pair on the pivoted arm and when made with a compass had one with 360 degree readout rather than one of box form. The usual semi-circumferentor (see Figs. 32, 43, and 59 of Bedini) is quite a bit smaller than the one here and made with a wooden body upon which the scale was marked and within which was set the box compass. The form of the one here is virtually unknown, and in our opinion, the instrument is unique. The details of construction suggest that it was made by someone without proper metal working tools (not even a lathe) and that it was the first such made as well. The scale is crudely engraved, the degree divisions are not uniform and the zero line at one end seems to have been put in incorrectly and a correct line then marked over it. The numerals are from stamps made for use on wood. The screws seem to be either hand-cut or part formed in crude dies and part hand-cut. Thus the instrument appears to date from the 18th c (its case and tripod form the 19th c) but it may also be a product of 18th c technology employed in the early 19th c.

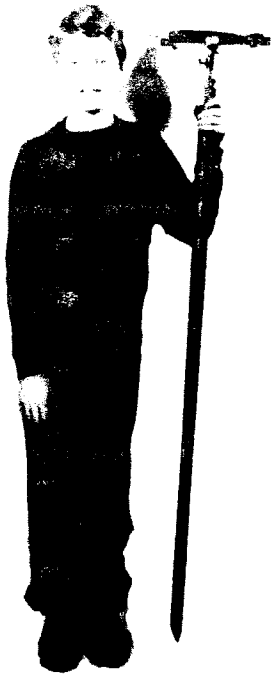
(2 UP packages, 30 lbs & 20 lbs) **$ 1,495**



139. CASED SET OF ENGINEER'S RULES - English, mid or 2nd half 19th c, signed "GRIFFIN & CO THE HARD PORTSEA". Two boxwood rules, 1 7/16" x 12 1/4" each, with a total of 16 mapping scales (on both sides) contained in a slide-cover mahogany case 4 7/8" x 12 7/8" x 7/8" h. The case is in very good plus, the rules in very fine condition. We have been unable to identify the maker although Taylor 2 lists a navigation teacher by the name of James Griffin who headed up Janet Taylor's Academy (1835-43). He may have set out on his own and set up the company signed on the set here.

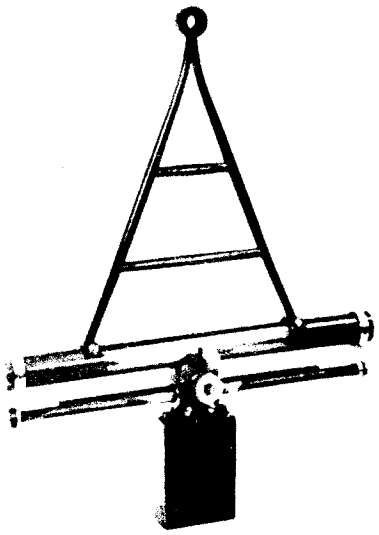
(4 lbs, UP, PS) $ 75

140. GOLDEN OAK SURVEYOR'S COMPASS ON JACOB STAFF - American, 2nd half 19th c, unsigned. The oak base is 16" long, 6 1/4" w, with brass mounting, screw-on 6" h brass sight vanes, and a 6 1/4" d compass housing with 3 7/8" needle, hand drawn paper compass face and metal azimuth ring divided to degrees. The 50 1/2" h oak Jacobs staff is fitted with a brass ball and socket joint. Very fine overall condition noting that the lacquer finish on the bright brass parts is a modern restoration. No case.



We suspect that this well made, but unusual, traditional surveyor's compass is the work of a New England country surveyor rather than that of a professional instrument maker. It is even possible that it is unique - made for his own use - following practices which had become obsolete in the early part of his century. The brass work is characteristic of the later part of the 19th century and the woodwork as well. It is a perfect match to country oak furniture of the same location and period.

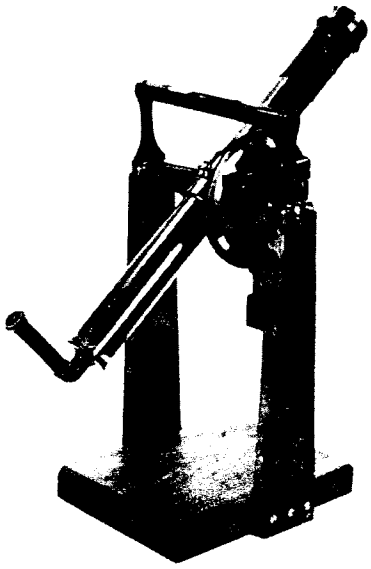
(2 UP packages, 8 lbs each) $ 485



141. ROAD BUILDER'S GRADIENT INSTRUMENT - English, 2nd half 19th c, signed "ELLIOTT BROs. LONDON". Brass, in black oxidized finish, some fittings and readout scale in bright lacquered brass, sight tube 12 1/8" long, overall ht 15 7/8" including blackened 2 7/16" x 1" x 3 1/4" h lead weight at bottom. Rack and pinion mechanism moves cursor edge along readout scale. Original hand dovetailed pine field case 14" x 17" x 3 1/4" thk. Case in rough shape, instrument very good to fine with some dark spotting of the lacquered brass, although not too bad for an instrument made for hard field use.

This instrument may be suspended from any tree, pole, or other vertical object within reach without having to use a regular tripod. An instrument intended for the same purpose of similar, but not identical design may be seen on exhibition in the Science Museum, London. The maker, Elliott Brothers, was founded about 1835 by William Elliott became Elliott & Sons in 1850, and in 1855 the form given here.

(20 lbs UP) $ 265



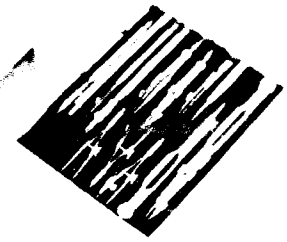
142. PORTABLE TRANSIT TELESCOPE - English, before 1897, signed on the eyepiece "T. COOKE & SONS, YORK" with the serial "No. 864" on the readout circle. Brass in black oxidized finish, telescope 19" long with 1 5/8" d objective and 2 eyepieces. Vertical readout circle 5 1/2" d, silvered, 1 arcminute vernier readout, swingaway magnifier and 4" bubble level. The removeable lateral alignment bubble level is 8 1/2" long on brackets 2 3/4" h. The instrument is shown mounted in a modern walnut display stand 13 1/2" h with a 7 3/4" x 10 3/4" base. Original dovetailed painted pine case 21" long, 10 1/2" w, 6 1/2" h in sound condition. The instrument is in excellent condition.

Thomas Cooke of York (1807-1858) established one of England's major optical firms in 1837. Between 1868 and 1897 it was known as T. Cooke & Sons (the name on this instrument), then T. Cooke Ltd. until 1922 when they merged with another great instrument making firm to become Cooke, Troughton & Simms. An instrument such as this, together with a good chronometer, was the surveyor's primary longitude reference or, conversely, his primary time calibration reference. As usual, the original support structure and the cased portable instrument have become separtted, and so a modern display stand has been provided to show how the instrument would have been used.

(30 lbs UP) $ 675.

IS THE ITEM YOU WANT STILL AVAILABLE?

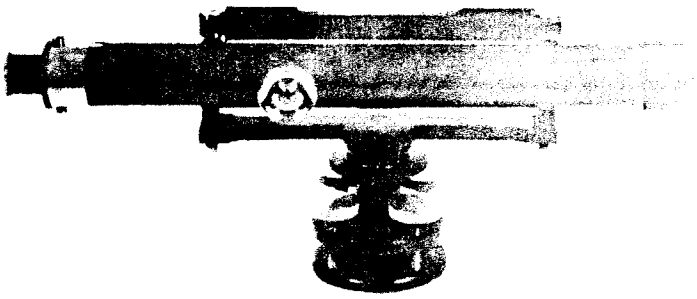
It may be. Why not call or write and find out? An interest in instruments is very much an individualistic pursuit. Often an item is almost uniquely suited to but one person.



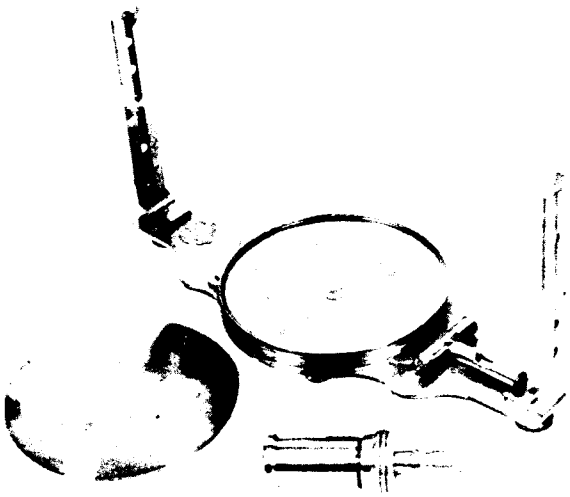
143. PRESENTATION DRAWING INSTRUMENTS - English, by "Stanley" of London, the plate on the cover engraved *"PRESENTED TO Charles Vincent Bennett. BY THE EMPLOYES OF THE GAS & WATER DEPARTMENS OF THE RAMSGATE CORPORATION as a mark of esteem and respect on his appointment as Engineer and Manager to the Walton on Thames Gas Co. AUGUST. 1886."* German silver bound oak case 8" x 6 1/4" x 2" h. The lift-out tray is complete with 15 separate items in German silver, steel, and ivory. The compartment below has a small protractor but appears to be missing whatever rules it once had. Extremely fine condition.

(5 lbs, UP, PS) $ 195

144. 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 eyepiece. 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) $ 185

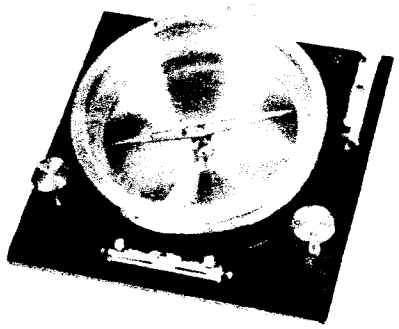


145. EARLY VERNIER COMPASS BY THE INVENTOR OF THE SURVEYOR'S TRANSIT - American, between 1832-40, signed "W. J. Young/MAKER/Philadelphia/Patent". Bright lacquered brass, 6 1/2" d compass housing on 15" long base, 7 3/8" h screw-on sight vanes. The compass dial is in Young's black oxidized finish with a silvered azimuth scale divided to half degrees. The 5 3/4" compass needle has a vernier scale on its South end. There is an external scale for the magnetic variation vernier, a chaining leg counter, and crossed bubbles levels which are later (instrument maker) replacements for the original circular bubble level as found on Young's original transits. There is also the original ball and socket joint and brass compass cover. The lacquer finish is a modern restoration on the ball and socket joint, original everywhere else. Original hand dovetailed walnut case 8" x 16" x 5 1/4" h in very good condition. The compass is excellent, really exceptional condition for an instrument of this period.

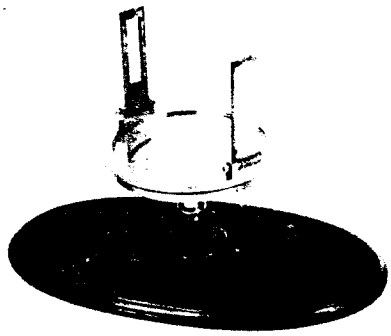
William J. Young (1800-1870), in business as an instrument maker by 1825 was unquestionably the inventor of the American Surveyor's Transit even though Bedini seems confused on this point. In 1832 he patented his black finish compass dial (placing a lower limit on the instrument here). Unpublished research has determined that in 1840 his signature changed from "W. J." to "Wm. J. Young" (giving us an upper date limit) and about 1850 serial numbers were added starting with about no. 3000. This compass is then contemporary with the earliest transits (invented in 1831) and exhibits certain similarities of design details.

(25 lbs UP) $ 595

146. REFERENCE OR ALIGNMENT COMPASS - Possibly American, c. 1900, unsigned. Machined and blackened 5" sq brass base with 3 leveling screws in bright lacquered brass and crossed 1 3/4" bubble levels. The compass housing is 3 7/8" d with a lift-off class cover in a bright brass ring. Readout is on a silvered azimuth ring divided to degrees. There is a 3" lift-off needle on a jeweled center with a sliding weight to compensate for variations in the magnetic dip. There is also a replacement center post and an unmounted needle. Very fine overall condition with original finish throughout.

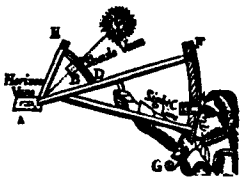


(6 lbs UP) $ 145



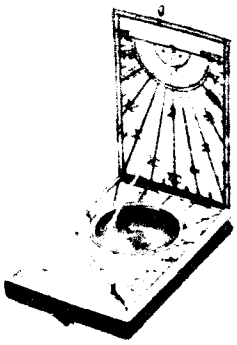
147. SMALL STAFF-MOUNTING POCKET SURVEYOR'S COMPASS - Possibly American, 2nd half 19th c, unsigned. Bright lacquered brass 3 9/16" d with 2 1/4" h folding sight vanes, silvered compass dial and degree divided azimuth ring, 2 1/4" needle, 3 7/8" overall height. Very fine overall condition noting original finish only on the vanes. Mahogany display stand included.

(4 lbs, UP, PS) $ 135



148. IVORY-FACED DIPTYCH DIAL - German, 18th century, no makers name but stamped with 3 leaf clovers and semi-sunbursts and the compass dial marked "B (?)". The 1 3/8" x 2 1/16" bottom part of the dial has a wood center with upper and lower ivory surfaces and a 3/4" d inset compass. Sundials have been engraved (with red and blue colored lines) on the horizontal and (solid ivory) vertical surfaces with a 49 deg string gnomon running between them. The fixed dials of a lunar volvelle are engraved on the top surface of the cover (not shown) but the rotating disc is now missing. This attractive little Nuremburg dial is in, otherwise, extremely fine original condition. Similar examples exist in a number of museum collections and we believe that some study and research could yield the name of the actual maker.

(4 lbs UP) $ 545



149. BIRD GNOMON DIAL FOR NORTH AFRICA - French, 2nd qtr 19th c, unsigned. Walnut case 2 3/4" sq (7 cm) x 3/4" thk, the compass well 2 3/8" d. The compass dial, azimuth ring, hour circle and Butterfield type adjustable bird gnomon are all in silver plated brass. The compass is set for 17 deg west variation, the gnomon graduated in degrees from 25 to 38 north latitude, and the hour circle has 4 bands for latitudes: 25, 30, 35, 40 deg. Compass directions are in French. Very fine condition.

One or two similar dials made for North America are known. This one required a degree of study to establish its intent. The combination of latitude range and fixed variation indicated that within the past 200 years it could have been used only in North Africa. At Algiers (Lat 36° 47' N, Long 3° 04 E) Peter Barlow's chart of c. 1830 gives the variation as 20° W, tables of 1858 give 17° W, Admiralty charts of 1907 make it 13° W, and in 1955 it was less than 10° W. French occupation of Algeria was consolidated about 1840, and it is thus quite reasonable that this dial was made for use by the French military in the deserts of North Africa about this time.

(3 lbs UP) $ 465

150. BLACK-SURFACE TERRESTRIAL GLOBE - probably English, c. 1900, unsigned. Matt black globe 6" d with continents outlined in white, incised latitude and longitude lines; on turned black wooden base 5 3/8" d for overall ht of 11 7/8". Brass fittings hold polar axis. Generally fine to very fine condition except for wear to the wooden base and minor rubbed spots on the globe. It appears that this globe was intended for school use so that students could fill in country boundaries with chalk lines and then erase them. Although unsigned this globe may be the work of the London firm, Philips.

(7 lbs UP, PS) $ 145

151. WOODEN DIPTYCH DIAL - Probably German, 18th c, unsigned. Well worn wooden dial 2 3/4" x 2" x 5/8" thk (closed) with brass hardware. Scribed and stamped horizontal and vertical dial faces. Needle of 1" d compass is a modern replacement and string and bead vertical indicator now lacking, very good overall condition. This early but somewhat simple sundial is of rural origin, and yet in its own way presents an interesting, but little documented, aspect of the art and science of gnomonics.

(2 lbs UP, PS) $ 105