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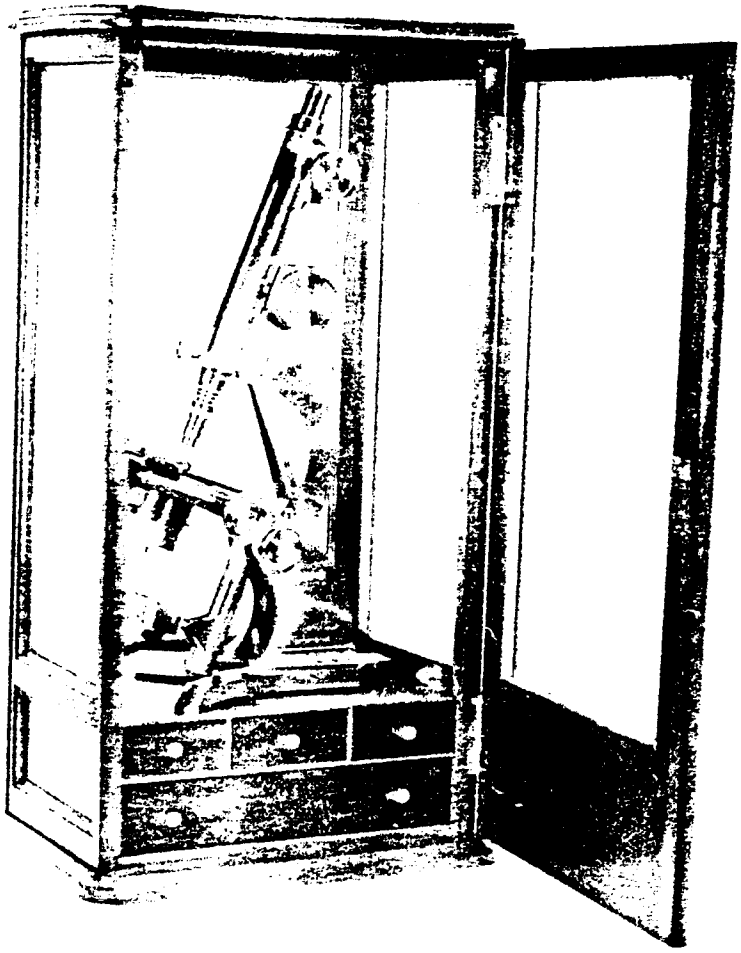

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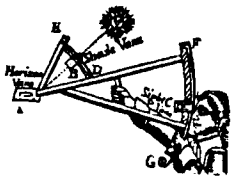

Catalog 128
Summer, 1985
Six Dollars

One of the More Inventive Solutions to the Longitude Problem

35. Jane Squire, "A PROPOSAL To Determine our LONGITUDE.", 2nd Ed, in English only, for the author, London, 1743. Original embossed leather binding, 8" h, 5" w; 160 pgs plus the very large foldout engraved chart titled "LODGITUDE". Very fine overall condition except for a cracked front hinge (cover tight) which has been taped internally. Ex library of Lord W. Kerr, G.C.B. of Brocket Hall. The 1st edition of this work (1731) was in French as well. This one includes transcripts of her correspondence to various individuals complaining about the poor reception to her first submittal to the Board of Longitude. Taylor 2 remarks, "Miss Jane Squire was a lady of good social standing who harried the Commissioners for ten years. Her fantastic scheme required the rejection of many of the basic principles, as well as the terminology, of current astronomy, and the mastering of a new international system of numeration of Miss Jane's invention. The sky was to be divided up into a million and a quarter small spaces - 'cloves' she called them - each enumerated, and the stars located in each were to be learned by heart by boys intended for the sea. Since only the stars were in question, astral time was to be kept, the prime meridian being that which passed through the Manger at Bethlehem. Furnished with an astral watch, the sailor only had to recognize the stars in the zenith 'clove', and take the elevation of the Pole, to fix his position." Taylor was not quite right (as usual) in describing Jane Squire's concept, and its faults. The smallest divisions were "cards", not "cloves", and the major fault did not lie in the queer terminology or choice of zero longitude. One of the problems with her solution was that it was based on the existence of a precise chronometer - astral watch - which indeed was really one of the solutions being sought. Further her "cards" were really an attempt to replace calculation by pattern recognition. One of the basic problems here is that the visual celestial sphere contains but 5,000 to 6,000 stars so that most of her "cards" are empty. Lastly there is the problem of determining the zenith "card" from an unstabilized observation platform. In other words, Miss Squire did not solve the technical problem; she just substituted one problem for another. Still, let us conclude with her, "And every Star, being thus known by its own particular Name; which (to the meanest Capacity) expresses its Place, both in Longitude and Latitude: must keep their minds much more intent on their Business, than observing them only in Constellations; which unavoidably fill their Heads with foreign Ideas, and lead them out of their Way." (postpaid) $ 275

LAND SURVEYING, GEOLOGY, & MINING

The Famous Hoover Translation

36. Georgius Agricola, "DE RE METALLICA" Translated From The First Latin Edition of 1556 . . . BY HERBERT CLARKE HOOVER . . . AND LOU HENRY HOOVER, The Mining Magazine, London, 1912. Original vellum binding 13 3/4" h, 8 1/2" w; pgs. xxxi, 640, with hundreds of text figures reproduced from the original woodcut illustrations. Generally fine condition except for an ink ownership inscription on the 1st blank page, cracked front hinge (cover attached), and some discoloration of the covers. Hoover and his wife, Lou, worked five years on this translation into English of the greatest medieval treatise ever published on mining and the metal working arts. Indeed, because Hoover was a working mining engineer at the time and knew the subject as no pure scholar ever could, this translation is generally recognized as being superior to all others ever attempted. The extensive added footnotes and explanations result in this work being more than a simple translation; it is truly a study of medieval matallurgy, the like of which may never be equaled. The passage of time may yet result in Herbert Hoover's place in history being established by this publication. (postpaid) $ 375

Standard Reference, Long Out Of Print

37. Silvio Bedini, "EARLY AMERICAN SCIENTIFIC INSTRUMENTS and Their Makers", Smithsonian Institution, Washington, D.C., 1964. Original paper binding 9 1/4" h, 6 1/4" w; pgs. xii, 184, 85 figures, most of instruments. Very fine condition. (postpaid) $ 75

38. Amedée Burat, "GÉOLOGIE APPLIQUÉE - TRAITÉ DU GISEMENT ET DE L'EXPLOITATION DES MINÉRAUX UTILES", 4th Ed, in two vols, L. Langlois, Paris, 1858, 59. Later half leather fine bindings 8 3/4" h, 5 3/4" w; pgs. I. ("GÉOLOGIE PRATIQUE") 550, 29 PLATES (some double page, 2 of them large folding maps) and 49 text figures; II. ("EXPLOITATION DES MINES") 540, 33 plates (of 34, lacking Pl. XIX, "disposition . . . machines a molettes"), 192 text figures. Extremely fine condition. The 1st edition of the 1st part of this extensive work seems to have been published in 1843. This one includes more material and the whole work has been revised and updated. (In French) (postpaid) $ 145

The First Systematic, If Theological, Geology - In Four Parts

39. Thomas Burnet, "TELLURIS Theoria Sacra: ORBIS NOSTRI ORIGINEM & Mutationes Generales, quas Aut jam fubiit, aut alim fubiturus eſt, COMPLECTENS. LIBRI DUO PRIORES DE DILUVIO & PARADISO", Vol 1 (Books I & II), 2nd Ed, Kettilby, London, 1689; "LIBRI DUO POSTERIORES DE Comflagratione Mundi, ET DE Futuro Rerum, ET DE Statu", Vol. 2 (Books III & IV) (1st Ed), Kettilby, London, 1689 (1688 on separate Book IV title page). Original leather binding (the 2 vols bound as one) 8 1/4" h, 6 1/2" w; pgs. 1: frontis plate, title, (12), 287, 10 engravings, most almost full page, printed on text pages; 2: repeat of original frontis plate (depicting the Earth in its 7 states), title, (16), 262, (1), engraving on p. 149. Binding with edge and spine wear and weak hinges but still somewhat sound, contents in very fine condition. According to Rees' Vol XXII, in the article 'Earth', the author (1635-1715) was "a man of genius and taste" and the first to treat the geology of the Earth in a systematic manner. "Under the ſplendor of his conceptions and the elegance of his ſtyle, he has had the art to conceal feeble arguments, and erroneous principles, of philoſophy. . . . Burnet ſupoſes that the primeval earth was a fluid maſs composed of heterogeneous materials, the heavieſt of which deſcended to the centre, and there formed a hard and ſolid body. The water was collected round this body . . . Between the orbs of water and air was interpoſed an oily matter, upon which the earthy impure particles, blended with the air deſcended, and formed with it a cruſt of earth and oil. . . . The ſurface of the earth was level and uniform, without mountains, ſeas, or other inequalities, . . . The earth at length was rent in pieces, and the waters guſhed out, with ſuch force and in ſuch abundance, as to overwhelm the dry land and occaſion the univerſal deluge. After a certain period the water ſubſided into the cavities that were left between the ſolid maſſes of earth, and as theſe cavities were filled with water, the earth appeared in the moſt elevated parts, and the lower parts or valleys were occupied by the water which formed the ocean."

In Vol V of Rees' it is pointed out that this theory "was much applauded on its first appearance, and many perſons were ſeduced by the invention and ingenuity diſplayed in it, and by the elegance of its compoſition. . . . The mathematicians, however, were not ſo eaſily ſeduced." More on the life of Burnet and his theories is to be found in Rees and the DNB. The 1st edition of books I and II (Vol 1) on the "Deluge" and "Paradise" was in 1680. The 2nd edition (here) was issued simultaneously with the 1st edition (also in Latin) of Books III and IV (Vol. 2), which detail the coming conflagration and the reconstruction of the Earth thereafter - resulting in the first complete edition of the entire work. Editions in English of Vol. I appeared in 1684 and Vol. 2 in 1690. This work represents (the somewhat erratic) beginnings of the science of geology. (In Latin) (postpaid) $ 325

40. Abel Flint, (AUTOGRAPH LETTER), Hartford, Conn., Sept. 30, 1824. Two page letter 9" h x 7 1/4" w addressed to Nathaniel Goodwin of Hartford for his use as a testimonial as to the value of a plotting instrument invented by him. It reads, in part; "This certifies that I have examined a Mathematical instrument called a Rectangular Protractor, invented by Nathaniel Goodwin Esqr. a surveyor in Hartford County, Connecticut, the design of which is to protract fields, by the Northings and Southings, Eastings and Westings, as found by the system of Rectangular Surveying. The instrument appears to me to be well calculated to answer the object in view; . . . I therefore recommend it, as an assistant to the practical Surveyor, . . . ". There is also a note from Flint to Goodwin with some suggestions of a practical nature in reference to selling the instrument. The letter is in fine condition with 2 small holes at the folds and a larger hole where a wax seal was once attached. (postpaid) $ 120

41. Abel Flint, "A SYSTEM OF GEOMETRY AND TRIGONOMETRY: TOGETHER WITH A TREATISE ON SURVEYING . . . LIKEWISE, RECTANGULAR SURVEYING;", 4th Ed, Cooke & Hale, Hartford, 1818. Original leather binding (some surface wear but otherwise in sound, very good condition) 8 1/2" h, 5 1/4" w; pgs. 80, 88 (tables), 4 engraved folding plates. Contents fine except for some light foxing. The 1st edition was issued in 1804 and Karpinski lists 15 separate issues through 1854. Changes, sometimes significant, were made from edition to edition, representing changing American practice over the 1st half of the 19th century. (postpaid) $ 45

Third American Edition

42. Robert Gibson, "A TREATISE OF Practical Surveying: WHICH IS DEMONSTRATED FROM ITS FIRST PRINCIPLES. WHEREIN EVERY THING THAT IS USEFUL AND CURIOUS IN THAT ART, IS FULLY CONSIDERED AND EXPLAINED. . . . WITH ALTERATIONS AND AMENDMENTS, ADAPTED TO THE USE OF AMERICAN SURVEYORS.", 6th Ed, Joseph Crukshank, Philadelphia, 1792. Modern full leather binding 8 1/4" h, 5 1/4" w; pgs. viii, 288, 64 page section of tables dated 1794, 12 foldout engraved plates. Generally very good condition except for some staining and foxing, deterioration of the outside edged of the plates (particularly Pl. 7). The 1st American edition (called the 4th) was published in 1785, taken directly from one of the London versions (4th Ed?) of the period. The 1st edition may have been issued in Dublin c. 1750 and Taylor 2 notes a 2nd London edition of 1767. The author may well have been the Dublin surveyor (fl. 1731-61?) who held the post of examiner of applicant surveyors to the Surveyor General of Ireland, and was also a teacher of mathematics (Temple Lane, Essex St., Dublin, 1752 and Anglesey St., 1754). (postpaid) $ 140

Fifth Philadelphia & Seventh American Edition

43. Robert Gibson. "A TREATISE OF Practical Surveying; WHICH IS DEMONSTRATED FROM ITS FIRST PRINCIPLES", 8th Ed, (actually 5th Philadelphia & 7th American), Joseph & James Crukshank, Philadelphia, 1803. Original leather binding 8 1/2" h, 5 1/4" w; pgs. viii, 288, 152 (tables), 13 foldout plates. Good condition, the binding with edge wear and partially cracked, but tight hinges, contents sound but stained and foxed, end papers lacking. All of the pre-War of 1812 editions tend to be rare. (postpaid) $ 75

The Rare First Edition

44. John Gummere, "A TREATISE ON SURVEYING, CONTAINING THE THEORY AND PRACTICE: TO WHICH IS PREFIXED, A PERSPICUOUS SYSTEM OF PLANE TRIGONOMETRY.", (1st Ed), Kimber & Richardson, Philadelphia, 1814. Original leather binding with red label 8 3/4" h, 5 1/2" w; pgs. v, (5), (9)-202, 152 (tables dated 1814), 8 foldout engraved plates. Generally fine condition with light foxing, a weak front hinge, and wear to edges of the spine. This was possibly the most popular American book on surveying ever published for it continued to be published for more than a century, Karpinski noting that there was an edition as late as 1917. The author (1784-1845), although largely self-taught, was recognized as one of the ablest mathematicians in the United States of his time. He was an active contributer to the Transactions of the American Philosophical Society (Philadelphia). His source of income was, primarily, from teaching and running schools: Horsham, Pa., 1803-05; Rancocas, N. J., 1806-11; Burlington, N. J., 1814-33; Haverford, Ma, 1833-44; and then back to Burlington, N. J. He was also the author of an "Elementary Treatise on Astronomy", 1822. (postpaid) $ 175

45. John Gummere, "A TREATISE ON SURVEYING", 14th Ed (14th issue), Thomas, Cowperthwait, & Co., Philadelphia, 1846. Modern leather binding 9 1/4" h, 5 3/4" w; pgs. title page, (5)-266, 152 (tables), 11 plates. Very fine overall condition except for edge stains to the front blanks and title leaf and large water stains to the plates. Edition numbering is as erratic as 'Gibson' with a jump from 8th to 14th in 1838, and all subsequent editions through 1850, also called the 14th. (postpaid) $ 60

Latin American Edition of Noted Catalog

46. W. & L. E. Gurley, "Manual y Catalogo Gurley INSTRUMENTOS de INGENIERÍA para Trabajos de Campo y de Oficina, . . . Adaptacion al espanol y el systema métrico por Alexander Ramoneda, Ing.", W. & L. E. Gurley, Troy, N. Y., (1915). Original (well worn) leather backed stiff paper covers 9" h, 6" w; 167 pgs with many illustrations. Contents fair to good with many pencil annotations and several inserted loose sheets of paper. (In Spanish) (postpaid) $ 35

A Major German Treatise, Extensively and Well Illustrated

47. 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. (5 leaves 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. The layout of this book is a typographical delight. (In gothic letter German) (postpaid) $ 375

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We will accept hold requests by telephone pending your prompt written confirmation with payment. We expect to hear from residents of the U.S. within 4 business days, and from our overseas customers within a reasonable time span.

62. George E. Davis, "PRACTICAL MICROSCOPY", 2nd Ed, David Bogue, London, 1882. Original cloth binding 8 1/2" h, 5 1/2" w; pgs. colored frontis plate, viii, 355, (1), 257 text figures. Binding in very good condition, contents fine. This English work has the unusual feature of extensive descriptions of American equipment (later editions introduced German equipment as well) and a balanced discussion of their merits. Indeed, the book is very much equipment oriented, even presenting information not to be found in Hogg or Carpenter. (postpaid) $ 45

63. Simon Henry Gage, "THE MICROSCOPE DARK-FIELD EDITION", 14th Ed, Comstock Publishing, Ithaca, N. Y., 1925. Original cloth binding 9 1/4" h, 6" w; pgs. ix, 517, 277 text figures, plate with portraits of 9 great innovators in optical design. Very fine condition. The first edition of this major American work on microscopy was published in 1881. This edition contains a large amount of technical information relative to instrument design. (postpaid) $ 32

64. Philip Henry Gosse, "EVENINGS AT THE MICROSCOPE; OR, RESEARCHES AMONG THE MINUTER ORGANS AND FORMS OF ANIMAL LIFE.", American reissue of 1st ed, D. Appleton, New York, 1896. Original half leather binding 7 3/4" h, 5 1/4" w; pgs. xii, 480, over 110 text illustrations. Fine to very fine overall condition. This detailed book for the amateur microscopist was first printed in England in 1859. (postpaid) $ 30

65. Jabez Hogg, "THE MICROSCOPE: ITS HISTORY, CONSTRUCTION, AND APPLICATION", New (6th) Ed, George Routledge & Sons, London, (1867). Original cloth binding (slight edge wear) 7 3/4" h, 5" w; pgs. xx, 762, 8 colored plates, 362 text figures. Very fine condition. The first edition of this standard reference was in 1854. The 2nd was a major enlargement. The 3rd was another revision while the 4th and 5th represented no major change. However, this, the 6th, (the 7th was mostly unchanged) represented another major revision and enlargement and is important in a complete sequence of editions. (postpaid) $ 65

66. Edwin Lancaster, M.D., "HALF-HOURS WITH THE MICROSCOPE", New (3rd) Ed, C. Arthur Pearson, London, n.d. (c. 1920). Original red cloth binding 6 3/4" h, 4 1/2" w; pgs. xxiv, 118, (2), 8 full page plates. Fine overall condition with slight edge wear to the binding. This well known book was intended as an introduction to the use of the microscope; but for adults, not students, and seemingly those with a professional background. The format allows an intelligent, educated person with but limited time (hence the "half-hours") to teach himself the use of the instrument. (postpaid) $ 15

First Four Years of American Magazine

67. "THE MICROSCOPE AND ITS RELATION TO MEDICINE AND PHARMACY", 4 Vols bound in 2, Ann Arbor (Michigan), 1881-4. Old 3/4 leather bindings, rebacked, 8 1/2" h, 5 3/4" w; pgs. 197, (3), 211, (3), 240, 5, 285, and many text illustrations. All but Vol. III have separate indexes. Generally fine condition with a little edge wear to the covers. This magazine was edited and published by Charles H. Stowell, M.D., and F.R.M.S. (postpaid) $ 65

68. Rev. J. C. Wood, "COMMON OBJECTS OF THE MICROSCOPE.", (1st Ed), Routledge, London, n.d. (c. 1890). Original cloth binding 6 3/4" h, 4 1/4" w; pgs. iv, 132, 12 colored plates. Fine overall condition with minor light foxing. This is a description of interesting objects for microscopic inspection together with details of their preparation as slides and instructions for optimum viewing. (postpaid) $ 27

69. Rev. J. G. Wood, revised by E. C. Bousfield, "COMMON OBJECTS OF THE MICROSCOPE", 3rd Ed, Routledge, London, 1902. Original printed paper covered boards binding 7 1/2" h, 5" w; pgs. x, (2), 186, 14 monochrome plates. Very good to fine overall condition except for edge wear to binding. An enlarged version of the original work. (postpaid) $ 23

70. (Zeiss Microscope Catalog), "MICROSCOPES AND MICROSCOPICAL ACCESSORIES", 29th Ed, Carl Zeiss Optische Werkstatte, Jena, 1891. Original cloth binding 10 3/4" h, 7 1/4" w; pgs. (6), 125, 59 text figures of equipment. Ex library copy with worn spine and weakening (although sound) hinges, contents fine. Text in English. (postpaid) $ 75

APPLIED MATHEMATICS & COMPUTATION

71. Bernard Forest de Belidor, "Neuer CURSUS MATHEMATICUS Zum Gebrauch Der Officiers von der Artillerie, Und Der Ingenieurs . . . ", (1st Vienna Ed), Johann Joseph Penk, Wien (Vienna), 1746. Modern full leather binding 9" h, 7" w; pgs. (20), 539, (5), elaborately engraved frontis plate, 34 engraved folding plates. Text in extremely fine condition except for these few minor faults: frontis plate & title page with one repaired tear each and worn edges, and 5 leaves near end with stained upper corners not affecting the text. The author (c. 1693-1761) was an expert on artillery, fortifications and large scale civil engineering. Born in Catalonia, Spain, he had been Royal Professor of Mathematics at the Artillery School of la Fère, member of the French Academy of Sciences, and held several military posts as a Colonel of the infantry. The first edition of this large and impressive work was published in French, in Paris, in 1725. It starts with basic mathematics and then has detailed sections on fortification, ballistics, mechanics, and hydraulic engineering. The plates of the copy here match those of the French editions. The author also wrote specialized books on ballistics (1731), fortification (1735), and hydraulics (1737-53). (In gothic letter German) (postpaid) $ 165

Did Capra Invent Galileo's Sector?

72. Balthasar Capra, "VSVS ET FABRICA CIRCINI CVIVSDAM PROPORTIONIS, Per quem omnia ferè tum Euclidis, tum Mathematicorum omnium problemata facili negotio refoluuntur.", (1st Ed), H. E. de Duccijs, Bononiae (Bologna), 1655. Modern leather binding 10 1/4" h, 7 1/2" w; pgs. (6), 80, many text woodcuts including a full page one of the sector and others showing its construction and use. Extremely fine condition. The author (1580-1626) an Italian astronomer and philosopher is best known for his challenge of Galileo as the inventor of the compass (or circle) of proportion, or sector. This book was written in 1607 (although not published until 1655) which was after Galileo's first disclosure, about 1598. The student of the life of Galileo as well as of computational technology will find that this book presents important information even if it does not resolve the dispute. (In Latin) (postpaid) $ 255

73. William Crakelt, "A NEW AND COMPLETE TREATISE OF SPHERICAL TRIGONOMETRY: . . . contained . . . SOLUTIONS OF THE SEVERAL CASES OF SPHERICAL TRIANGLES, . . . A COMPREHENSIVE THEORY of the FLUXIONS of thefe TRIANGLES . . . TRANSLATED FROM THE FRENCH OF MR. MAUDIT", (1st and only? ed), W. Adlard, London, 1768. Modern leather binding 8 1/4" h, 5 1/8" w; pgs. xv, (1), 216, 2 folding engraved plates. Generally fine condition although some staining, particularly the 2 plates. Crakelt (1741-1812), known as a classical scholar, was also master of Northfleet grammar school and (from 1774) vicar of Chalk. He edited and published various editions of Entick's dictionaries. (postpaid) $ 60

74. Jeremiah Day, "A COURSE OF MATHEMATICS: CONTAINING THE PRINCIPLES OF PLANE TRIGONOMETRY, MENSURATION, NAVIGATION, AND SURVEYING. ADAPTED TO THE METHOD OF INSTRUCTION IN THE AMERICAN COLLEGES.", parts II, III, IV, each with separate title page and pagination , (reissued 4th Ed), Durrie & Peck, New Haven (Conn.), 1838. Original leather binding 8 3/4" h, 5 1/4" w; pgs. (6), 155, 3 foldout plates, (4), 96, 2 foldout plates, (4), 119, 3 foldout plates. Fine condition except for some foxing and a missing front flyleaf. Part I, Algebra (1st edition in 1814), was always issued separately. The parts here, initially issued separately in 1815, 1811, and 1817, first appeared together in 1831 as the 3rd edition. The 4th edition was in 1836 with reissues in 1838 (this one), 1839, and 1848. The author (1773-1867) was professor of mathematics and natural philosophy at Yale from 1803-17, at which time he was appointed president, a position he held for 30 years. (postpaid) $ 45

The Combined Geometry & Optics

75. "Euclidis Megarenſis mathematici clariſsimi Elementorum geometricorum libri xv. Cum expoſitione Theonis in priores XIII à Bartholomaeo Veneto Latinitate donata, Campani in omnes, & Hypſiclis Alexandrini in duas poſtremos. His adiecta ſunt Phaenomena, Catoptrica & Optica, deinde Protheoria Marini & Data, Poſtremum uero, Opuſculum de Leui & Ponderoſo, hactenus non uiſum, eiuſdem autoris.", Iohannem Hervagium, Basileae, 1546. Early vellum binding 12 1/2" h, 9" w; pgs. (8), 587, (1), hundreds of text diagrams. Binding worn and slightly shorter than text (shrinkage?), deterioration of end papers, stains at beginning and end causing small tears in last text leaf, yet contents otherwise very fine (clean & crisp) resulting in a very presentable volume. Early signatures on title page of "Noirfontaine" (?, crossed out) and "Jacques de Buissonrond". This is a reissue of the 1537 Basel edition of the 'Geometry' and includes the Philipp Melancthon preface dated 1537. The Bartholomaeus Zambertus 'Data' is dated M. D. V. VIII. Several pages at the beginning have extensive marginal annotation. (In Latin) (postpaid) $ 495

Galileo's Invention of the Sector

76. Galileo Galilei, "LE OPERAZIONI DEL COMPASSO GEOMETRICO, ET MILITARE", Terza (3rd) Ed, Paolo Frambotto, Padova, 1649. Old (but possibly not original) hard vellum binding 8 1/2" h, 6 1/2" w; pgs. title, (6), 80, folding engraved plate of the sector, and many text woodcut illustrations. Very fine overall condition. Galileo seems to have invented his "compasso geometrico", also called compass of proportion, or sector (in the English speaking world) about 1597 and disclosed it about 1598. The first edition of this, his first book, was published in 1606 with, it seems, less than 60 copies issued. It was reprinted in 1619. A second, improved edition was issued in 1640 by the same publisher of the third, which is offered here. The instrument itself with linear, square, cube and other scales upon it, made it possible to calculate the ratios between linear dimensions of planar and solid bodies by setting the angle of the sector to desired ratios of the areas or volumes of such bodies, and the inverse. Edmund Gunter was then to add his logarithmic scales to Galileo's sector and further extend its use. This is a major book in the history of computers. (In Italian) (postpaid) $ 635

77. Sylvestre François LaCroix, "TRAITÉ ÉLÉMENTAIRE DE TRIGONOMÉTRIE RECTILIGNE ET SPHÉRIQUE, ET D'APPLICATION DE L'ALGÈBRE A LA GÉOMÉTRIE.", 3rd Ed, Courcier, Paris, AN XII (1803). Old hard vellum binding, later vellum rebacked, 8" h, 5 1/8" w; pgs. xxviii, 265, (1), 5 foldout engraved plates. Fine plus overall condition. The author (1765-1843) studied under Monge (noted for his handbook or the Revolution on the construction of cannons), held a number of educational posts including professor at l'École Militaire and the Collége de France, becoming a member of the French Academy of Science in 1796. Author of several books in mathematics, he provided the first definition of definite and indefinite integrals and worked on the theory of differential equations and functions of a real variable. (In French) (postpaid) $ 65

78. A. Nesbit & W. Little, "A TREATISE ON PRACTICAL GAUGING", New Ed, Wilson & Sons, York, 1826, bound with A. Nesbit & W. Little, "A KEY TO NESBIT'S and LITTLE'S PRACTICAL GAUGING, CONTAINING THE SOLUTIONS TO ALL THE QUESTIONS which are not answered in that WORK; WITH REFERENCES TO THE PROBLEMS, RULES, and NOTES", same publisher and date. Original half leather binding 7" h, 4 1/4" w; pgs. I. xii, 281, 40, (3); II. title, xxiv, 531, 20. Fine condition except for binding edge wear and weakening hinges. Many areas of measurement are covered although the most interesting are the extensive sections on how to evaluate and tax alcoholic beverages. (postpaid) $ 45

79. Jacques Ozanum, "USAGE DU COMPAS DE PROPORTION, ET DE L'INSTRUMENT UNIVERSEL. Pour résoudre promptement & très-xactement les Problêmes de la Géométrie practique, tant sur le papier que sur le terrein, sans aucun calcul. Avec un Traité de la Division de Champs.", Nouvelle Édition, Claude-Antoine Jambert, Fils, Paris, 1769. Original leather binding 6 3/4" h, 4" w; pgs. xx, (4), 240, 12 foldout engraved plates. Extremely fine overall condition except for some wormholes in the binding (none in the contents). The first edition of this work was published in Paris in 1688 becoming the standard text on the sector in France during the next half century. Ozanam (1640-1717) was one of the leading French mathematicians of his time. Not only did his books go through many editions in France, but a number were also translated into English by Moxon, Raphson, Desaguliers and others. (In French) (postpaid) $ 165

80. John Potter, "A SYSTEM OF Practical Mathematics:", 2nd Ed, for the author, London, 1757. Original leather binding 8" h, 5" w; pgs. title, (6), viii, 395, (1), (135, tables), many text diagrams. Ex library copy (stamps on title page) in generally fine condition except that the hinges are cracked, but tight, and there is some page darkening, the first and last being the most noticeable. Taylor 2 dates the 1st edition to 1753 and remarks, "Potter wrote for the use of schools and artificers and deals briefly with the application of mathematics to mensuration, surveying, astronomy, dialling, and the calendar. He acknowledges assistance from the mathematical teacher Triplett and he received a testimonial from Nathaniel Hammond 'of the Bank' (of England)." The first edition contained an advertisement by Heath and Wing for their mathematical and philosophical instruments. (postpaid) $ 70

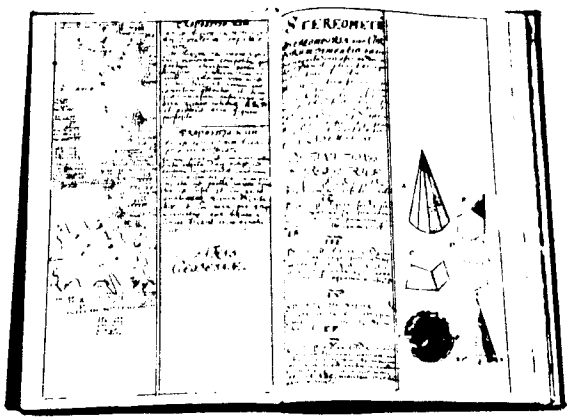
Two Volume Collected Works of the Inventor of the Ballistic Pendulum

81. Benjamin Robins (James Wilson, editor), "MATHEMATICAL TRACTS . . . VOL. I. Containing his NEW PRINCIPLES OF GUNNERY, with ſeveral ſubſequent DISCOURSES on the ſame Subject, the greateſt Part never before printed. . . . VOL. II. Containing his DISCOURSE ON THE METHODS OF FLUXIONS and of PRIME AND ULTIMATE RATIOS, with other Miſcellaneous Pieces.", J. Nourse, London, 1761. Original half leather bindings 8 3/4" h, 5 1/2" w; pgs. I. xlvi, (2), 341, (3), 3 engraved plates; II. 380, text figures. Very fine condition, the pages uncut, minor wear to the board covers. The author (1707-51), a self-taught mathematician was elected a Fellow of the Royal Society when only 20 years old, invented the ballistic pendulum in 1742, and received the Copley medal in 1747. Most of Vol. I was first printed in 1742, the other sections having been first issued through 1751. Some of the mathematical studies (dating from 1727) were found in manuscript form, unpublished, at the time of his death. The sections on ballistics include comparisons of experimental data with theoretical predictions. Interestingly, Robins discovered the great anomalies which occur with muzzle velocities just above the speed of sound but was unable to explain them in terms of non-linear air resistance (shock wave effects). Indeed, it was not until well into the 20th century that we have been able to handle the mathematics of such problems. (postpaid) $ 245

82. Robert Simson, "ELEMENTS OF THE CONIC SECTIONS", 2nd Ed, James Dickson and William Creech, Edinburgh, 1792. Original (temporary) board covers, later rebacked, 9" h, 5 1/2" w; pgs. (6), 284, (3), 14 foldout engraved plates. As issued, pages untrimmed, very fine overall condition except for the use of paper strips reinforcing front and back hinges and the half title page. The work is in 3 "books": the parabola, the ellipse, and the hyperbola. The author (1687-1768), Regius professor of mathematics at the University of Glasgow, 1711-61, was also a student of the geometry of ancient times. The first edition of this work (in 5 books) was published in Latin in 1735. (postpaid) $ 50

Mathematical Notebook Over 300 Years Old

83. "John Spencer His Booke", MATHEMATICAL COMMONPLACE BOOK, English, possibly London, c. 1665. Cloth binding, c. 1900, 12 1/2" h, 8" w; 152 pgs. with 5 of them blank (the 4th blank signed as above) and half of one page cut out (to provide the paper for the cutouts of the developed surfaces of various solid figures found pinned to margins on various pages of the book?). Rather nice overall condition with minor stains in a few spots. The subjects covered "Principia Geometriae", followed by 21 problems and 14 theorems; "Trigonometria Triangulorum Planorum", followed by "Exempla Trigonometriae Practicae", 10 problems in surveying with pen and colored wash drawings in the margins of nine pages; miscellaneous recipes: "to make red inke", "notes for ye using of colours" and geometrical problems; notes on progression, on formal and pyramidal numbers, on various numerical problems; tables of square, cube, and triangular numbers and other variables of all numbers from 1 to 1000; a list of "geometrical writers", and axioms and problems in "geodesia planorum", "stereometria" and "horologium" (theory and design of sundials) with pen and colored wash drawings in the margins of 14 pages. There are a good number of other diagrams and tables throughout the book. In the section on inks and paints the author provides "Notes for ye using of Colours w'ch Mr. Mathews received from Thomas Lewes of Wapping dwelling at ye signe of ye seacompasse.", which suggests the London origin of this work. However, we have had no luck in locating either of the gentlemen named. The most recently published book given in reference is John Collins' "Sector on a Quadrant", (1st edition 1658) by the presentation of a problem for the year 1663 to be worked upon Collins Quadrant. All the authors listed under "Geometrical writers" were published at earlier dates. Thus it appears to us that parts of this book (it may have been written over a period of several years) do not predate 1658 but can not be much later than 1663 either. Here is an unusual opportunity for the scholar interested in mathematical education in 17th century England. (Text in Latin & English) (postpaid) $ 475



OPTICAL THEORY AND DESIGN

84. Sir David Brewster, "A TREATISE ON OPTICS", New Edition. With An Appendix . . . By A. D. Bache, Lea & Blanchard, Philadelphia, 1839. Original faded cloth binding 7 1/2" h, 4 1/2" w; pgs. 323, viii, 9-95, 196 text figures. Fine overall condition with light spotting at front and back. This work was first issued in London in 1831 as an independent volume of Lardner's Cabinet Cyclopaedia. It was corrected and augmented for American publication in 1833 by Prof. A. D. Bache of the University of Pennsylvania. The author (1781-1868), Scottish scientist, F.R.S. 1815, was one of the great scientific innovators in 19th century Britain. He was noted for his researches into polarization of light, the diffraction grating, double refraction, absorbtion and reflection of light at metallic surfaces, and the optical properties of many different materials. He invented the Kaleidoscope, formulated the laws of and devised instruments for stereoscopic imaging, and was the author of numerous scientific papers and books. (postpaid) $ 50

85. George Lindsay Johnson, "PHOTOGRAPHIC OPTICS AND COLOUR PHOTOGRAPHY Including The Camera, Kinematograph, Optical Lantern, And The Theory And Practice of Image Formation", Ward & Co., London, 1909. Original cloth binding 8 5/8" h, 5 3/4" w; pgs. x, (2), 332 (including 28 of camera ads), 14 full page plates (5 in color) and 170 text illustrations. Fine overall condition. This book is on the processes of image formation from the point of view of both optics and emulsion. It deals at some length with achromatism; Fresnel's theories of wave motion, interference, and polarization; the theory of lens systems and the equivalent planes of Gauss; and diffraction theory of microscopic objective imaging. All of these are related to actual instrumentation. (postpaid) $ 55

86. William Kitchiner, M.D., "THE ECONOMY OF THE EYES: PRECEPTS FOR THE IMPROVEMENT AND PRESERVATION OF THE SIGHT. PLAIN RULES WHICH WILL ENABLE ALL TO JUDGE EXACTLY WHEN, AND WHAT SPECTACLES ARE BEST CALCULATED FOR THIER EYES. OBSERVATIONS ON OPERA GLASSES AND THEATRES, AND AN ACCOUNT OF THE PANCRATIC MAGNIFIER, FOR DOUBLE STARS, AND DAY TELESCOPES.", (1st Ed), Hurst, Robinson & Co., London, 1824. Original cloth binding 6 1/2" h, 4 1/4" w; pgs. viii, 246, (2), 2 engraved plates. Generally fine condition with some wear to the binding and partial cracks to the front hinge. The author (1775?-1827) educated at Eton, with an M.D. from Glasgow, and independent income from his father, a coal merchant, was an amateur scientist in the true British sense. His studies of optical instruments, primarily astronomical telescopes, led to an understanding of optical resolution which was not improved upon until the advent of diffraction theory. He identified resolution as a function of aperture (diffraction limit), optical design (transfer functions), and quality of workmanship. He tested and evaluated telescopes by most of the leading 18th and early 19th century opticians. He was the first to identify "empty magnification". His "Practical Observations on Telescopes", first version in 1815, provided the first scientific evaluations of telescopic optics. His studies demonstrated the role of human vision as a limit on optical instrumentation, thus leading to the work here. (postpaid) $ 125

Second Edition, Second Issue

87. Sir Isaac Newton, Knt., "OPTICKS: OR, A TREATISE OF THE Reflections, Refractions, Inflections and Colours OF LIGHT.", 2nd Ed with Additions, W. & J. Innys, London, 1718. Modern full leather binding 8" h, 5" w; pgs. title, (4), (1), (1), 382, (2) [book catalogue of W. Innys], 12 foldout engraved plates. The work is complete according to Gray's no. 176. Very fine overall condition except for minor foxing. Only very slight alterations to the text, the resetting of the first 2 pages of the Advertisement to the 1st edition, and a new title page differentiate this book from the 1st issue of the 2nd edition of 1717. (postpaid) $ 750

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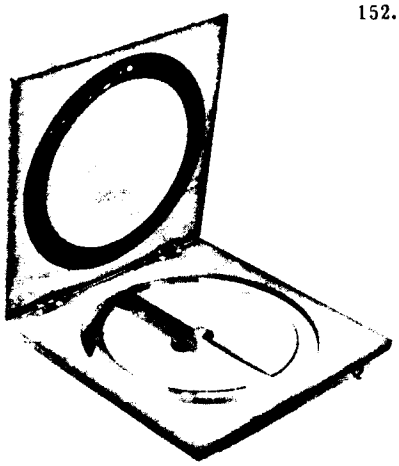


152. **LARGE CASED FULL CIRCLE PROTRACTOR** - English, mid 19th c?, signed "Troughton & Simms, London". Electrum metal, or German silver, 10" d, scale on beveled edge graduated to 15 arcmin intervals and numbered clockwise every 10 degrees. Original lidded mahogany case 11 1/2" sq x 1" thk in almost fine condition. The protractor is very fine, even with a few very small nicks at the edge of the scale. This is a particularly elegant item in keeping with the high quality of workmanship associated with its makers. (8 lbs UP) **$ 375**

153. **EARLY ELEGANT GRAPHOMETRE** - French c. 1700, signed "Butterfield AParis". Bright brass, restored lacquer finish, 8 3/4" across the major diameter, the semi-circular readout scale of 3 3/8" (85 mm) radius, and the pivoting alidade 6" long. The scale is divided to degrees and the verniers on the alidade read to 5 arcmins. The sight vanes are 1 15/16" h, the silvered face compass 2" d with a 1 1/2" needle; 6 1/4" overall ht including ball and socket staff mount. Excellent overall condition noting one (early) replacement nut and a 2 mm notch cut into the edge of one end of the alidade along side the vernier scale. No case.

Michael Butterfield and Nicolas Bion were the two most important instrument makers in France in the period about 1700. Daumas writes, "Biographical details on Butterfield are somewhat contradictory, and only the date of his death, 28 May 1724, is authenticated. Moreri says that he was eighty-nine years old, in which case he would have been born in 1635. He was undoubtedly of English nationality, . . . some biographers say that he came to Paris in 1715, others that he arrived in 1685. In fact, he must have been there even earlier, to judge from a prospectus he published in 1677 (plate 51)." He is best known for his bird gnomon pocket sundials. Next, in terms of survival, are sets of drawing instruments and components of such sets. Again, according to Daumas, "Apart from sun-dials and astronomical rings, relatively few of Butterfield's instruments survive today. Surviving instruments include graphometres, and a brass quadrant on an iron pedestal, . . . ". We offered a smaller and somewhat plainer example as Item 142 of Catalog 124. Item 129 of the Nachet collection is the same size and quality as the one here, with a slightly different cut-out floral pattern for the interior of the base plate. The Whipple surveying collection catalog does not list a single example by Butterfield. Thus, although a few of his surveying instruments are known, they are not at all common and any collection with even one would be somewhat special.
(6 lbs UP) **$ 2,395**

154. **EXTREMELY RARE "UNIVERSAL INSTRUMENT"** - French, c. 1800?, marked with the letters "P/D/JE" within a triangle and "DES/BOR/DES" within a square. Bright brass with original lacquer finish with a basic rectangular frame 8.5 cm x 11.5 cm (3 5/16" x 4 1/2") with one short side extended 3.8 cm. Three folding sight vanes (one double) are located on this structure plus a fitting for a handle. A pivoted alidade of 14.5 cm radius has large (12.3 cm h) and small (4.5 cm h) folding sight vanes and reads out on a tangent scale engraved on one long side of the rectangle. A plumb-bob can be suspended from the large vane. (A handle attaches to the frame so that it may be held either horizontally, as shown, or vertically. (The 4" h stand shown in the photograph is not original but is provided for display purposes.) The original 5 1/4" sq x 1 1/8" h black cloth covered fitted case (not shown) is in very good condition (some edge wear), the instrument is very fine.

Fabrication details of both the case and the instrument suggest a late 18th, or very early 19th century date for the instrument. We have been unable to find a Desbordes working in this period, but will not on this basis try to invent an early 18th century origin for the piece. The "Universal Instrument" is more a display of the designer's ingenuity than an item for use by a surveyor in the field. The readout scale has nominal graduations only (every 0.1) and so comes nowhere near the accuracy potential of the instrument. Versions first appeared on the Continent in the 16th century and one early form is described in the anonymous book "Methode de Lever les Plans et les Cartes de Terre et de Mer" published in Paris in 1693. Two "Universal Instruments" similar to this example are now on exhibit in the Science Museum, London. Keily, "Surveying Instruments Their History" describes several instruments under this designation but most have circular readout scales and none employ linear structures, suggesting that he was unaware of the type offered here. (4 lbs UP) **$845**

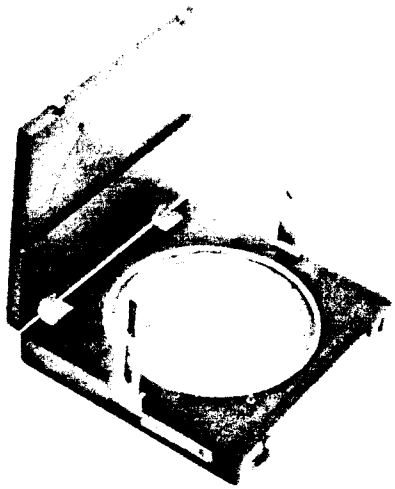
155. **UNIQUE AMERICAN DESIGN** - Wooden surveyor's compass, mid 19th c, signed "G. L. WHITEHOUSE, FARMINGTON, N. H.". Wooden construction (various fruitwoods?), 11" long, 6" d compass housing with printed paper dial and 4 7/8" needle, vertical sight vanes 5 5/16" h each, and horizontal sight vanes, 5 1/4" w each. The bubble vials are in wooden housings and the needle lifter is made of brass wire. Very fine overall condition and completely original except for the glass face plate which is a modern replacement.

Another example of this design is shown on p. 259 of Smart. The one there is of somewhat poorer workmanship and in our opinion dates from shortly before Whitehouse's death, while the example here appears to date from his most productive period. According to Smart, George Leighton Whitehouse was born in Middleton N.H. in 1797 and died in 1887. "From 1839 to 1871 he was engaged in surveys for railroads and canals in New Hampshire and Massachusetts. He was a member of the New Hampshire legislature in 1930 and again in 1856-57. His varied activities included judge of the court of common pleas from 1841 to 1855. He was a land surveyor for 60 years." To date, we know of no published discussion of the design aspects of this instrument. (7 lbs UP) **$ 895**

156. **LARGE OFFICE PANTOGRAPH** - English, 1st half 19th c, signed "Dollond , LONDON". Bright brass, original lacquer finish, the two outside arms 36 1/4" long each, one marked with ratio scales as is the shorter arm joined to it. There are 6 ivory wheeled casters, 1 fixed sleeve and 2 adjustable ones (on the ratio scale arms). The case contains the original 3 1/2" d lead pivot weight with its pivot rod, original brass pencil holder, and modern replacement brass tracer stylus. Original hand dovetailed mahogany case 37" long x 3 1/4"h x 5" w at one end and 2 1/2" w at the other, in fair to good condition with age cracks, missing case hooks, lock, and 2" long wood chip at lock position. The pantograph is fine except for a few dark spots and darkening of the lacquer finish, primarily on the long "C" arm.

A pantograph is used for reducing or enlarging maps or plots of one scale to another, sometimes for transferring partial plots to an overall area map. Dollond was England's major optical firm from the 1770's right on through the first half of the 19th century and still exists but now as a chain of optical retail stores. During the first half of the 19th century they seem to have offered a wide range of precision instruments, such as this pantograph, which one may suspect they had made for them by other specialist firms. The demand for their optical instruments was so great that it would be quite surprising if they had the shop capacity for other types of work. Needless to say, this pantograph is of top quality for they could not afford to hurt their overall reputation. (25 lbs UP) **$ 315**

157. **SURVEYORS FOLDING COMPASS** - English, 3rd qtr 18th c, signed "Whitehurst & Son/DERBY". Mahogany body and hinged cover 7 5/8" w x 7 1/4" deep x 1 5/8" thk (closed) 5 1/8" d silver faced compass with 3 3/4" needle, inserted from bottom, and bright lacquered brass 3 5/8" h folding sight vanes. The outer scale has the very unusual division into 32 numbered intervals, each subdivided in four. Fine overall condition noting that dial silvering is original, the lacquer finish on the vanes and case hooks is modern, and there is a very old repair (by brass straps) of a very old crack in the wooden case.



A similar compass with the same strange graduation, signed and dated "Jn Whitehurst Derby 1757", is to be found at the National Maritime Museum. Taylor 2 notes that John Whitehurst of Derby (1713-85), at Bolt Court, Fleet St. London after 1775, and F.R.S. 1779, "was a watchmaker, instrument maker and assayer, and ended his days as an officer at the Mint." Interestingly, he is best known for his geological theories expounded in his well known book, "An Inquiry Into The Original State And Formation Of The Earth; Deduced From Facts And The Laws Of Nature", 1778. The geologist John Playfair (noted for his exposition of the Huttonian Theory) seems to have been impressed by this work since it was he who proposed Whitehurst for the Royal Society. Whitehurst was also involved in designing and using experimental equipment so as to obtain "an invariable measure of length". (7 lbs UP) **$ 545**

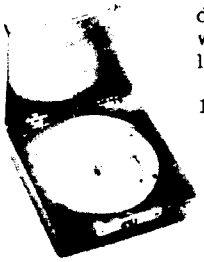
158. **PRESENTATION MARKING PROTRACTOR** - English, unsigned, engraved inscription on cover of case reads,

The Royal Indian Engineering College
Session 1881-82
Prize for Geometrical Drawing
AWARDED TO
(blank)
Student of the Second Year

Bright brass, original lacquer finish, 6" d circle with inlet silver scale divided to half degrees, opposing silver verniers reading to 1 arcmin. Tangent screw slow motion for the 3 5/8" long pivoted marking arms. Original hand dovetailed oak case 7 1/2" sq x 2 1/8" thk, missing original hand magnifier, but otherwise in fine condition. The instrument is very fine.

This instrument was particularly useful for field work when accurate work was required under adverse conditions. The pin marks would define a bearing line which then could be connected with a straight edge and pencil. We are not certain as to why the presentee's name was not filled in although we have found this situation before. (7 lbs UP) **$ 465**

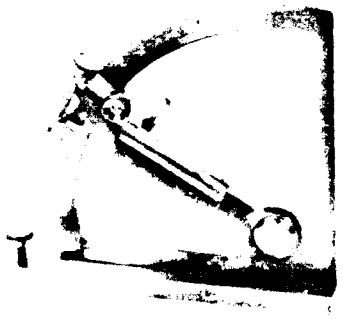
159. **DIPPING NEEDLE** - American, late 19th c, unsigned. Bright lacquered brass case and covers, 3 5/8" d x 1 1/4" thk (covers in place), 3 7/8" d folding loop handle, glass windows on both sides, and 2 1/2" needle in 2-degree of freedom mount. The silvered internal ring is graduated in degrees from 0 to 90 (at the bottom) and back to zero. Generally fine condition with the original finish somewhat darkened, particularly on the removeable covers. The needle seems to have lost its magnetism so that the instrument no longer functions correctly but is still satisfactory for display purposes. These dipping needles were made for two purposes: tracing veins of iron ore which would cause variations in the inclination of the local magnetic field, and locating buried iron pipes, boxes and survey markers. (3 lbs, UP, PS) **$ 125**



160. **MILITARY ENGINEER'S POCKET COMPASS** - American, signed and dated, "U.S. ENGINEER DEPARTMENT/W. & L.E. GURLEY, TROY, N.Y./1918". Lidded mahogany case 3 1/4" sq x 1 1/8" thk, 2 5/8" white faced compass with outer ring graduated in degrees and marked (counter clockwise) every 10 degrees; 2" needle. Very fine condition. (2 lbs, UP, PS) **$ 90**

161. **YOUNG STYLE TRANSIT DIVIDED ON RAMSDEN'S ENGINE** - American , 1860-70, signed "Knox & Shain/Makers/Philad" with a trade label within the case placing them at 716 Chestnut. Bright brass, restored lacquer finish, 11 3/4" h including the 4-screw leveling base with the 11" long rack and pinion focussing telescope horizontal. The 5 7/8" d compass housing contains a silvered outer ring graduated to half degrees, an interior azimuth scale appearing within a single vernier window and reading to 1 arcmin, and a 5" needle. Under the base plate are the knobs for the needle lifter, azimuth clamp screw, and azimuth drive pinion. The compass dial face has faded slightly from Young's patented black finish. The rear bubble tube is 2 1/4" long and the side one (mounted within the right standard) is 2" long. The original mahogany tripod has 58" legs. The original hand dovetailed walnut case, 9" x 12 1/2" x 10 1/4" h, is in very good condition as is the tripod (brass fine, legs sound but show rough usage). The transit is extremely fine (although lens cap missing).

This instrument should be compared with William J. Young's original transit (p. 175 of Smart) and his 2nd Model of 1837 (Item 154.of Catalog 124). Indeed a leading scholar of Philadelphia surveying instrument makers has noted "there is no more difference between the Young and Knox and Shain instruments than between different Young instruments." This is not surprising since Joseph Knox was Young's foreman from the early 40's until 1850 and Charles J. Shain served his apprenticeship with Young (1835-42) and worked for him until 1850. In 1851 both men formed a partnership to make telegraph and surveying instruments although they may not have started making surveying instruments until 1855 (the date given in Smart). The reason for this is that they did not acquire a dividing engine until then. Recent research by A.N. Stinson of the National Maritime Museum, Greenwich, has shown that Ramsden's circular dividing engine of 1774 was transferred to Matthew Berge in 1800. After his death in 1819 it was again transferred (in 1821) to Nathaniel Worthington who remained in business until 1852. It appears that Knox and Shain purchased this very same engine (now in the Smithsonian) from Worthington, probably when he closed his firm. It is most likely that it was at this point that they started making their own instruments. Their use of straight bubble levels dates this instrument after 1860. Although they did not move to 816 Chestnut until after 1869, the label in the case may date from a repair job, not the original manufacture. There was never much improvement by them over the original Young designs and by 1876 their instruments were considered to be of quite primitive construction. By 1880 they had sold Ramsden's engine to Professor Henry Morton of Stevens Institute of Technology, Hoboken, N.J. (2 UP packages, 25 & 28 lbs) **$ 1,295**



162. **ARTILLERY QUADRANT** - English, 4th qtr 19th c, signed "ELLIOTT BROS. LONDON". Bright brass, original deep gold lacquer finish, heavy base, 1 1/2" w x 9/16" h x 9" long, with adjustment screw at end, 7 7/8" h overall. The 6" radius quadrant scale is read out to 3 arcmin by the vernier on the pivoted arm with tangent screw slow motion. This arm is fitted with a 3" level bubble and a folding 1 5/8" crosslevel bubble. The quadrant frame is a heavy 5/16" thk (to stand up to battle conditions). Generally fine condition except for some dark spots to the lacquer finish, primarily on the side visible in the photograph. No case.

This instrument would be placed on the outside of a cannon barrel (after appropriate zero adjustment). Barrel elevation would be read from the scale once the longitudinal bubble had been set level. William Elliott (fl. 1825-54) founded the firm which became Elliott & Sons in 1850 and Elliott Brothers in 1854. (9 lbs, UP, PS) **$ 195**

163. **LARGE WOODEN ELEVATION THEODOLITE ON TRIPOD** - American, 1st half 19th c, possibly quite early, unsigned. Wooden semi-circular ring, 18" d, with 1" h v-notch and peep sights, 3 1/2" bubble vial (no liquid), suspended in 9 7/8" h standards, which in turn are located on a double base plate, 8 7/8" long x 4" w which can be leveled in the elevation plane. The leveling screws are wood and most joints are pinned with wooden pegs. There is also a wooden tangent screw assembly on the elevation axis (one connecting link is a modern replacement). An engraved copper elevation circle is attached to the outer edge of the elevation ring and is, rather roughly, graduated to degrees (do not show in the photograph). The wooden tripod with 56" legs and brass thumb nuts is later than the instrument, although still 19th c, but only now supplied for display purposes. Extremely fine overall condition considering natural aging and shrinkage of original materials.

It is suspected that this may be a patent model dating from the beginning of the 19th century rather than an instrument intended for actual use. The lack of fine graduations on the readout scale point in this direction although the craftsmanship involved is at least equal to that of other wooden instruments known to have been made for practical use. The elimination of an azimuth scale, however, limits the applications of such an item and again suggests an invention conceived more from a point of uniqueness than in response to an existing need. The basic design seems to have evolved from the Ramsden pattern of theodolite. A very impressive and probably unique American instrument.

(2 UP packages, 10 lbs each) **$ 995**

164. **CASED POCKET SURVEY COMPASS** - French for the English speaking market, late 19th c, marked "MADE IN FRANCE". Bright lacquered brass 3 5/8" d with 2 1/2" h black oxidized folding sight vanes, silvered compass dial 2 7/8" d with 2 1/4" needle. Original 4" d x 1 1/4" h case in simulated fishskin covering. The case is warped and shows edge wear but the compass is in very fine original condition.

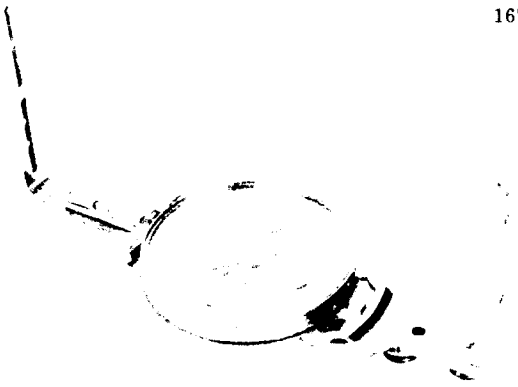
(3 lbs, UP, PS) **$ 155**

165. **MINE SURVEYOR'S COMPASS OUTFIT** - English, c. 1830-35, signed "TROUGHTON & SIMMS, LONDON" The compass is bright brass, original lacquer finish, base plate 9 7/8" long on to which slide the two 5" h sight vanes; 6 3/8" overall ht. The compass housing is 5 1/4" d with silvered dial and 4 3/8" needle within. Its 5 3/8" cover is engraved with two elevation scales, one in degrees and the other labeled "Diff of Hypo & Base". Within the case is a little plumb bob for use when the compass is turned sideways in its clinometer mode. The original hand dovetailed mahogany case, 10 3/4" w x 6 1/2" deep x 3 1/4" h, also contains the ball and socket joint and 3 tripod feet. A second, original hand dovetailed slightly tapered pine case, 27 1/2" long x 4 1/2" deep (max) x 4" h (max) holds the original 26 1/2" long shorty mahogany tripod with brass fittings. The compass case is in almost fine condition missing one internal fitting, the tripod case somewhat scared and stained (typical of soft pine), the tripod very fine with restored lacquer finish on the brass parts, and the compass very fine with original lacquer finish throughout with dark spotting at points of rubbing.

Troughton & Simms was established in 1826 when Edward Troughton (1753-1836), one of England's two greatest instrument makers (Jesse Ramsden was the other), took William Simms (1793-1860) in as his partner. Instrument design considerations and construction of the cases suggest that this outfit dates from just after the formation of the partnership. The compass, without bubble levels, a relatively short sight base and the elevation scale cover is typical of that used for British mine surveying. Fig 12, "Old English Miner's Dial" of Scott, et al, "The Evolution of Mine Surveying Instruments", N.Y. 1902 shows a later version of the same instrument. See also the written comments on pgs 14 and 15 of the same book. (18 lbs UP) **$ 795**

166. **MINIATURE 4-VANE CIRCUMFERENTOR** - English, c. 1800, possibly late 18th c, signed "Bleuler, London". Bright brass, restored lacquer finish, the base plate 5 3/4" d, overall ht 6 1/2" including the ball and socket joint for staff mounting. The outer (fixed) folding vanes are 1 1/2" h and the inner (rotating) folding vanes are 2 3/8" h. The azimuth scale on the base plate is graduated to degrees and there are opposing index lines (no verniers) on the beveled 5 5/16" d rotating top plate. Except for a thumb screw missing from the lower end of the ball and socket joint and some etching of the under surface of the base plate, overall condition is extremely fine. No case.

Taylor 2 lists John Bleuler (1757-1829) as apprenticed to Henry Shuttleworth in 1771 and worked with him until 1791, when he succeeded to the business of Thomas Whitford. Although not much more about him is listed in the references, two of his trade cards are illustrated (Plates 11 & 12) in the Science Museum's catalogue "Scientific Trade Cards". His known instruments display a high level of workmanship, one such example being the large ring dial sold as Item 108 in the Linton Collection sale, Paris, 1980. However, relatively few museums list even one of his instruments in their catalogs - none at the National Maritime, none in the Whipple Museum surveying instrument collection, none in the Van Marum collection in Holland, only one ebony quadrant at the Peabody Museum, Salem - leading us to conclude that any surviving work by him must be relatively rare. (6 lbs UP) **$1,450**

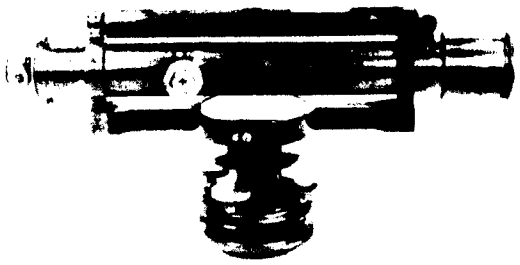


167. **MID-WESTERN SURVEYOR'S VERNIER COMPASS** - American, 5th decade, 19th c, signed "HENRY WARE, MAKER, CINCINNATI, O.". Bright brass, restored lacquer finish, 5 7/8" d silvered face compass with 5" needle on 14 1/2" long base plate. The orthogonal bubble levels are 2 1/2" and 2 3/4" long and the screw on sight vanes, 7 1/8" h. A pinion drive is used to set in the magnetic variation and a silvered dial surveying leg counter is viewed through a small opening near the variation vernier. The original hand dovetailed mahogany case, 7" x 15" x 4 3/4" h, has fittings for a ball and socket joint, but none is present. It is in very good condition except for chipped off wood at either end of the case. The compass is very fine.

Smart lists Henry Ware (1810-1885) born in Montpelier, Vermont as first appearing in the Cincinnati directory for 1839-40 at the corner of 5th and Sycamore. During 1855 and 56 there was a partnership of Ware and Hireman located on E. 4th Street, by 1858 Ware is listed by himself again still on E. 4th Street. A trade label within the case gives his address as the North East corner of Main and Fifth Sts. which would have to date from 1854 or earlier. There are unique design features of the instrument here which lead us to believe that was actually made by Ware. Thus he was one of this nation's earliest instrument makers west of the Allegheny Mountains.
(18 lbs UP) **$ 795**

168. **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 and readout scales, black finish to center region of the 3 1/2" d compass. Upper sighting cylinder 3 1/2" d, lower cylinder 4" d; 8" h overall. 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) **$ 335**

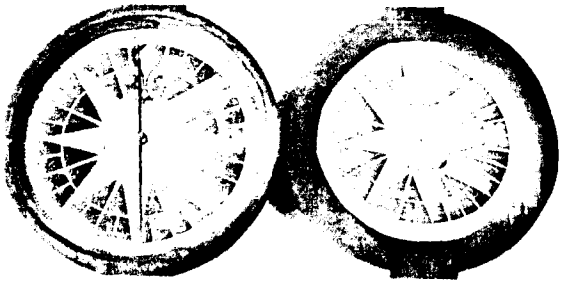


169. **SUBSTANTIAL DUMPY LEVEL, COMPASS MODEL** - English, 4th qtr 19th c, signed "Cary, London" and also with an owner's name, "W.R. Mansel". The black-oxidized brass instrument is 7 3/4" h including the screw-off 4-screw leveling base, has a telescope 15" long (min) extending to 18 3/4" by rack and pinion focussing and sliding forward objective lens (pivoted cover) sun shield. The telescope is fitted with 8 5/8" longitudinal and 2 3/4" transverse bubble levels. The 3 3/4" d compass is fitted with a floating graduated edge ring type needle but is missing its slip-in (and hence slip-out) scale magnifier. There is a clip-on mirror for observing the longitudinal bubble from the eyepiece position. Original hand dovetailed mahogany case, 20 1/4" long, 5 1/2" w, 5 1/4" h, in very fine condition, with an empty hole which once held a plumb bob. The level is in fine condition with original finish throughout, lightly rubbed in places.

William Cary (1759-1825) worked for Jesse Ramsden before founding his own firm in 1786. His nephews, George and John, assumed ownership in 1825. Even after they retired, Cary of London remained in business through the end of the century and even into the early part of the 20th when Porter was the actual owner. Throughout this time (more than a century) they maintained a reputation for first quality work, this level being no exception. (22 lbs UP) **$ 295**

170. **EXTREMELY EARLY AMERICAN SURVEYOR'S COMPASS** - c. 1740, the engraved compass card signed "Made by THOMAS GREENOUGH BOSTON N.England". Wooden instrument 14" long, compass 6 1/4" outside d, 1 3/4" thk overall. Compass card with sailing boat and lighthouse in center is 5 1/2" d. Compass needle, glass and 1 1/8" h brass sight posts are modern restorations. Original pine compass cover included. The wooden tripod with 47" long oak legs and 7 1/2" top section was not found with the compass, but is (in our opinion) 18th century American, made with wooden pegged joints, and typical of what may have been original to the compass. Compass and tripod are in very fine restored display condition.

When originally located, a second Greenough compass card with the figure with a Davis quadrant in the center, was pasted over the "lighthouse" card. (This card will go to the purchaser of the instrument.) Bedini shows this card as Fig. 46 and notes that of the five Greenough wooden compasses known to him, "The compass card in each of these five instruments is identical, designed for use in the mariner's compass (see fig. 46)." The bottom compass card here is the only known example of what is obviously his earlier design. Four of his five known wooden compasses have wooden vanes, the one in the Bucks County Historical Society has brass sights according to Smart, 6 5/8" h according to Bedini, but it is not known to us what shape they take. The compass here was found without any sign of ever having wooden sights. Rather there were longitudinal slits about 3/4" long each, one of which held the rusted remains of a thin iron blade. Based on this, two brass sighting vanes of the correct size were made and fitted into the slits. It is believed that this is the correct restoration of what is certainly the earliest known instrument by Greenough.



Thomas Greenough, Sr., (1710-1785) was born and died in Boston, fathered 12 children by 2 wives, and seems to have been a major figure in the commerce of early Boston. He was a member of one of the militia companies in Boston, in 1747 he was listed as 3rd sergeant, and according to Bedini, "He was a firm patriot, held town office, and was a founder and deacon of the New Brick Church in Boston". Thus the instrument here is significant on several counts; it is the earliest known example of the work of an early and major Boston instrument maker, and it appears to be one of the two earliest known signed American surveying instruments, the other one, by Joseph Halsey (1657-1754), is shown as Fig. 39 in Bedini. This compass is a major find.
(2 UP packages, 10 lbs & 15 lbs) **$ 1,750**

171. **SURVEYOR'S COMPASS BY WILLIAM YOUNG'S TEACHER IN THE ART** - American, signed "T. Whitney Maker Philada." with serial "No. 321" on the base outside the compass housing and marked "1817 B" on an underside interior surface, which should be the date. Bright brass, restored lacquer finish, the silvered dial compass within a 6" d housing on a 14" long baseplate. There is the original compass cover but no ball and socket joint and no case. The 6" h screw-on sight vanes are instrument maker made old replacements. Generally fine overall condition.

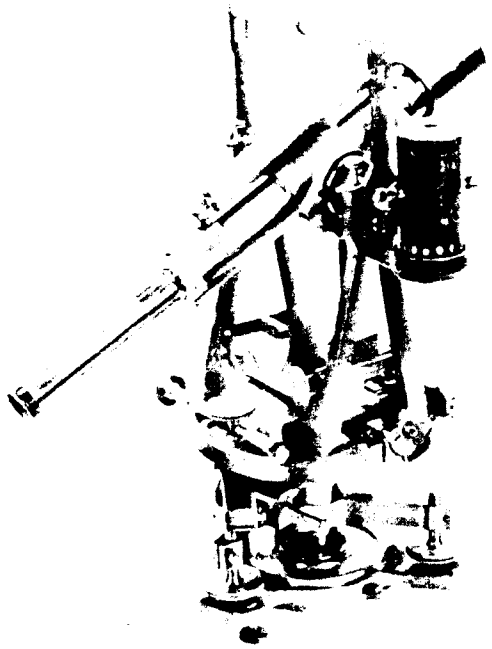
Thomas Whitney (?-1823) was apprenticed to Samuel Browning (of Spencer, Browning & Rust, London) in 1782. They were all members (strangely) of the Grocers' Company which had a significant number of significant instrument makers including the George Adamses and the Troughtons. He obtained his freedom in 1790 and shortly thereafter emigrated to Philadelphia, first advertising himself as an instrument maker in 1798. By 1820, according to his advertisement of that year reprinted on p. 167 of Smart, he specialized in surveying compasses and by then had made 500 of them. William J. Young, the inventor of the American Surveyor's Transit, apprenticed to Whitney in 1813. It may very well be that Young worked on part or all of the instrument here since his 7 year term was not concluded until 1820, when he started his own firm.
(9 lbs UP) **$ 745**

SURVEYING CHAINS
(For Sale Only To Purchasers Of Other Surveying Equipment.)

172. **IRON HANDLE 50 LINK 2 POLE CHAIN** - American, 2nd half 19th c, unsigned. Light weight iron links (some approx 0.105" thk, others 0.125" with several thousandths variation in each case) with (initially) 2 circular rings between each link. Apparently because of chain stretching some of these rings have been removed. Only one forged iron handle is present, the other having been lost and replaced by a wire loop. Also, only 2 (of the original 4) brass marker tags are still present. Generally very good to fine condition except as already indicated. (5 lbs, UP, PS) **$ 90**

173. **D-LOOP REPLACEMENT 50 LINK ENGINEER'S CHAIN** - American, 2nd half 19th c, possibly c. 1900, unmarked. Galvanized steel links, each 12" long, without interlink rings, no handles or tags. (Probably for use with snap-on handles.) Each link is formed from a piece of steel wire doubled over with "D" loops at either end and wrapped and soldered at the midpoint. Generally very good condition with light touches of rust in a few links. The wire is a relatively uniform 0.097" d suggesting a late 19th century origin. (7 lbs, UP, PS) **$ 65**

174. **HEAVY IRON 100 LINK 4 POLE CHAIN** - English, 2nd half 19th c, signed "CHESTERMAN/JC/SHEFFIELD" on center brass marker tag. Brass handles marked "4 P", brass marker tags every 10 links, 3 anti-twist joints, 100 long links, varying in thickness from 0.160" to 0.165", connected by 3 small oval links. Generally age darkened and roughened from heavy use but not rusty; very good overall condition. Taylor 2 lists James Chesterman of Sheffield as fl. 1829, but we know that his firm lasted well into the 20th century (see the Whipple Surveying Catalogue). The variation in thickness of the iron links leads to the given dating. (14 lbs, UP, PS) **$ 165**

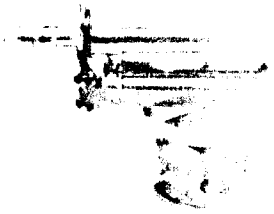


175. **LARGE TRANSIT THEODOLITE** - English, late 19th c, signed "TROUGHTON & SIMMS/LONDON". All brass in green-black oxidized finish with knobs, screws, etc. in bright lacquered brass, 16 1/2" overall ht as shown with removeable transverse level in place. The telescope, as shown with its erecting eyepiece (there is also a high power right angle eyepiece) is 15" long, extending to 17 1/2"; the longitudinal bubble vial is 5 1/2" long. There are orthogonal bubbles on the base plate, and a beveled silver azimuth circle of 6" readout d with opposing 10 arcsec verniers and their magnifiers. An 8 1/8" long trough compass slides in under the base plate. There is a little kerosene lamp for night illumination of the telescope crosshairs and the special quick release tripod mount for the 3-screw leveling base. Four small screws are modern replacements, the protective pivoted cover on the sunshade is missing, and a plumb bob is missing from the case; otherwise the instrument is complete, original, and in very fine condition. Original hand dovetailed mahogany case 15" w x 12" deep x 9" h in sound condition although the surfaces are stained and rubbed.

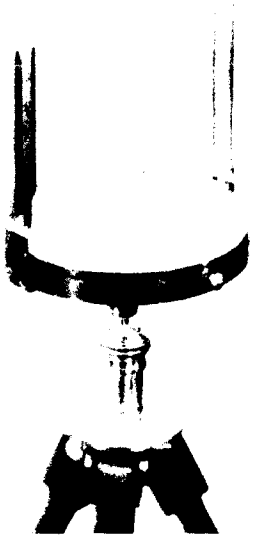
This instrument was intended for precise geodetic work and hence was made without the usual circular compass but does have a more accurate trough compass for north alignment. It was intended that true north was to be obtained from celestial sightings. With an accurate watch (chronometer), longitude could be obtained by stellar transits. This instrument may be similar to Item 81 of the Whipple Museum Surveying Catalog, which is dated c. 1880. (43 lbs UP) **$ 1,750**

176. **OCTAGONAL SURVEYOR'S CROSS** - French, late 19th c, signed "S L" on either side of a 3 branch candelabrum (the only one we have ever seen so marked). Bright brass with original lacquer finish, 5 3/4" h overall; the 3" h octagonal sighting head 2 3/8" across the flats. The staff mounting post screws off, is reversed, and screwed back through the hole in the top for storage. Original oak case, 3" h x 4 1/8" w x 3 1/4" deep, in good condition. The instrument is very fine. This design is derived from the classical 4-vane surveyor's cross with its shape providing slits at 45 degree intervals. Thus it may be used for both laying out small plots and 'classical' rectangular surveying. (4 lbs, UP, PS) **$ 125**

177. **BUILDERS "Y" LEVEL** - American, early 20th c, signed "EUGENE DIETZGEN CO/CHICAGO-NEW YORK/5545". Brass construction in black oxidized finish, some parts black enamel, and fittings and knobs in original bright lacquer. Rack and pinion focussing telescope is 11 1/2" long, with 5 1/8" long bubble level, fitting into wyes 7" apart on 8" base. There is a 4" d silvered azimuth scale reading out by vernier to 5 aremins. 7" h overall including 4-screw leveling base. The original 13" x 5 1/4" x 8 1/8" h mahogany case also contains (not illustrated) a plumb-bob and a triangular foot for plane table application. The case is in very good condition, the level very fine and original although it is missing its lens cap.

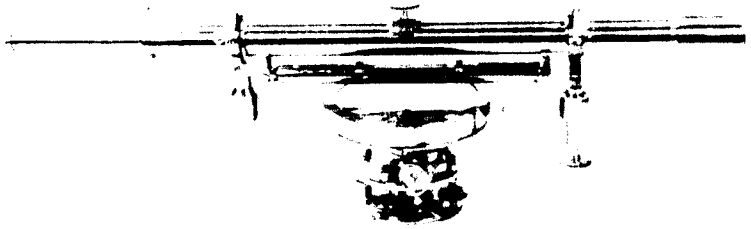


Eugene Dietzger was born in Uckerroth, Germany in 1862 and died in Chicago in 1929. He came to the U.S. in 1880 and, in 1885, formed the partnership of Cuhring and Dietzgen. The firm became Eugene Dietzgen & Co. in 1891 and then Eugen Dietzgen Co. in 1893 and is still in business under this name. The instrument here is an example of one of their designs intended for use in the construction and building trades. Although not as early as some of the instruments in this catalog, its unusually fine original condition makes it appropriate for any high quality collection. (16 lbs UP) **$ 295**



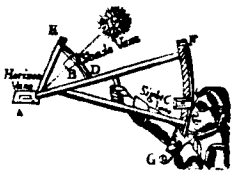
178. **SURVEYOR'S VERNIER POCKET COMPASS ON TRIPOD** - American, last 3rd 19th c, signed "W. & L.E. GURLEY, Troy, N.Y.". Bright lacquered brass 5 5/8" d silvered compass face inset with 1 1/4" bubble levels, 4 5/8" h folding sight vanes, magnetic variation scale and vernier readout engraved on the outer edge of the compass body. Ball and socket joint for staff or tripod mounting. Original tripod with 47" mahogany legs. No case. Fine overall condition except that the needle tends to stick; original finish on compass body, restored finish elsewhere, some minor pinpoint spotting.

Dating of this instrument presents some problems. The design of the tripod head predates that shown in Gurley's catalog of 1873 and is typical of that found in their 1869 catalog. However the largest pocket compass listed in either of these catalogs has but a 3 1/2" needle. Their 1902 catalog does list a 4 1/2" needle model but states quite specifically that it has half slit vanes rather than those of the type found on the example here and the illustrations show a later form of tripod. Could this instrument have been available in the 1860's, but not catalogued with a different tripod and vanes until the 1890's? We do not know. (15 lbs UP) **$ 385**

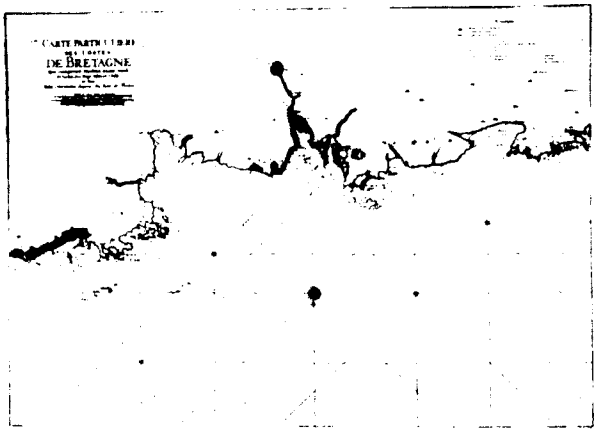


178. **LARGE, COMPASS MODEL "Y" LEVEL** - English, 2nd qtr 19th c, signed "W. C. Cox Devonport". Bright brass, (sparkling) original lacquer finish, 23 1/4" long overall with sunshield and erecting eyepeice in place, and minimum extension of rack and pinion focussing objective (which adds another 3 1/2"). Overall ht (including 4-screw leveling base) is 7". The bubble level under the telescope is 7" long, the wyes are 10 1/8" apart, and the 5 1/4" d compass housing contains a silvered face compass with 3 7/8" needle. Also included are a high power inverting eyepeice, objective lens cap, and the brass feet for a now missing tripod. Original hand dovetailed mahogany case 19" long, 8" deep, 6" h in fine condition. The Y level is extremely fine with a few minor dark spots mostly on the erecting eyepiece. This is a large and impressive instrument.

William Charles Cox is listed in Taylor 2 as fl. c. 1820. Goodison has more detail, listing him from 1822 to 56; at 86 Fore St., Plymouth Dock 1822-39, 89 Fore St. 1852-6, 24 Southside St. 1856, and 83 Fore St. 1857. The Webster index notes several sextants and a theodolite signed by him which appeared in the London auction rooms since 1959. The National Maritime Museum, Greenwich, has a mercury barometer, beam compasses, and several spyglasses by him. He seems to have been the major instrument maker for the port of Plymouth, Devon during the period indicated. (22 lbs UP) **$ 945**



180. **CHART FOR THE RED SEA** - DANISH, signed and dated "MARE RUBRIUM sens SINUS ARABICUS ad observationes maximam partem ab Auctore annis MDCCLXII et MDCCLXIII institutas delineatus a C. Niebuhr". Quadruple folding chart, recently hand colored, plate mark 30 3/4" h x 8 3/4" w on paper 32" h x 11 1/2" w. Very fine condition. Carsten Niebuhr (1733-1815) was a Danish engineer best known for his "Scientific Voyages in Arabia", 1761-1767. This chart may have been bound in his book, although it is on the heavy rag paper normally used for sea charts. If you plan to sail the Red Sea, or part it and walk across, this is your chart. (postpaid in the U.S. only) **$ 175**



181. **CHART OF THE COAST OF FRANCE IN ORIGINAL HAND COLORING** - "CARTE PARTICULIERE DES COSTES DE BRETAGNE . . . Faite Par Ordre Exprez Du Roy de France" - Dutch or French, c. 1700, unsigned. Printed area 23 1/4" h x 31 1/2" w on centerfold paper 23 3/4" h x 36 3/4" w. Elaborate engraved coastal detail, original hand coloring of the coastal regions, very fine overall condition except for some offsetting of the coloring across the center fold and a few spots where the acid in the colored inks has burned through the paper (these now repaired by rebacking so that no defect shows on the front). Our research leads us to believe that this may be the work of Pierre Mortier of Amsterdam taken from his "De Franshe Neptunus" issued from 1693-1700. It matches the style and engraving of Item 148 of our Catalog 115, a signed chart of the Pacific Ocean. However, the last line of the title also suggests that it may be an early sheet from the series of the French Admiralty charts issued from 1693 to 1740, an example of which was listed as Item 163 of Catalog 122. Either way, early charts with original hand coloring - more costly than the plain black and whites when first issued - are relatively rare. (postpaid in the U.S. only) **$ 295**