

# TESSERACT

Early Scientific Instruments

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# \* \* \* \* \* ASTRONOMY \* \* \* \* \*

#### BY AMERICA'S FIRST COMMERCIAL GLOBE MAKERS





#### 1. MINIATURE TERRES-TRIAL GLOBE IN HORIZONTAL STAND, American, second quarter 19th century, signed in the cartouche "A three inch Terrestrial Globe, by Wilson's & Co., Alb'y." This fine globe is printed with considerable detail, and is tan overall with hand-painted brown and greenish outlining and highlighting. The wooden stand is a fine, typically American turned spindle mounting, with dark ball feet, the whole standing 5" (13 cm) tall. Condition is very fine noting only some old stable hairline cracks to the globe.

James Wilson (1763 - 1855) produced his first globes in Bradford, Vermont in 1810. Transferring to Albany, NY, in 1818, he established his "artificial globe manufactury," eventually producing globes of 13", 9", and even such miniature

3" diameter. The firm name changed as James's sons joined the business, and as Cyrus Lancaster entered the family and the firm (see, e.g., D. Warner, **Rittenhouse 2**, pp. 135-7). We can date the present rare globe to second quarter 19th century, probably the 1830's, based on the political boundaries. \$8500.



2. ASTRONOMICAL CALENDAR MEDAL, French, 1975, heavy bronze, 3-3/4" (9.5 cm) in diameter, bearing, in relief on both sides, the designer's name J.-P. Réthoré, a full calendar for the year 1975, backgrounds of stars including the Milky Way, and the saying "Le temps ne fait rien sans homme...ni l'homme sans le temps." One side depicts a fine English crankwork orrery, the other the large astronomical sextant of Tycho Brahe. An impressive, if late, desktop medallion, in fine condition. \$250.



Opening from 9-5/8" to about 28" (24 - 71 cm), it has three drawtubes of green stained vellum over heavy card, and main tube bound in fine white rayskin with black interstices. All tubes have lacquered brass fittings, and there are sliding dust covers at both ends. The objective is a singlet stopped down to 1/2" (13 mm), the eyepiece a three-lens system in palisander mounts. The combination gives erect images of high magnification and high quality, and permits effective use on objects as close as six feet away. The telescope is complete and

permits effective use on objects as close as six feet away. The telescope is complete and in very fine condition throughout. Workmanship is typical of the famous firm of Peter and John Dollond, working in partnership in London c. 1766 - 1804. A fine example. \$2500.



3/4" (12 - 22 cm) with two drawtubes, and is complete with both screw-on end caps. It produces fine images with its greenish achromatic doublet objective and four-element erecting eyepiece system. Condition is very fine but for loss of lacquer finish, the brass now with a pleasant brown patina.

The makers were Jan van Deÿl (1715 - 1801) and his son Harmanus (1738 -1809), important early optical instrument makers in Amsterdam. Harmanus made the first achromatic microscope in Holland (see Engberts, 1970). In 1789 the van Deÿls constructed a splendid binocular telescope for van Marum (Turner & Levere, 1973). The present small instrument is of particularly high quality construction. \$1900.



**5. ELEGANT CELESTIAL GLOBE ON STAND,** French, c. mid-19th c. This diminutive 4-1/4" (11 cm) globe is printed with hundreds of stars and dozens of constellation names, all in black on a tan background. The brighter stars are identified with their Bayer Greek letters, and dotted outlines separate the constellations. The path of the Milky Way, the celestial equator and the ecliptic are all lined. Condition is fine

noting old spotting to the background.

The globe is mounted in a brass meridian ring divided every degree full circle. This sits and rotates within a pewter horizon ring, itself divided every degree full circle and stamped "Nord, Sud, Est, Ouest." The assembly has a semicircular cast iron supporter below, atop a turned and ebonized wood pillar with brass junction, all in very fine condition. The whole makes for an elegant desk-top accessory of unusual diminutive size, standing 10-3/4" (27 cm) overall. \$2200.



#### BY A NEWLY DISCOVERED ITALIAN MAKER



6. FOUR-HUNDRED-FIFTY-YEAR-OLD ASTRONOMICAL QUADRANT, Italian, c. third quarter 16th century, signed (with stamped letters) within an engraved banner "Antonius Beringuccius." This fine all-brass quadrant is 5-1/2" (14 cm) on a side, mounted with a pair of sight vanes with S-shaped decorative supporters, and with a shaped pin for supporting a plumb line. The thickness varies considerably around 1.7-2.3 mm, and the reverse is blank. The outer quarter circle scale is centered on the pin, divided every degree and numbered every ten CCW 0°- 90°. The design latitude is given "A.P.G. XXXXII M XXX," for altitude of the pole 42°30'. The main field is occupied by the hour lines as a function of time of year and thus solar declination. They run from 9 to 23 hours, for the 24-equal-hour Italian system commencing at sunset. Solid lines are for the morning hours, dashed lines for afternoon. This difference is explained directly on the quadrant "Linea Puntorum Post Meridiem." And because the calendar scale is "inverted," with the summer solstice at the top of the graph, and winter at the bottom, the hour lines bend down leftwards and give advantages to layout and readout (Cowham, 2014, A Study of the Quadrant, p.20). This date scale is folded, with the first months (January - June), and Zodiacal houses, to the right, the rest (July - December) to the left. Date arcs cross the hour lines, the central one boldly identified "Aequinoctiale," with the vernal equinox on 10/11 March (consistent with the pre-1582 Julian calendar).

The apex is engraved with a mnemonic circular correspondence between three rings of letters and numbers, and centered by the number 13. This is a solar course scale, permitting calculation of the exact Zodiacal position of the sun for any date in the year, and is clearly explained by A. Turner (2007, Catalogue of Sun-dials..., pp. 10-11). Surrounding this is a shadow square with sides Vm(bra) Ver(sa) and Vm(bra) Rec(ta), useful for surveying heights and distances of buildings and landmarks. Finally there is engraved a family blazon for the original owner, consisting of three leaves with central horizontal bar, all within a fine frame.

Condition is very fine, the brass with light wear and a tan patina, with tiny traces of probably original gilding.

Beringuccius is newly discovered as an early Italian instrument maker, but the object itself gives us a variety of clues. Several horary quadrants of this form have survived from the time of the Medici, notably those in the Museo Galileo in Florence. Makers include the della Volpaia dynasty, Giovanni Battista Giusti, Stefano Buonsignori, and Miniato Pitti (see Turner, *ibid*). Closest are #7 by Camillo della Volpaia and bearing the Medici emblen, #9 (Giusti, dated 1565), #10 (Giusti, 1568) and #11 (Girolamo della Volpaia 1570). G. Turner did an extensive study of all known Giusti instruments, comparing details of numeral punch shapes, etc. (Nuncius, 1995, pp. 131-172). We find strong similarities, but unique differences. As a whole the Florence quadrants tend to be somewhat larger than the present one, and marked for latitude 43°30'. Ours, at 1° further south, crosses Umbria in the province of Terni (e.g., ancient towns of Narni and Terni). The blazon is remarkably similar to that of the Feroli family, which, perhaps by coincidence, was centered in Narni. Yet there is a problem -- the three leaves on the Feroli coat of arms are strictly ivy, whereas those on the quadrant are vine leaves, as for the DeCaudry family in Northern France, near Belgium. The horizontal bar would indicate that a member of the family entered the Roman Catholic Church. More research is needed. Finally, although we have not traced Antonio, there are records of the Beringucci family in the area of Siena in the 15th and 16th centuries. \$18,000.

An important instrument.





7. AMERICAN TABLE GLOBE, c. late 19th century, signed in the cartouche in the printed gores "The Franklin Terrestrial Globe, 12 inches in diameter containing all the Geographical Divisions & Political Boundaries to the present date. Carefully Compiled from the best Authorities...Troy,



N.Y." Overlaid is the retailer's paper "H.B. Nims & Co." The printed globe gores are dense with detail, including many voyages of discovery which are traced, identified, and dated. The first transatlantic submarine cable (1858) is shown, plus the French cable from Brest to Cape Cod (1879), and the two Dakotahs (1889) are present. Overall the globe is tan with light green highlighting. Condition is good noting general patterned crazing from an old varnish, and minor restoration.

It is supported, inclined at the earth's 23.°5 tilt to its orbit, on a brass pillar and domed iron base, the latter cast with very decorative Greek key and floral bands.

The Troy, N.Y. publishers who produced and retailed the Franklin globes went through a variety of business names throughout the second half 19th century, starting c. 1851 (see Warner, **Rittenhouse 2**, 63-4). It was "H.B. Nims & Co." from 1869 to 1885, and again 1890 to 1896, the period of our globe. \$1850.







8. MINIATURE TABLE-TOP REFRACTOR, English, c. 1800, signed "Dollond, London." This compact, all brass outfit arrives as a rather solid brass cylinder 4-5/8" x 1-5/8" (12 x 4 cm). Removing the single drawtube, the tripod and pillar assembly is found stowed inside, and unscrews. The pillar then reverses, the head dovetails into a slot on the main tube, the dust cover unscrews, and we have a full tabletop instrument. The



objective is apparently a biconvex singlet, and there are four selectable eye lenses on a rotary wheel. The drawtube is engraved with four corresponding focal positions. Condition is fine noting tiny dents to the main tube, and losses to the lacquer finish. Images are erect, field of view is small, and there is a choice of four significant magnifications. Off-axis chromatic aberration is pronounced.

magnifications. Off-axis chromatic aberration is pronounced. This is an example of "The Pocket Galilean Telescope" as described by George Adams / William Jones in *Lectures on Natural and Experimental Philosophy...in Five Volumes.* \$1800.





# \* \* \* \* MICROSCOPY \* \* \* \* \*



- **9. THE "UNIVERSAL-POCKET-MICROSCOPE" OUTFIT,** German for the English market, c. 1900, the 2" (5 cm) long brass tube has aperture at one end, high power (40x) lens at the other, and spring loaded stage plate for glass slides. Condition is excellent, with the original wood case, instructions, three prepared specimen slides, and three blanks one with concave center for aqueous specimens trapped between slides. \$295.
- 10. EXTENSIBLE MAGNIFIER FOR TRANSMITTED LIGHT, c. second half 19th c., all brass opening and clampable by drawtube from 2-5/8" to 3-3/4" (6.7 9.5 cm), with pendant ring. It gives excellent images -- erect, clear, flat field, seemingly undistorted of materials placed against the far end of the device. It would be especially useful for viewing a large camera's ground glass screen or large thin sections placed on a light box. Condition is fine, the original clear lacquer finish now streaked. \$280.
- ACHROMATIC TABLETOP MAGNIFIER, American, c. 1925, unsigned. Constructed of plated brass and steel, 2-1/8" (5.4 cm) in diameter, it is set with a doublet eyepiece (giving wide field images of high quality and flat focus) in threaded focusing cell. The tripod stand has particularly decoratively shaped legs. Except for a considerable edge dent, condition is fine and functional throughout. \$98.
- 12. CIVIL WAR ERA LIVE BOX AND SLIDE VIEWER, American, c.1870, "Patented May 24, 1864." This compact 1-3/8" (3.5 cm) long single lens microscope is in brass, with drawtube and sliding ring forming insect confinement chamber between glass windows, and with side slots and ring to trap and view prepared specimen sliders. It was patented by John Ellis of N.Y. (#42,843) and is in good condition, the brass now darkening.



Rare. \$295.

**13. NATURAL HISTORY ENTERTAINMENT VIEWER,** American or English, second half 19th c., 3" (8 cm) tall with its thin brass and blown glass body. The single lens gives a good view of the specimen wheel, itself a rectangular block of wood on rotating spindle, mounted on the four sides with numerous shells, seeds, flowers, minerals, etc. Condition is fine noting some specimen losses, and minor denting. Uncommon. \$380.



# MINIATURE MICROSCOPES AND MAGNIFIERS FOR THE POCKET



- 14. TRIPOD-MOUNTED COMPOUND MICROSCOPE COMPARATOR, probably German, c. late 19th century. Extending from 2-3/4" to 4-1/2" (7 to 11 cm) tall by drawtube and knurled, threaded focusing ring, it features doublet ocular, doublet achromatic objective, and internal micrometer dividing the field of view into 25 one-hundredths of an inch. Of blackened brass, it is in very good condition, and high quality construction. \$495.
- **15. MINIATURE LIVE-BOX MAGNIFIER,** c. second half 19th century, the 1-1/2" (4 cm) tall instrument with openwork plated brass body, cylindrical clear glass containment, and fixed singlet lens above, all in very fine condition. \$135.
- 16. THE "SEE-SHARP" PATENTED FOCUSING DEVICE, American, c. 1930's, by R.P. Cargille, N.Y. In excellent condition, this 2-1/2" (6 cm) tall blackened iron stand has magnifier focused on the mirror below, ideal for helping focus a photographic enlarger image. \$120.



- **17. TWIN-POWER "INSECTOSCOPE,"** probably French, early 20th century, of plated brass 2" (5 cm) overall, the main tube holding low and high power lenses, in removable cells, useable singly or in combination, all in excellent condition. \$95.
- 18. THE AMERICAN AGRICULTURALIST MICROSCOPE, PRE-1878 PATENT, c. 1877, signed "Patent App'd For." This miniature Bausch & Lomb instrument is made of thermoplastic with a swiveling set of three combinable magnifiers plus aperture, a simple glass stage with spring clips, and the original insertable "live box" -- a pair of square glass plates with spacer in between. With sliding focus on the rear post, the microscope stands 2" (5 cm) tall, in excellent condition. It is complete with its original card box (signed "Orange Judd Company, 245 Broadway, New York," and in somewhat worn condition).



**19. "ACORN" MICROSCOPE COMPENDIUM,** English, c. second half 18th century. The turned ivory case with lid, somewhat in the overall shape of an acorn, stands 2" (5.1 cm) tall overall. Three independent simple microscopes are concealed within. Under the domed lid is a "flea glass" with high power lens in stained ivory mount, and specimen pin. This, and the base, unscrew to yield a cylindrical livebox with high power lens and glass chamber, the livebox again in dark stained ivory. The remaining body is mounted with a large-aperture low-power inspection lens with focal length almost 1-1/2". Condition is very fine throughout. This is a rare example of the acorn compendium. A similar instrument is found in the College of Optometrists in London (#1999.347), and one is in *Singular Beauty* (#28). \$4500.



**20. ZEISS APLANATIC MEASURING MAGNIFIER OUTFIT,** German, c. 1930, signed "Carl Zeiss, Jena" throughout, and bearing the retailer's plaque of "Devaux, Opticien à Lyon." The entire outfit is contained in the 5" x 2" x 2-1/8" (13 x 5 x 5 cm) fitted wood case with dovetailed lid. Constructed of bright plated brass with black eyeand specimen-surrounds, the instrument sets up with a fine two-element magnifier on adjustable clampable pillar, insertable and rotatable calibrated square sample grid, and adjustable pointer assembly with long-screw drive to the swing-away pointer. There are choices of three magnifiers (6x, 8x, 10x), four grids (with subdivisions of French inches and centimeters), and a micrometer scale 0(0.2)30 mm divided on glass. This precision outfit is in excellent condition.

CARL ZEISS JENA

Zeiss advertised their measuring magnifiers for many purposes, including in the textile and metal industries. Their aplanatic lens systems were "ideal for measuring... due to their clear and large image and their freedom from colour fringes... and relatively long free working distance."

\$1450.

The first of this form we have seen.

# \* \* \* \* \* DIALLING \* \* \* \* \*



21. GILT WOOD POLYHEDRAL TOWER DIAL, European, c. 18th century, bearing fragments of an old sale label in English. Standing 15-1/2" (39 cm) overall (including globe), the part-round flat-backed carved wood tower has three levels, with crenelated parapets and multiple windows, and is set with a total of four vertical and angled sundials with (replaced) brass gnomons. Mounted atop is a rotatable small wood globe in brass mounting, the brass horizon ring engraved with cardinal directions in Latin. The wood is covered with gesso throughout, then gilt and with black and red highlighting of windows, hour lines, etc. Condition is, well, special, what one might call "shabby chic," noting much wear to the gilding and gesso, losses to the crenelations, etc. But it is a very rare form of early multiple sundial, and presents well in a "cabinet de curiosités." Although dials (and clocks) have traditionally been mounted on castle and church towers, such tabletop tower dials are practically unknown.



22. PORTABLE EQUINOCTIAL SUNDIAL, French, 19th century. The dial is mounted within a beautiful 4-3/4" (12 cm) square hardwood (palisander?) case with hinged lid. It sets up with hinged latitude arc, hinged equinoctial chapter ring, and swiveling pingnomon mount, all in silvered brass. The ring is hand-stamped with seven European cities and their latitudes. Underneath is a glazed compass with lovely copper rose engraved with a bold N/S arrow plus a magnetic declination arrow at 22°/23° W (this the maximum recorded westward deviation at Paris, in effect c. 1800 - 1840). A silvered circumferential scale is divided every degree. Condition is excellent throughout. An interesting sundial in an unusual format.



**23.** EARLY "ACORN" SUNDIAL, German, c. 17th century. The turned brass case, 1-7/8" (4.7 cm) in diameter, contains a floating dry card compass, the card with printed and partially hand-colored rose, secured under early glass. A full horizontal sundial is mounted above the glass, divided with 4am - 8pm chapter ring and set with hinged gnomon for approximately 48° N. latitude (e.g., Augsburg). The turned cover completes the "acorn" look (and see the related miniature microscope compendium in this catalogue). Condition is fine, the brass with a fine brown patina, noting some external stains.

This early pocket dial is similar to a slightly smaller one in **Tesseract** Catalogue A (i.e., Catalogue #1, Item 17), that one with English directionals on the paper compass rose, and bearing a printed Drapers Company guild sign with the date 1574. Somewhat similar ones were recovered from the 1545 wreck of the *Mary Rose*. \$2200.



24. EXCEPTIONAL UNIVERSAL RING DIAL, German, c. 1700, constructed of brass, 3-1/16" (8 cm) in diameter. The pendant universal ring dial is useable anywhere on Earth and without need for a compass; only the date and one's latitude are needed to determine the apparent solar time. The design incorporates an outer meridian ring (divided every degree from 90°S latitude through 0° to 90°N latitude, a pendant ring and mount (here integral with a circumferential band which slides around to set the latitude, in the Continental fashion), an inner hour ring which swings out 90° (carrying its own stops) to fall in the plane of the celestial equator (divided every 15 minutes full circle through the twice-12 hour scale), and central bridge carrying the shadow casting pinhole slider (adjustable to the correct solar declination using the Zodiacal scale engraved on one side). Condition is very fine noting slight pitting.

Although this portable sundial is useable anywhere, it is necessary to know one's latitude to fix the angle of the dial. For this, all free surfaces of the rings, *including the outer edge of the equatorial ring*, are beautifully engraved with forty (!) town names and



their latitudes. Most are German, but they do include Gotland (Sweden), Venice, Riga, and Genoa. \$2950.







25. SEVENTEENTH CENTURY PRINTING PLATE FOR AN ALTITUDE HORARY QUADRANT, Flemish (Antwerp), 1674. Measuring 3-1/4" (8.3 cm) on a side, and with a variable thickness of approximately 1.1 mm, the copper quadrant is exquisitely engraved and signed "R. Collin excud. Antv." and dated "Nouocomi. 1674." Despite its small size, the quadrant is laid out in great detail, masterfully engraved. There is a fine sun face near the apex, and at the extremity a 90° arc divided every degree with alternating hachured squares. Within this is an horary quadrant laid out, as indicated, for 46° latitude (the lake country of Italy, Geneva, Lyon). The term "Nouocomi" is a puzzle, although in old Roman contexts there are mentions of place "Nouocomo" in the Transalpine. A doubled calendar scale to the side enables correction for solar declination throughout the year. It is designed with the summer solstice at the top, and with a vernal equinox about 21 March, consistent with the Gregorian calendar. An arc along the bottom gives the noon altitude of the sun versus Zodiacal date throughout the year (for 46° N. latitude), useful with plumb line readout of solar altitude observations. There are three concentric arcs for the equinoxes and solstices; these are crossed, unusually, by three sets of hour lines. Two sets are for Italian hours (running from 9 - 23, being 24 equal hours in each day, beginning at sunset), the solid lines for morning hours, arrowed lines afternoon. The third set, numbered interior to the graph, gives time of day (knowing the date and measuring the solar altitude) in our common system of twice-12 equal hours starting at midnight. There are numbered dotted lines every hour from 5am to 7pm. A Latin inscription reads "Heu nimium tenui pendentia tempora filo! filaque Parca secat, que secat hora diem." (Oh, time hangs by a slender thread! And Fate severs threads, as an hour cuts the day.) The instrument and an old proof print are mounted in a fine signed 20th century book-form case fully bound in leather and lined in colorful marblized paper. Condition is very fine throughout.

The one who published ("excud.") the copperplate, in Antwep ("Antv."), was one Richard Collin (1626 - 1698). Born in Luxembourg, Collin worked in Rome where he was trained by Sandrart, and in Antwerp where he became master in the Guild of St. Luke. Famous as a portrait engraver, moving to Brussels he became the court engraver for King Charles II of Spain.

The present "instrument" is a masterful work by him, perhaps never published, useful for creating paper-on-wood horary quadrants. \$9500.



**26. POCKET SUNDIAL FOR SETTING POCKET WATCHES,** French, second half 18th century. This finely crafted compass / sundial is 2-1/8" (5.4 cm) in diameter, the "watch-case" housing of gilt brass with domed glass. The fixed horizontal sundial has a fine silvered chapter ring divided every half hour from 6am to 6pm and set with a nicely shaped gnomon. This is mounted above a magnetic compass also with silvered face, here marked with four principal directionals and with a line of western magnetic declination. The cleverly-designed compass needle extends to one side only, the other end very short and heavily weighted for balance. Condition is excellent noting a little wear to the gilding.

This is a version of the watch-case compass / sundial invented by Rousseau and intended as a portable standard with which to adjust (perhaps frequently) the 18th century pocket watch, using the sun to give the true time. It is the same Rousseau who invented the noon cannon dial (see Marcelin).

A fine pocket dial.





# \* \* \* \* \* NAVIGATION \* \* \* \* \*





**27. UNIQUE MINIATURE BACKSTAFF**, probably English, c. 20th c. With an overall length of just 8-1/2" (22 cm), the backstaff is realistically constructed of contrasting woods, with divided principal and secondary arcs, finely shaped decorative terminus, and one sight vane. All construction

decorative terminus, and one sight vane. All construction joints are mortise-and-tenon. This charming miniature navigational instrument, in excellent condition, may be contrasted with the full size 1739 example in **Tesseract** Catalogue 94 (Item 15) and with the very rare mid-size 1749 one (83 / 18). \$1500.



28. EXCEPTIONAL PARAL-LEL RULE BY THOMAS WRIGHT, English, c. 1735, signed "Tho. Wright, Londini fecit." The 12-1/8" (31 cm)



long rule is beautifully crafted of rosewood, apparently, with brass bound edges, the outer with curved bevels, and with a large elegant scissors hinge mechanism of brass with shaped arms, central engraved rose, and the large confident signature. The hinge motion is smooth and sure. Condition is very fine with only a couple of very tiny chips to the wood.

Trained and employed by Rowley, Thomas Wright went on to succeed him c. 1720, and to produce some of the finest instruments of the time, including grand planetaria.



Wright was himself succeeded by Benjamin Cole (I). A functional, sculptural object by a superb maker. \$4500.



29. THIRTY-SEVEN DOUBLE-PAGE PLATES OF ASTRONOMY AND GEOGRAPHY, Atlas Methodique et Elementaire...by Buy de Mornas, French, 1761, one large 10-3/4" x 13-1/2" (27 x 34 cm) volume, in French, consisting of double-folio leaves all engraved and printed on single sides of thick quality paper. Thirty-seven are centered on fine engravings of globes, celestial relations, maps, etc., all plates with some hand coloring. The rest are text only. There is also the wonderful double folio title page, illustrating numerous scientific instruments, and which explains that it was "Direxii" (directed) by the famous Desnos (1725 - 1805), and that the book was available for sale

at the shop of the author on rue St. Jacques in Paris, also at his associate Desnos' shop on the same street at the trade sign of the Globe. On the same page is an ad for Desnos globes, and a notice that the same plates that constitute this book are available with a richer border (for more money!) Condition is generally good throughout, noting relatively light foxing and staining, and 1-1/2 of the double-folio *text only* leaves missing. The probably original heavy board binding is rough.

This is one of several volumes, all published separately, in this sort of serial atlas by Buy de Mornas. The author was born in Lyon, and became important professor of geography and history. He served as official geographer to the Duc de Berry, and to Louis XVI, the last King of France before the Revolution. (*and see back cover of this catalogue*) \$3500.



# \* \* \* \* \* SURVEYING AND DRAFTING \* \* \* \* \*



**30.** EARLY AUSTRIAN/GERMAN SURVEYING/MINING COMPASS, c. late 16th / early 17th century. This fine wooden compass has a 5-3/8" x 5-1/2" (13.7 x 14 cm) main plate set with large central rotating compass. The plate has beveled edges on all sides, each divided and numbered (increasing left to right) with linear scales. The four scales subdivide the approximately 123 mm distance as follows: 0 to 8 by eighths, 0 to 12 by eighths, 0 to 8 by quarters, and 0 to 8 twice by eighths. Two opposite edges have hole pairs, possibly for inserting sight vanes. The top surface of the plate has incised "floral" decoration, especially in the spandrels. The central rotating 4-1/2" (11.5 cm) diameter compass has a circumferential hour / direction ring divided full circle CW every eighth from 0 to 24, then a similar ring 0 to 12 twice, and finally a ring of serpentine designs (similar to those found on some Nuremberg diptych dials by Michael Lesel -- see e.g. Gouk, 1988, p.121). Within this is the compass itself, under very early (probably original) glass, with fine (functioning) arrow needle, and rose on the interior wood with central flower and directions "Septentrio, Meridies, Orient, Occident." The engraved numerals are distinctive, typical of c. 1600 Germany but with their own small idiosyncratic details. Many retain black infill, and there are traces of red infill in some of the decoration.

The present instrument may be compared with the few surviving mining compasses from western Austria and southern Germany (see for example H. Michel, 1977). They were often of non-metallic construction (as here), and often used swiveling angular supports for strings running down mine galleries. The present beveled edge scales,



useful on plane table plotting, and apparent sight vane provision, suggest its use for surface as well as mine surveying. A significant example. \$12,500.



**31. CAPTAIN HENRY KATER'S** BEST COMPASS, WITH **RHOMBUS AND MIRROR**, English, c. 1820. This large 5-1/4" (13 cm) diameter flat-bottomed lacquered-brass compass contains a floating compass ring riding over black background and with external arrestor (momentary as well as fixed). The "ring" is an assembly of a pierced oval iron needle with stone pivot, a circumferential green paper ring divided every half-degree full circle 0° - 360° CW, and numbered every 10° normally, plus every 5° inverted and reversed. The paper is supported on the needle ends by two circular arcs of cut mica sheet, giving a fine aesthetic to this functional instrument. The paper ring has many dots of red sealing wax applied underneath, to balance the assembly perfectly level. The

needle itself is formed of two symmetrical arcs plus crossbar through the central pivot, and is thus almost a pierced rhombus design (not to be confused with an asymmetrical "rhomboid" shape). A fine bezel ring holds the glass cover in place. A tall folding sight vane, with string sight, sliding (cylindrical?) lens, and integral spirit level, erects vertically on one side of the compass body. On the other is mounted a sighting box, hinged and raisable for focus, consisting of slit, two lenses and 45° mirror, and permitting simultaneous viewing of vane, distant target, and compass degree ring. The compass is contained in the original fitted mahogany box with trade label. Condition is very fine to excellent, noting only some oxidation spotting to the needle.

The retailer and probable maker, given on the fine trade label, is the superb innovative craftsman "By Special Appointment, Thomas Jones (Pupil of Ramsden), Astronomical and Philosophical Instrument Maker To His Royal Highness The Duke of Clarence, 62 Charing Cross, London." A manuscript note indicates the precision expected and possible with this compass "N.B. Width of black lines of degrees on the Card = 7'."

This is a superb example from the earliest evolution of the prismatic compass. In 1811 Captain Henry Kater (1777 - 1835), while surveying with the British army in India, invented the first compass of this sort, using a mirror in the sighting box (as here). One year later, Schmalcalder patented the basic design, but substituted a prism for the mirror; the "prismatic compass" was widely employed for the next 50+ years. Kater's apparent prototype is preserved in Sydney, (see Holland *SIS Bulletin* **127**, pp. 34 - 39), along with a compass almost identical to ours, with the same exposed oval needle, indeed made by Thomas Jones, brought to Australia in 1821 by the new governor of New South Wales, Sir Thomas Brisbane (MAAS Object #H9956).

Kater made exhaustive experimental studies of magnetic needle materials, shapes, areas, and masses, and in 1821 published his Bakerian Lecture "On the Best Kind of Steel and Form for a Compass Needle" (*Phil. Trans.* **111**, pp. 104 - 129). On the last two pages he presents clear conclusions for the design, fabrication, and magnetization techniques to give the greatest attractive energy, finding the pierced rhombus of proportions 2" x 5" (as here) to be the best.

An important survival.



\* \* \*

2 proeders Baijens 2 **32. FINE DUTCH PROTRAC**-**TOR,** c. 1800, the 4-3/16" (10.6 cm) wide brass protractor beautifully signed in script "Gebroeders Baÿens, Delft," and with a capital letter (J?). proveders Baijens Delft The semicircular scale is divided every degree 0° - 180°

and back, and finely numbered every 10°. Below is a linear scale of three Rhine inches, engraved "Rhÿnland." Condition is excellent. The Baÿens brothers, Pieter (1774 - 1846) and Adrianus, worked in Delft in the

The Baÿens brothers, Pieter (1774 - 1846) and Adrianus, worked in Delft in the early 19th century. Daumas records a Dellebarre microscope in Leiden, made in Delft by the Baÿens, during Dellebarre's stay in Holland. A lovely instrument. \$650.



**33.** ELEGANT AMERICAN SURVEYING COMPASS, c. 1830, signed "Rich'd Patten, New York." This perfectly functional brass sighting compass has 10-3/4" (27 cm) long main plate mounted with removable paired 4-3/4" tall slit-and-string sight vanes, spirit level, glazed compass with slim tapered needle, needle lifter, and circumferential scale finely divided every degree 0° - 90° in each quadrant, and clampable staff mount below. There is also the brass compass cover, the brass staff head with ball-and-socket joint, and the good walnut case.

But beyond the functionality, what sets this apart is the aesthetic design and high quality of the engraved, silvered compass face. The compass "rose" has an exuberant fleur-de-lys north point, and



fleur-de-lys north point, and lush verdant designs around the middle and in the cardinal directions. Condition is very fine noting some marking to the brass, and a small clamp screw apparently replaced.

This is Richard Patten at his best, and puts it among the most finely adorned of American surveying compasses. We have had one other like it in 36 years

(Tesseract Catalogue 25 Item 44), with engraved patterns very similar yet completely different in detail. Patten (1792 - 1865) worked in New York City from 1813 to c. 1840. He advertised instruments "made to order and Warranted being divided on an Engine after the plan of Ramsdens." By 1842 he had moved to Washington, D.C., and was established as Richard Patten and Son. \$2950.



**34. "ENGINEER'S" CHAIN,** English, 19th century, signed "J.C. Chesterman, Sheffield, Eng'd." and with the archer's bow logo. This surveying chain is complete with 100 iron links bent closed, three small connector rings between links, central antitwist joint, notched brass markers every ten links for counting, and large brass handles stamped with the length "100 F(eet)." The chain has been used, the brass now dark, the links uniformly rusted. It is a good complete example of the classic surveying tool.

The Engineer's chain, as opposed to the 66 foot long Gunter's chain, measures 100 feet (30.48 m) end-to-end (including handles). It is sometimes termed an "Imperial chain," or even a "Ramsden chain," as it was Jesse Ramsden who constructed, c. 1784, a precision 100-link, 100-foot long chain which with careful use yielded an accuracy of three inches in five miles! James Chesterman (1792 - 1867) set up business in Sheffield c. 1820, and this evolved into a major manufactory, especially after he developed long steel measuring tapes. We note that by 1900 the extensive K&E catalogue included just one page on chains, but fully 24 pages on flexible measuring tapes. Chesterman surveying chains have been used worldwide. \$495.

**35. SET OF SURVEYOR'S ARROWS,** English or American, c. late 19th or early 20th century, comprising ten plated iron pins, 14" (35.5 cm) long overall, the tips sharp and



the tops bent round, forming handles. Each has a visible red cloth banner attached, and the set is conveniently carried, and dispensed, by a bent iron carrier. Condition is very good noting some loss of plating, with surface The pins oxidation. would have been used in land surveying, to mark off successive chain lengths on a long boundary line. \$270.



**36.** UNUSUAL FRENCH LEVEL / RULE, 18th c., signed "Launay". This folding brass rule, measuring 6-3/4" (17cm) long (closed), has hinged interior strut for conversion to a level. A plumb bob could be hung to read against the curiously decorated strut. The pierced patterns are reminiscent of early "bone-work" decoration. The exterior has crude engraving of floral and animal designs, and a linear "Pied de Roy" scale. An unusual rule, in good condition, probably by a provincial French artisan. \$495.



**37. EARLY DRAFTING SET BY RICHARD GLYNNE,** English, c. first quarter 18th century, signed on the sector. Although incomplete, the set retains a number of splendid instruments by this exceptional maker. The original fitted case,  $8-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \ge 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 14 \le 3-7/8" \ge 5-1/2" \ge 2-1/2" (22.5 \le 3-7/8" \ge 5-1/2" \ge$ 

There are 13 brass instruments or accessories in the case and most, including all the important ones, seem original to the set. In particular:

-- finely engraved signed sector of the English form, with 0-12 inch scale along the very edges, doubled sector scales of Sin, Tan, tan, Cho, Lin, Sec, plus on one side

additional single scales of Tan, Sin, Num (i.e., scale of logarithms), and on the other, instead of the "standard" four sundial-making scales, we have one of chords "Cho," and another curiously unlabeled very nonlinear one running 0 to 180, and with a connected scale centered on 90 and relabeled in the central section of degrees(?)  $0\pm23.5$ . There is fine floral hinge engraving. The sector may be compared with that in **Tesseract** Catalogue 30 (Item 23).

-- beautiful scissors-hinge parallel rule of the very stable four-point design which prevents sideways translation of the ruler (and see the much larger one by Thomas



# Wright in this catalogue).

-- early "square-body" proportional dividers with fine inset steel points, sliding fulcrum with butterfly clamp screw, and scales of Lines and Circles. It is a transitional form -- compare the Jost Burgi style with heavy rectangular shanks, the early 18th century illustration in Bion, and the transitional somewhat rounded form already developed by George Adams Senior (**Tesseract** Catalogue 48 Item 34).

-- remarkable parallel-motion dividers with triple gear train, adjustable leg, and fine ink pen. The gearing, and the two parallel long screws, give very fine adjustment over a wide range of point separation. This is the first such early geared dividers we have seen. -- two fine pairs of dividers with decoratively shaped shoulders, the larger (6-3/8" long) with three interchangeable hinged points (ink pen, pencil, and dotting wheel).

Condition is generally fine noting some minor wear and soiling and some losses to the case hardware (although lock and key are present). Richard Glynne (1681 - 1755) was mathematical instrument maker in London, apprenticed to Henry Wynne in 1696, made free of the Clockmakers Company in 1705, and working until 1730 when his stock was auctioned at Edward Scarlett's shop. Instruments by him are rare, and of the highest quality (compare the other spectacular part set **Tesseract** Catalogue 57 Item 31).\$7500.



38. SIX-FOLD PLANE TABLE RULE, English, first half 18th century, the six-segment brass-hinged boxwood rule 5/16" thick, opening to 13-1/2" x 16-1/2" (34 x 42 cm) overall. In use it would be slipped over a 12" x 15" plain board to hold down the paper, and provide direct plotting of angles and distances. It is divided and boldly numbered on both sides all around with scales in inches (divided every tenth) and in degrees (every half degree CW and CCW). One peripheral degree scale is centered on the plane table center, the other on a point just 2-11/16' in from the table's edge. Condition is excellent, the boxwood with a wonderful deep honey colored patina.

This was an important tool for the early surveyor, and seems to have been made for several standard format boards, including a  $12^{\circ}$  x  $15^{\circ}$  one (as here and in **Tesseract** Catalogue 98, Item 24) and an  $11^{\circ}$  x  $13-3/4^{\circ}$  one (68/26). We find an illustration of such a folding rule as early as 1611, by Arthur Hopton in The Topographicall Glasse. \$1950.





39. UNUSUAL TRAVELER'S COMPENDIUM, French, 19th century. The 4-1/4" (11 cm) ivory block is mounted with an inset glazed compass with printed paper rose, a swing-out brass index divided every 5° for inclinations 0°- 45°, swing-out brass divider legs, and a pull-out



wind-up cloth tape measure divided and labeled in French inches 0 - 24. The block is also divided with linear scales of inches (to twelfths) and centimeters (to tenths), the scales continuing on the extended divider legs. Condition is excellent throughout. Rare, the first we have seen. \$750.



**40. FINE AMERICAN PROTRACTOR OF ELECTRUM,** c. third quarter 19th century, signed "J. Prentice, 1 Chambers St., N.Y." This 3-5/8" (9 cm) radius semi-circular protractor is divided every half-degree from 0° to 180° and back, and is fitted with glass-windowed center point plus rotating and clampable 9-1/8" long alidade with one-arcminute 0±15 vernier. It is a very fine instrument in excellent condition.

James Prentice (1812 -1888) emigrated from England in 1842, establishing a successful manufactory of mathematical and surveying instruments (Smart, 1962). He exhibited at various international exhibitions. In New York he was, for example, awarded a Diploma for the "best drawing instruments" in 1856 (*Transactions of the American Institute of the City of New-York*). \$695.

**41. FINE PAPERWEIGHT OF SCIENCE AND INDUSTRY,** c. 19th century, the substantial black cast iron weight 4-1/2" x 3-1/8" x 1-5/8" (11.4 x 8 x 4 cm) overall.



Upon the verdant background lies a globe in stand, embraced by a pair of dividers, surrounded by semicircular protractor, Tsquare, two drafting squares, a long water level (?), and a large caduceus with its twin serpents and twin wings. The latter is the staff carried by Greek Hermes and Roman Mercury, particularly appreciated as the protector of merchants and symbol of commerce (but protector also of gamblers, liars, and thieves!) In fine condition, this is an unusual desk accessory for the scientific instrument maker, dealer, or collector. \$695.



**42.** "SQUADRA MOBILE" VARIANT, Italian, c. 17th century. Constructed of brass throughout, this early surveying instrument has an 11-1/8" x 3-5/8" (28 x 9 cm) main plate with long edge carrying two fixed sight vanes, semicircular scale divided CW every degree 0° - 180°, adjacent scale of polygon angles from 12 to 4 to 12, and integral right angle shadow square with sides "Umbra Recta" and "Umbra Versa" each divided every degree 0° - 60°, again radially from the center. Engraving is of high quality. There is good decorative shaping at the ends and center. The plate is mounted with a rotating, clampable alidade, with beveled index edge and curious 60(1)85 divisions at one end, and set with sights at each end. The reverse has three pegs for mounting to some support, and a fine plumb needle for assuring horizontality. Condition is good noting some stains and darkening, and probable old replacements of some sight vanes.

This is a version of the "squadra mobile" published by Ottavio Fabri in Venice in 1598 (with many subsequent editions). Fabri gives dozens of detailed, well-illustrated examples using the squadra to determine architectural and topographic heights, and distances, and angles of elevation, depression, and azimuth. The present variant incorporates expanded length of the sighting arms, and a plumb level, both for increased accuracy. As such it begins to approach the look of Philippe Danfrie's "graphometre," published in 1597, just one year before Fabri. \$8500.



**43.** L'Uso del la Squadra Mobile, BY OTTAVIO FABRI, Italian, (Padua), 1673 edition of 1598. This fine book, written by the inventor of the "squadra mobile," describes in detail its construction and diverse uses. It runs to 100 numbered pages, with a beautiful

engraved title page, a large fold-out plate of the instrument, and many fine illustrations in the text. Condition is good, with a later binding, a couple of pages closley trimmed, and two pages mis-bound in double but in different states. An important work, and splendid accompaniment to the instrument. \$1800.

# \* \* \* \* \* CALCULATION \* \* \* \* \*



44. ABACUS-FORM FINANCIAL CALCULATOR, English, 1856, signed "Accountant Machine by J.R.C. Appleby, Saint James, Shaftesbury, Dorset, 1856." The beautiful thick grained mahogany body measures 14-3/4" x 4" x 1-3/4" (38 x 10 x 4.5 cm) closed. Mounted within are eight thick boxwood strips bearing 20 columns of manuscript numbers, giving various pounds, shillings, pence, and farthings. In between are four columns of copper (?) wires carrying sliding beads and boxwood markers, each column with 50-55 beads (of two colors) and five markers. It appears to permit monetary tallying and conversions. Condition is fine, noting oxidation of the wires, thus some beads tight, and a few beads possibly lacking. It is complete with the original stylus, all within the notably handsome body.

A second, almost identical example is known, shown on the comprehensive History of Computers web site. We quote from their research: "James Ramsey Cuthbert Appleby was born on 2 Jan. 1807 in Shaftesbury, Dorset, a child of George (1767-1841) and Elizabeth Appleby. He spent all his life in Shaftesbury, working as a linsey maker and hosier, and later as a parish clerk. James Appleby died in 1891 in Shaftesbury." \$2800.



45. DUTCH COMPAR-ISON / PRICING RULE, c. early 19th century, the substantial hinged boxwood rule opening to 24-7/8" (63 cm) long, with a 9" (23 cm) long brass bar hinged at right angles.



The sides are divided their whole lengths and stamped with five scales, three being local ("Rynland, Groningen, Amsterdam") linear measures in inches to eighths, one being metric (labeled "Nederl. Maat") in centimeters to millimeters, and one puzzling scale labeled "Penning\*Maat" and "G\*B." The latter is divided into panels every Dutch (i.e., "Amsterdam") inch, each panel with cryptic numbering (e.g., "\*7\*10" in the panel between 10 and 11 inches, "1\*7\*9" between 20 and 21). All scales begin with their zero points just at the inner edge of the brass crossbar, and run all the way to the far end, which has a brass termination. The rule is pierced midway to allow insertion of a pin to lock it open. Condition is excellent.

The use of this rule is not obvious. It is constructed much like a horse measuring stick, although the size of a dog measuring stick (which do exist!). But in those cases the brass cross bar slides along the scale, to measure height to the withers. It would of course be feasible to measure the height of something (less than 24") sitting (or standing) on a table, with the rule vertical and hanging just past the table edge.

Finally we struggle with the puzzle of the Penning\*Maat (penny-measure) scale. The Dutch term appears rarely in the literature, but is used to describe a tax-measure, probably for dry volumes, and usually connected with the vicinity of Schiedam near Rotterdam (de Hilster, personal communication). So the triple numerals along this scale could be interpreted as tax measure, perhaps even prices. We experimented and took them as numbers of guilders (each = 320 penning), stuivers (= 16 penning), and penningen, then calculated the number of penning at each distance (e.g., "1\*7\*9" = 441 penning), then plotted the curve of price vs. distance along the rule. The curve is very smooth, confirming the approach, and the curve follows exactly "# penning = # inches squared." Another subdivided currency works almost as well, being British pounds (= 240 pence), shillings (= 12 pence), and pence. Again the curve is smooth, following "# pence = 0.75 x (# inches squared), understandable as the British pence ratios are exactly 3/4 of the Dutch ratios. And that could explain the rule's "G\*B" mark as "Groot Brittanië". However, simplest is the Dutch currency interpretation -- any flat object (e.g., square Dutch tiles) might be taxed by surface area, so the rule would read the correct area-based tax next to the measurement along one side. A rectangular tile twice as long on each side would pay exactly four times the tax.

A splendid, and most uncommon, puzzle.

\$2650.



46. FINE DOUBLE-SIDED TWIN-SLIDER CALCULATING RULE OF BOXWOOD, English, c. mid-19th c., signed "J. Long Maker, 20 Little Tower St., London." This 12-3/4" (32 cm) long slide rule is divided and finely stamped on both sides (and one edge) with a multitude of scales, ranging from standard logarithmic ones to those with special emphasis on computing the volume of liquid in partially filled vessels of various shapes. The latter was of special interest to the customs duty assessor. In very fine condition, by a fine maker recorded at this address 1821 - 1884. \$240.



**47.** THE ODONTAGRAPH OF **PROFESSOR** WILLIS, English, third quarter 19th century, engraved "Professor Willis's Odontagraph, Made by Holtzapffel & Co., London," and nicely stamped with an owner's name "W.H. Fisher" and "63." This gallows-shaped flat brass plate has a 14-1/4" (36 cm) long main arm divided every unit from 0-230 for the "Scale of Centres inside the Pitch Circle," and 0-40 in the other direction for "Outside Centres." Condition is fine noting a few scratches.

Professor Williss Odontagraph, Made by Holtzapffel & C. London.

Included are two "Explanation of the Instrument" sheets, in fair condition only. The Odontagraph is used to design the shapes of gear teeth "so that any two Wheels of a set may work truly together." Proper rounding of the upper and lower portions of teeth is critical, with the Odontagraph serving to solve for the

respective centers of curvature. The famous firm of Holtzapffel offered the instrument in "Card, Wood, Brass, &c.," the brass version costing six times as much as the card. It was invented in 1838 by Robert Willis, an extraordinary authority on mechanisms as well as archeology and architecture (see e.g., Buchanan, 2013, *Robert Willis (1800-1875) and the Foundation of Architectural History*). He became Jacksonian Professor of Natural and Experimental Philosophy at Cambridge University. \$385.

# \* \* \* \* DEMONSTRATION, EXPERIMENTATION, ETC. \* \* \* \*



**48. PRECISION BIAXIAL INCLINOMETER,** English, c. third quarter 19th century, signed "Elliott Bro's. London." This lovely bright lacquered brass instrument has a 2-3/4" x 3" (6.9 x 7.6 cm) oval base supporting a vertical frame with zenithal knife-edge scale of 0°±25°, finely divided every degree on both sides. An external oval gimbal ring is mounted to the frame, and carries at right angles an internal swinging disk well weighted at the bottom, and engraved at the top with 0°±45° scale, again finely divided every degree on both sides. Whatever the tilt of the base, the disk quickly finds a stable position allowing precise simultaneous indications of front-to-back and side-to-side incline. The only challenge is reading both scales at the same time, if necessary. Condition is excellent, with all original lacquer finish.

Started in 1817 by William Elliott, the company developed into a major manufactory of precision scientific instruments, absorbing Watkins and Hill, trading under the name "Elliott Brothers" from 1854 (see articles by Clifton and by Bristow in *SIS Bulletin #36*). \$1750.

**49. STRAIN BIREFRIGENCE PRESS,** French, c. 1875, finely signed by the maker "Institut d'Optique du Dr. J.G. Hofmann, Paris." This attractive demonstration instrument measures 9-1/4" (23.5 cm) long, constructed with bright lacquered brass body, fine turned wood handle, and iron turnscrew. The body has an open chamber accessible via hinged door, and contains an iron push-plate. Condition is very fine throughout, noting minor blemishes to the finish.

In use an unannealed glass plate would be inserted, and observed through the portals using crossed polarizers. Various colored patterns of strain birefrigence would be seen



of strain birefrigence would be seen in the deformed glass, varying with the applied pressure. An example by Duboscq is in the Teyler Museum collection (Turner, *The Practice of Science in the Nineteenth Century...*, entry 562).

Our maker specialized in physics demonstration and experimentation apparatus, especially optical ones, working in Paris. \$595.



**50.** EARLY ARTIFICIAL MAGNET, probably English, c. mid-18th century, stamped "EC." The assembly stands 3-1/4" (8 cm) tall, plus suspension ring. Mounted very much like a lodestone, the single bent iron magnet is bound in shaped brass plates secured by

bolts and nuts of early form. The design is charming, the fabrication somewhat modest. Condition is fine retaining slight magnetism.

This is a rare example of early artificial permanent magnet, bound like a lodestone. The first workable technique for creating strong permanent magnets was developed by Servington Savery (published 1730). He magnetized many steel wires with a lodestone, bundled them together and added soft iron end pieces. Savery also produced large bar magnets (see Andrade, "The Early History of the Permanent Magnet" in *Endeavor*, 1958). He was followed by Gowin Knight (1713 - 1772), who in 1744 presented powerful bar magnets before the Royal Society.

Lodestones and magnets are rarely signed. The maker of this one is not certain, although it is tempting to identify "EC" as the exceptional instrument maker and inventor, Edmund Culpeper (died 1737), or his son Edmund (II), who was working in London in the late 1750's. \$2800.





51. EARLY DE SAUSSURE FORM ELECTROMETER, Continental, c. 1790. Standing 5-1/4" (13 cm) overall, this early electrometer has a square brass base, a four-sided hand-blown and cut glass body, and an upper lacquered brass assembly from which are suspended fine strands of straw. The dome exterior has red lacquered apex; the interior two metal (lead?) foil "terminals" on opposite sides. Joints are sealed with red wax. The glass is hand-engraved with a scale divided every unit 0±9, to measure quantitatively the displacements of the strands under electrostatic charge. Condition is very fine noting small losses to the enamel.

There were early attempts to construct instruments to detect and measure electrical charge. By the mid 18th century Nollet had developed a system of two suspended wires that diverged when charged. In 1770 Henley invented his portable quadrant electrometer. And by 1779 Cavallo had designed a small electroscope with two balls suspended inside a glass enclosure. But it was the great Swiss physicist who created (c. 1785) the first true electrometer, with a glass enclosure and graduated scale to make quantitative measurements. He sometimes attached a long vertical wire to enhance the sensitivity to atmospheric electricity (see Archinard, *Les Instruments scientifiques d'Horace-Bénédict de Saussure* for an example in Geneva, and see **Tesseract** Catalogue 82, Item 28).

A rare survival.

\$2250.



**52. BALANCE FOR STATIC AND HYDROSTATIC WEIGHING OF GOLD COINS,** English, third quarter 18th century, signed "Bradford, Darby & Hulls, By ye King's Patent." It is constructed with an 8" (20 cm) long brass beam mounted with two pairs of steel pivots (labeled A & B), sliding weight, and coin clip on chain. The beam is divided, on both sides, with a total of four linear scales labeled A, W, B, W, running variously from 7 to 79, with divisions every half unit. Condition is excellent, complete with the original watered paper and tooled leather covered wood pocket case, stamped "RD."

This unusual steelyard-form balance is designed to support a coin over the edge of the shelf or tabletop, while balancing on a chosen pair of pivots. With a coin held in the spring clip, its weight is found by moving the little sliding weight along the beam to achieve balance, and reading its position. The specific gravity is determined by weighing the coin in air and again, using the appropriate graduations, in water.

the coin in air and again, using the appropriate graduations, in water. The form was patented, in 1753, by Jonathan Hulls and William Bradford, of Chipping Camden, as "A new machine or instrument for discovering and preventing frauds by counterfeit gold, which gives the weight and shows the alloy of that metal."

This hydrostatic coin scale is rare; we had a variant example in **Tesseract** Catalogue 13 (Item 55), that one with two-position adjustment for the suspension joint, and a single line of graduations. It too had the original carrying case, again with the unidentified mark "RD" (possibly R. Darby). \$2750.



**53. THE CHROMOTROPE OUTFIT OF COUNTER-ROTATING SLIDES FOR THE MAGIC LANTERN,** English, c. 1870. The 10" x 5" x 5" (25 x 13x 13 cm) softwood box has an old red wash finish, and is fitted out to accommodate the geared holder and 12 insertable disks. The holder assembly is a 4-1/2" x 7" block of mahogany with central aperture containing ring gearing driving two brass cells in opposite rotation. An external crank provides the motion. Each cell can be fitted with any of the dozen 3-1/8" diameter disks, which are hand-painted in color with various pinwheel patterns. The result is kaleidoscopic motion, projected large by a magic lantern. Condition is very fine, the crank a bit tight, and noting minor losses to the paint.

This is a sophisticated mechanization, whereby nothing stands still. And with 12 disks to choose from, 66 different combined pairs are possible. We find a somewhat similar outfit in the Richard Balzer collection. \$2400.

# \* \* \* \* \* MEDICAL \* \* \* \* \*



54. LARGE GERMAN AMPUTATION SET, c. mid-19th century, signed on the trade label and on the larger tools by Ernst Twele of Leipzig. The splendid 18-3/4" x 11-1/4" x 2-5/8" (48 x 28.5 x 7 cm) fitted wood case is bound in leather stained purple and with superb decorative gilt stamping, and lined with purple velvet. It appears complete with large bow saw with its fine pistol-grip hardwood handle, small bow saw, finger saws, three Liston knives, metacarpal knife, bone snips, slide-catch forceps, tenaculum, Petit tourniquet, and three pressure pads. Several instruments are wood handled, but the three large knives are all metal, and indeed by Twele. We can speculate that the three are period replacements in the third quarter 19th century to accommodate the needs of sterilization. Condition is very fine throughout, noting only light rubbing to the case exterior.

This little known maker was a fine craftsman, recorded in trade directories in the 1840's and 1850's. An exceptional cased set. \$5500.



55. PERNICIOUS DIPHTHERIA OF THE PHARYNX -- A REMARKABLE ANATOMICAL MODEL, German, c. early 20th century, labeled "Diphtherie des Rachens, bösartig." Mounted to an 8-1/4" x 12-1/4" (21 x 31 cm) ebonized wood panel is a life-size head formed hollow and hand-painted. The opened mouth reveals realistic teeth, plus the disease which has spread to the entire tongue and back of the throat. Condition is very fine noting warping to the wood panel. \$3200.



**56.** UNUSUAL STRAIGHT LEVER PELICAN, c. late 17th / early 18th century. This 6-1/2" (16.5 cm) long iron instrument has a slightly sinuous long shaft partially hollowed as a trough along one end terminating in a small solid bolster, and broadening to a lever / handle on the other. A long claw (with serrations and two teeth) pivots from the center, with a choice of three mounting holes to set the claw / bolster separation. The claw's arm can enter and rest within the trough. Condition is fine and complete, with a little old oxidation.

Various pelicans are described in Bennion, *Antique Dental Instruments*, 1986, but none quite like this extremely compact yet effective version. \$1800.

#### TWO REMARKABLE WAX MODELS BY THE RENOWNED DR. FORTUNATO



**57. EXTREMELY REALISTIC HEAD WITH MELANOMA,** American, 1935, signed "V. Fortunato, New York, 1935." Mounted to a 7-3/8" x 9-1/2" (19 x 24 cm) ebonized wood plaque, this eerily realistic head is fashioned of hard wax, set with human hair and realistic eyelashes, and presented with a cloth surround. A serious skin lesion is on the side of the jaw. The grimace, the slight wrinkles around the eye and mouth, are exceedingly well crafted. Condition is very fine.

The craftsman was Dr. Vladimir Fortunato, physician and modeler, born in 1885 in the Crimea. Educated at the University of Moscow, he worked for the Moscow Medical Museum as a sculptor of anatomical models. As a 1921 immigrant to the U.S., he continued this career at Johns Hopkins University, and was called upon to make the death mask of President Woodrow Wilson. At the time of his own death, in 1938, Fortunato was busy preparing models for the 1939 World's Fair, for exposition in the impressive Medicine and Public Health building. Fortunato's other claim to fame is as the inventor/producer of the vibrating dildo, in 1937. \$4200.

**58. EXTRAORDINARY MODEL OF LEPROSY TO THE HAND,** American, c. 1935, signed "V. Fortunato." This life-size wax model is set in a cloth surround and affixed to an ebonized wood panel 6-1/4" x 8-3/4" (16 x 22 cm), all in very fine condition. It appears at first to present a "claw hand," an "ulnar claw," but combined with the skin lesion and badly deteriorated finger nails, the most likely diagnosis is leprosy. Again it was modeled by Dr. Vladimir Fortunato, undoubtedly from life. \$4950.





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