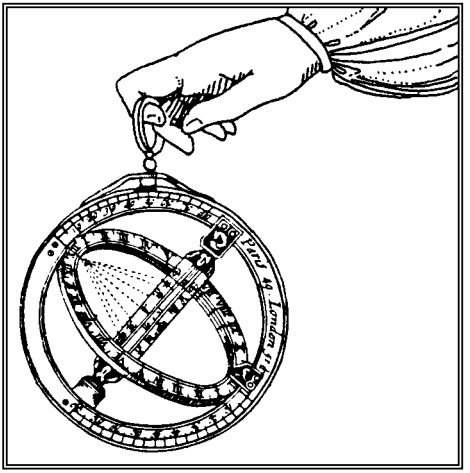


TESSERACT

Early Scientific Instruments

Catalogue One Hundred Eleven

Spring, 2020 $10

CATALOGUE ONE HUNDRED ELEVEN

CONDITIONS OF SALE

All items in this catalogue are available at the time of printing. *We do not charge* for shipping and insurance to anywhere in the contiguous 48 states. New York residents must pay applicable sales taxes. For buyers outside the 48 states, we will provide packing and delivery to the post office or shipper but you must pay the actual shipping charges. Items may be reserved by telephone, and will be held for a reasonable time pending receipt of payment. All items are offered with a 10-day money-back guarantee for any reason, but you pay return postage and insurance. We will do everything possible to expedite your shipment, and can work within the framework of institutional requirements.

The prices in this catalogue are net and are in effect through September, 2020. Payments by check, bank transfer, or credit card (Visa, Mastercard, American Express) are all welcome.

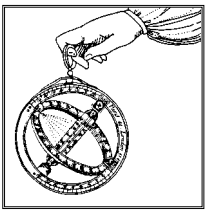
— David Coffeen, Ph.D.
— Yola Coffeen, Ph.D.

Members:
Scientific Instrument Society
American Association for the History of Medicine
Historical Medical Equipment Society
Antiquarian Horological Society
International Society of Antique Scale Collectors
Surveyors Historical Society
Early American Industries Association
The Oughtred Society
American Astronomical Society
International Coronelli Society
American Association of Museums

Co-Published :
RITTENHOUSE: The Journal of the American Scientific Instrument Enterprise
(http://www.etesseract.com/RHjournal/)

We are always interested in buying single items or collections.

In addition to buying and selling early instruments, we can perform formal appraisals of your single instruments or whole collections, whether to determine fair market value for donation, for insurance, for loss, etc. We were recently engaged to appraise a medical collection of several hundred items being donated to an American museum, and to appraise a major European collection of early scientific instruments, being insured for a loan exhibition.

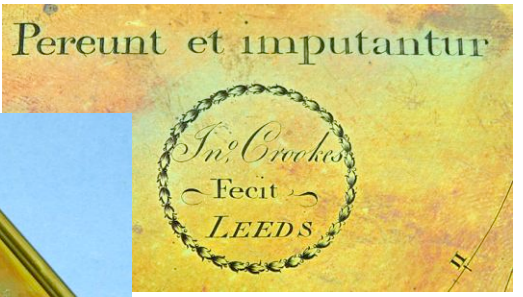


founded 1982

TESSERACT
Box 151
Hastings-on-Hudson
New York 10706 USA

telephone: 1-914-478-2594
e-mail: mail@etesseract.com
web site: http://www.etesseract.com

*** * * * * ASTRONOMY * * * * ***

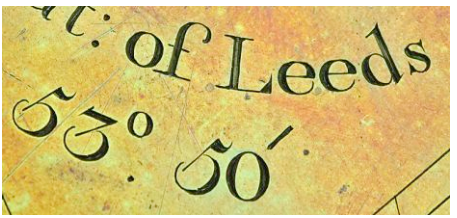


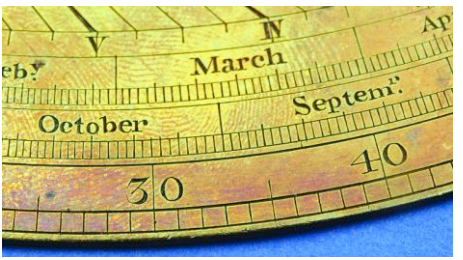
1. HORARY QUADRANT FROM LEEDS, English, c. third quarter 18th century, signed "Jn'o Crookes, Fecit, Leeds," and "Lat. of Leeds 53°50" and "Pereunt et imputantur" or roughly "They (the hours and days) perish, and are reckoned (to our accounts)." The brass quadrant has a 5" (13 cm) radius, pierced with tiny hole for plumb string (and with an extraneous later hole), and mounted with a 5" long sighting tube. It is engraved with a 0°-90° scale running CCW, a calendar scale divided every day (with vernal equinox 21 March and thus post-1752 in England), a folded pattern of curved hour lines (for winter and summer) crossed by the ecliptic, and a straight edge scale of solar declination divided every degree. All of the engraving is of very high quality. Condition is very fine noting some darkening to the brass.

This quadrant follows the basic design of Edmund Gunter. Its layout and uses are well described in 68 pages in his "An Appendix concerning the Description and Use of a small Portable Quadrant, for the most easy finding of the Hour and Azimuth, and other Astronomical and Geometrical Conclusions," to which we refer.

Our excellent craftsman, perhaps "Jonothan" or "Jonothon" Crookes, is not listed in Clifton. He is recorded by the Websters for this very instrument, and with an interesting provenance to the "Musée Lombard, Geneva." Jean Lombard was a grand international high-end jeweler, in Geneva, collaborating with the son of Carl Fabergé. Lombard founded his museum in 1957, its contents since dispersed.

A very fine, and very rare instrument from Leeds. $5500.





BY AMERICA'S FIRST COMMERCIAL GLOBE MAKER

2. SIGNIFICANT PAIR OF AMERICAN TABLE GLOBES, 1826 & 1828, each dated and signed "J. Wilson & Sons, Albany, St. N.Y." These fine 13" (33 cm) diameter globes are superbly mounted with tan gores printed with a wealth of political, geographic, and astronomical information. Coastlines, constellations, etc. are enhanced with delicate hand coloring. They are mounted within fine brass meridian rings divided every degree of latitude, 0° - 90° in each quadrant, and have rotatable polar time pointers. They rotate, and are adjustable in latitude, within the original four-legged turned wood stands with cross-stretchers, clamp screws, and horizon rings printed and hand colored.

The 1826 "New American Celestial Globe" has wonderful constellation figures and plots the positions of almost 5000 heavenly bodies. Stars are sized according to seven different magnitudes, and nebulae, clusters and double stars are shown. Constellation figures are named in both Latin and English, and include Mariner's Compass, Telescope, Air Pump, Sculptor's Tools, and Engravers Burins (*Caela Sculptoria*).

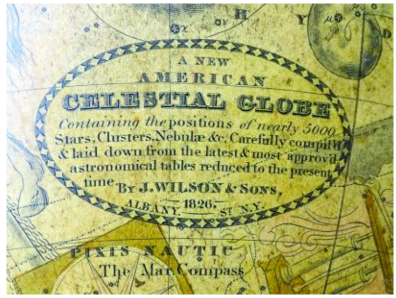
The 1828 "A New American Thirteen Inch Terrestrial Globe" explains, in a wonderful cartouche, that it incorporates all the new discoveries and "Political Alterations" right up to 1828. Signed in the vignette are the names of the cartographer "D.W. Wilson del.," (Wilson's son) and the printer "Balch, Rawdon & Co. fect." Included on the globe are numerous dated tracks of oceanic circumnavigators. The polar demarcations, in the 1820's, are still rather undefined.

Condition is very fine, with minimal restoration, notably to some patches on the horizon ring paper.

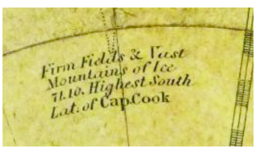
James Wilson (1763 - 1855) produced his first globes in Bradford, Vermont. Transferring to Albany, N.Y., in 1818, he established his "artificial globe manufactory," eventually producing globes of 13", 9", and even miniature 3" diameter. (See **Tesseract** Catalogue 108 item 1), The firm name changed as James's sons joined the business and later as Cyrus Lancaster entered the family and the firm (see, e.g., D. Warner, **Rittenhouse 2,** pp.135-7).

A number of Wilson globes are of course known, most in institutional collections. Yonge (1968, *A Catalogue of Early Globes)* reports a similar 1826 / 1828 pair in the Mariner's Museum, Newport News, Virginia. An exceptional early pair by America's foremost globe maker. $38,500.


A NEW AMERICAN THIRTEEN INCH
TERRESTRIAL GLOBE.
Exhibiting with the greatest possible Accuracy,
THE POSITIONS OF THE PRINCIPAL KNOWN
PLACES OF THE EARTH;
With the Tracks of various Circumnavigators together with
New Discoveries and Political Alterations down to
The present PERIOD: 1826.
BY J. WILSON & SONS ALBANY ST. N.Y.

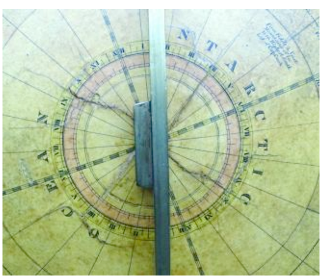

A NEW
AMERICAN
CELESTIAL GLOBE
Containing the positions of nearly 5000
Stars, Clusters, Nebulæ &c. Carefully compil'd
& laid down from the latest & most approv'd
astronomical tables reduced to the present
time By J. WILSON & SONS,
ALBANY, 1826. ST. N.Y.
PIXIS NAUTIC
The Mar. Compass


ORION


Firm Fields & Vast
Mountains of Ice
71.10. Highest South
Lat. of Cap. Cook

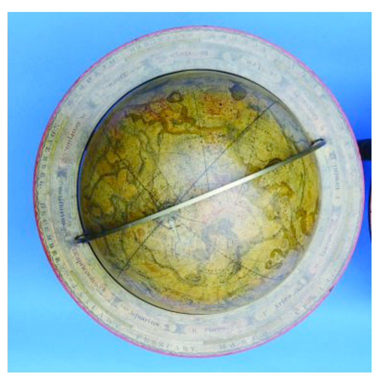

Auckland I.
Antipodes I.


Algol
MEDUSÆ


ANTARCTIC
OCEAN


CÆLA SCULPTORIA
The Gravers

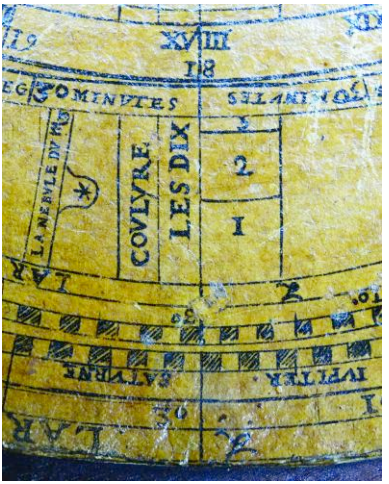

Dn. Maria Lajara discovered
by the ship Hercules in 1781
Well Inhabited
F
ISLANDS
At Woahoo Lieut. Hergest Commander of the
Dædalus Mr. Gooch the Astronomer &
one of the Seamen were Murdered by the Natives
OWHYHEE
Karakakooa B.
Here Capt. Cook was killed
by the Natives Feb. 1st. 1779 &
Capt. Clerk Succeded in the
command of the Resolution



THE ONLY SURVIVING EXAMPLE KNOWN OF THIS SORT OF ASTRONOMICAL / ASTROLOGICAL ASTROLABE

3. PARTIAL "PANTOCOSME" OF MORGARD, French, c. first quarter 17th century. This universal instrument is constructed as a 9-1/2" (24 cm) mahogany disk mounted with a printed and varnished paper sheet, two brass index arms with twin sighting holes at each end, and a bracket in fleur-de-lys form with swivel-mounted suspension ring. The paper is a complex form of *rete* but with much supplementary astronomical and astrological information, including the climates, the aspects of the planets for each day of the houses of the Zodiac, etc. The "Index Solaire" is engraved with circular scales, the "Index Lunaire" with an *aspectarium* and lunar phase volvelle. (For more technical details, see the catalogue essay by A. Turner in *The Time Museum: Time Measuring Instruments Part 1,* pp. 232-237). Condition is good, the paper uniformly browned.

Noel Leon Morgard was a teacher of mathematical sciences in early 17th century Paris, and described his invention in a rare 1612 book entitled (translating into English) "*Declaration, Instruction and Use of the Pantocosme or Universal Instrument, concerning the Observations of Astronomy, Astrology, Cosmography, Geography, Navigation, Geometry, Chorography, and others."* This substantial book includes detailed plates of the full instrument. No other example of the instrument is known. Somewhat similar in form and function is the 1585 French *"Cosmometer"* of Jacques Chauvet (one example known, see *Strumenti Scientifici della Collezione Carrand,* 1991, pp. 60-63). $9800.



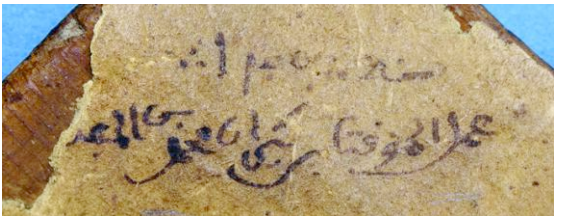
* * * * *

4. COMPACT BINOCULARS / OPERA GLASSES, French, c. late 19th century, signed for the model "Mars," and in the 4-5/8" (12 cm) wide case signed by the retailer "Leuchars & Son, Piccadilly, London." Measuring only 1/4" (6 mm) thick when collapsed, the binoculars are made of plated steel with flip-up pair of eyelenses, and flip-up pair of objective lenses with attached handle. Eyepieces are on a long slide for focus. Condition is fine noting light wear to the finish, complete with pouch of red morocco leather lined in green silk. $180.

5. A TELESCOPE OF LUXURY, English, c. 1850, signed in beautiful engraving on the eyetube "C.W. Dixey, Optician to the Queen, New Bond Street, London," and stamped for the maker on the case. Opening from 6" to 16-3/4" (15 - 42 cm) on three drawtubes, this elegant instrument is made of gold-plated brass, with main tube bound in variegated tortoiseshell. The achromatic objective and erecting eyepiece system give fine images of considerable magnification. Condition is excellent noting very small areas of wear to the finish, and an unavoidable hairline check the length of the tortoise. It is complete with the original stitched leather case.

Charles Wastell Dixey worked c. 1838 - 1862, and held a Royal appointment as "Optician and Mathematical Instrument Maker" to Queen Victoria.

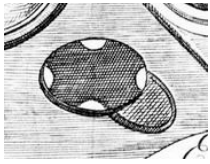
A most elegant telescope. $1650.



6. ISLAMIC ASTRONOMICAL SIGHTING QUADRANT, probably NW Africa, perhaps Morocco, c. late 19th century. The wood quadrant is 6" (15 cm) in radius, covered each side with paper and mounted with two brass sight vanes and brass suspension ring and swivel. It is pierced for plumb line at the apex of the quadrant arc. The face is well laid out in manuscript ink with a 90° arc, divided every degree and labeled (forward and back) every 5° in Arabic alphanumeric (abjad) notation. Linear edge scales are similarly divided 0°-60°. The center is filled with a sinecal quadrant for trigonometric calculations without need for tables, and it is crossed by curves of Sines, Cosines, and a 23-1/2° curve for the maximum declination of the sun. The reverse bears the (worn) signature, inscribed in western Kufic, "Made by al-Mufta(?) ibn Kayran Muhammad ibn al-Mu...." (thanks to Taha Yasin Arslan for transcription guidance). The quadrant is in rough condition, having survived wear and water stains and bugs. The majority of content on the face is certainly readable.

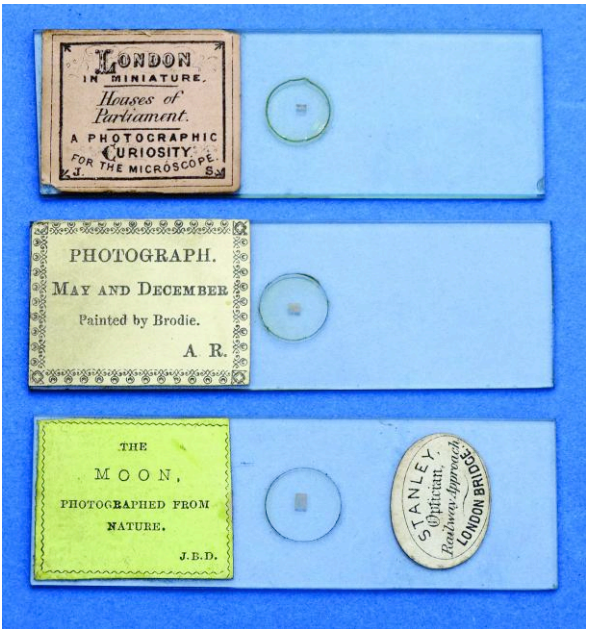
Despite its condition, this is a significant survival of astronomical quadrant from the Maghrib. $4500.

*** * * * * MICROSCOPY * * * * ***



(Scarlett, c. 1728)

7. ELEGANT OVAL MAGNIFIER SET IN SILVER AND TORTOISE, probably English, c. first half 18th century, measuring 2-7/8" x 2-1/8" (7.3 x 5.4 cm) overall (closed). The fine magnifying lens is mounted in a ringed silver band which swivels out from the exquisite case of variegated tortoiseshell framed in lovely chased silver mounts. Condition is excellent. This is not only a practical simple magnifier but a thing of true beauty. The form is illustrated in Scarlett's c. 1728 trade card. $695.



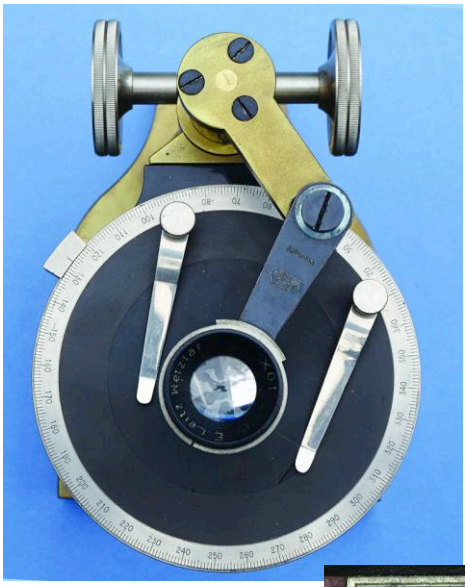
ARTWORKS THROUGH THE MICROSCOPE -- THREE MICROPHOTOGRAPHIC SLIDES, English, late 19th century. Each 1" x 3" glass slide has a microphotograph approximately 0.05" square, sealed under cover glass, and carries a printed label with the image title, and maker's initials. The three makers used the technologies of microscopy and photography to produce this unique form of Victorian entertainment, enabling the individual to own microscopic museums of art. All in very fine condition.

8. "LONDON IN MINIATURE: HOUSES OF PARLIAMENT. A PHOTOGRAPHIC CURIOSITY FOR THE MICROSCOPE. JS," showing a grand scene of these magnificent structures. The maker was probably Joseph Sidebottom (see Bracegirdle). $95.

9. "PHOTOGRAPH. MAY AND DECEMBER. PAINTED BY BRODIE," showing an elderly gentleman and his "arm candy" in a Victorian salon, the maker probably A. Reeve. $98.

10. "THE MOON, PHOTOGRAPHED FROM NATURE. J.B.D.," and with the retailer's label of "Stanley, Optician, Railway Approach, London Bridge." This fine and rare John Benjamin Dancer slide presents an image of the quarter moon. Such a pleasure to view the moon through a microscope! $250.

11. *(not illustrated)* **Bracegirlde B., and J.B. McCormick, THE MICROSCOPIC PHOTOGRAPHS OF J.B. DANCER,** 1993, 288pp. with 844 illus. A magnificent descriptive atlas of Dancer's microphotography, with superb illustrations, showing all known surviving images. $98.



12. UNCOMMON LEITZ STAND, German, c. 1900, signed on the eyepiece and eyepiece arm "E. Leitz, Wetzlar," and under the base and stage "69." It stands 6-1/2" (16.5 cm) tall (minimum) on its bronze(d) horseshoe base, and has pinion drive to the substantial triangular rack support in the rear pillar, raising the double-jointed lens arm another 3-1/8". It features rotary black matte brass stage with 0 °- 360° circumferential scale, stage clips, double mirror (plane / concave) in yoke on long swinging substage arm, and achromatic 10-power magnifier. There are no other accessories. Condition is very fine noting two empty fittings on the base. It is contained in a signed Leitz case with N.Y. retailer's label.

A quite unusual Leitz model, similar to their dissecting microscopes but with rotary stage for prepared specimen slides. $650.

13. SIMPLE MICROSCOPE FOR SEED STUDIES, c. late 19th century, 3-1/4" (8 cm) tall, constructed with base and single-lens cell of grey tin plate, with fine bulbous hand-blown glass body. The instrument is seemingly sealed, enclosing a variety of dried seeds over a patterned, colored paper background. Condition is very fine noting a little bending of the eye surround. Unusual. $450.

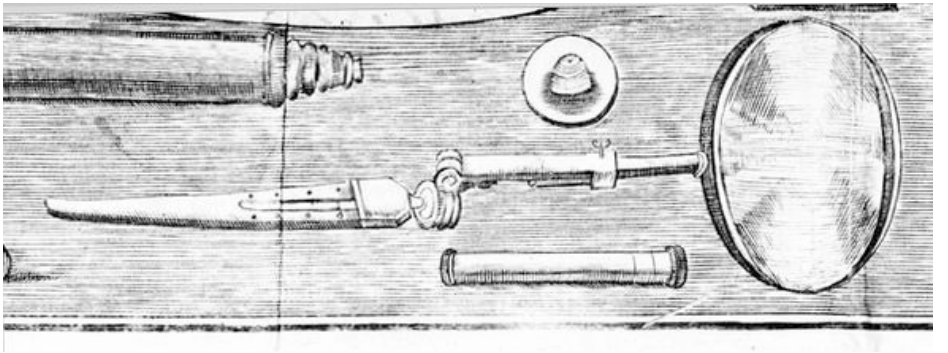
DISCOVERED -- AN ALTERNATIVE TO SPECTACLES?
Early 18th century head-mounted binocular-vision reading glass??

14. THE SCARLETT / CULPEPER READING GLASS, English, c. early 18th century, boldly signed "Edm. Culpeper, Londini Fecit." A 7-1/8" (18 cm) long tapered ebony stem is laminated with a pierced brass nameplate carrying a sliding knob, and with support for an articulated brass arm which swivels at the end of the stem, and tilts on a five-leaf hinge. The arm is slotted to support, and clamp in position, the brass holder for a 2-3/4" x 4" (7 x 10 cm) oval magnifying lens in wood frame. The brass has fine decorative shaping and is engraved with lovely Culpeper-style floral designs. Condition is very fine noting some small edge chips to the (replaced) lens.

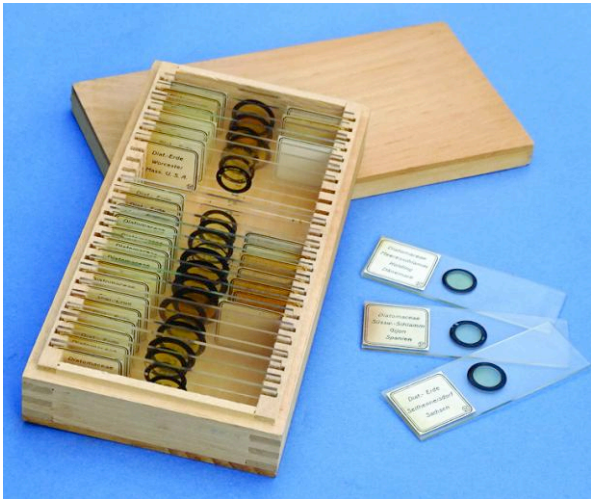
This is a fine signed example of an exceedingly rare optical device from the early years of the 18th century. We have found one museum example, that one quite similar but with stem of ivory, and apparently unsigned, in the London Science Museum, provenanced to the famous microscopist Thomas Court. The one related documentation is an illustration in Edward Scarlett's wonderful c. 1728 trade card (see Calvert, 1971, *Scientific Trade Cards in the Science Museum Collection*). Scarlett gained his freedom in the Spectaclemakers Guild in 1705, working under the trade sign of Archimedes & Globe until his death in 1743. He is credited with the first presentation of spectacles with hinged side arms (as opposed to simple ones balanced on the nose) and illustrates our very own mysterious instrument.

The intended application of this magnifier is unclear. We have yet to find period documentation of it, or even a painting showing it in use. It has been suggested that the tongue be slid vertically in between the backstrip and spine of a book, for use as a reading glass, but the viewing geometry doesn't work. An interesting possibility is that the tongue be slid horizontally into a slot in a hat or wig or headband. The geometry works, as a form of magnifying spectacles for both eyes, adjustable in tilt and rotation and focal distance. Another targeted insertion might be in a vertical slot in the workbench of a maker of fine lace or embroidery or even miniatures, but its significance in the trade card of Scarlett, alongside telescopes, microscopes, barometers, etc., suggests a more popular use than as a "tool-of-the-trade."

The maker was of course the remarkable craftsman, Edmund Culpeper, working c. 1700 to 1737. He was a master at invention, construction, and decoration of all manner of instruments, ranging from exquisite drawing tools (**Tesseract** Catalogue 7 Item 55, also C88/27), to his elaborate sector-base screw-barrel microscope (C22/20) to his widely copied double reflecting microscope (C22/64) to a silver inclining sundial (C105/16). Here we see his work in a magnifying device of extreme rarity. $12,000.



(Scarlett, c. 1728)



15. SET OF MOLLER STREWN DIATOM SLIDES, German, mid-20th century, bearing the encircled-M logo. The 25 1" x 3" slides are each mounted with a circular strewn field of a specific diatom type, identified on a printed label by name and sample location. They are from origins worldwide, many in the U.S. Condition is very fine, noting light browning to some labels.

Brian Bracegirdle (*Microscopical Mounts and Mounters,* 1998) describes in some detail the diatom slide production of J.D. Möller (1844 - 1907) and successors. As late as 1951, they were advertising the availability of 25 separate diatoms (as here) as well as arranged type-plates and tests.

A good example of diatom variety. $350.

16. "INSECTOSCOPE" ON STAND, c. late 19th century, standing 3-1/4" (8 cm) overall with body and lens mount of thin brass plate, and transparent specimen chamber a removable blown glass cylinder. Condition is very fine, complete with fair original cylindrical card case bound in watered paper.

This is an unusual form of live-box simple microscope on elevated stand. We had nothing quite like it in the collection of 126 simple microscopes offered in **Tesseract** Catalogue 98. $395.

17. SUBSTANTIAL CASE-MOUNTING SIMPLE AND COMPOUND MICROSCOPE OUTFIT, English, c. 1820. The 6-1/4" x 5-1/4" x 1-3/4" (16 x 13 x 4 cm) mahogany case has domed top, central boss for mounting, the interior fitted and lined with dark blue velvet. Constructed of bright lacquered brass, the microscope has vertical pillar with rear rack, pinion drive for the insertable stage height, insertable dovetailed lens arm accommodating one or more of the three interchangeable stackable lenses as well as the compound tube, and concave mirror below. Accessories include live box, stage forceps, presentation spike, and three fine sliders of transparent and opaque specimens. The lens arm may be handheld for field use, when fitted with a lens and, as necessary, the forceps arm. Condition is fine noting some loss to mirror silvering.

This is basically a large and rather early version of the Cary / Gould design (see G. Turner, 1989, *The Great Age of the Microscope,* p. 75ff). $1800.

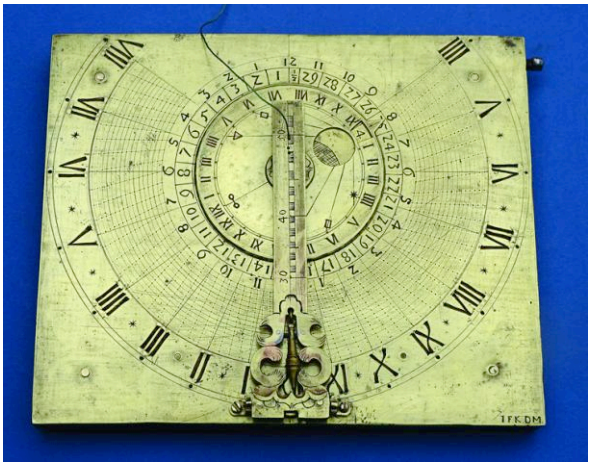
18. THE "CHRONODEIK" FOR PRECISION TIME DETERMINATION, Austrian, c. late 19th century, signed "St. Ressel, K.K. Sternwarte, Wien, No. 104." Standing 8-1/4" (21 cm) tall, of golden lacquered brass, it consists of a telescope mounted vertically and with swing-away dark grey solar filter on top, the internally-focusable telescope directed at a clear glass mirror below, adjustable in tilt by external thumbscrew, thus directing the line of sight outwards (towards the sun) through a cut-away in the tube. This assembly is mounted on a circular platform rotatable manually or with fine swing-away worm and ring gearing. It carries crossed spirit levels, and rides on a substantial base with three leveling screws. It is quite handsome, in very fine condition.

With this simple but very effective instrument, one can determine the precise time of solar or stellar meridian passage, and thus find the apparent solar time in a given place to within one second, as well as determination of observer's latitude, etc.

In use, one levels the instrument carefully and sometime before noon sights the sun by rotating the assembly and tilting the mirror (both by thumbscrew motion) until the sun's image is exactly centered in the eyepiece reticle. Carefully note the time. Then, about as long after noon, and *without touching the mirror tilt,* rotate the assembly, waiting and noting the time when the sun's image is again centered. The average of the two times will be exact noon, thus revealing by how much the watch or clock is slow or fast. For the most precise work, one compensates (using tables) for the very small change to solar declination between the two measurement times.

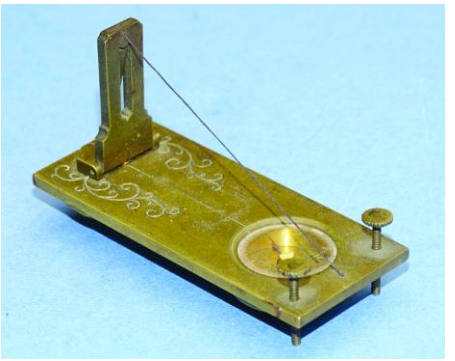
Invented and patented by S.C. Chandler, Jr., c. 1879, the original device was suspended within the cylinder to hang freely vertical (see Chandler, 1880, in *The Science Observer,* III, pp. 17-22). Improvements by Professor Palisa, discoverer of many minor planets, and implemented by Stefan Ressel, the instrument maker of the University Observatory in Vienna, led to the present form a few years later.

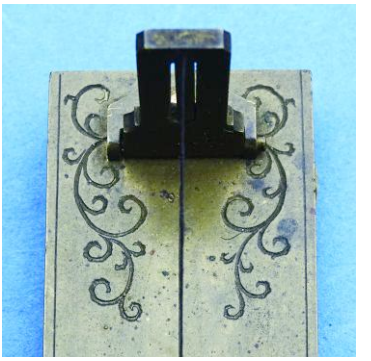
The Chronodeik is obviously quite rare, found in very few collections worldwide. The first we saw was years ago in the Polish sundial museum The Przypkowskis Museum of Jedrzejow, and we have come across one other since. $2950.



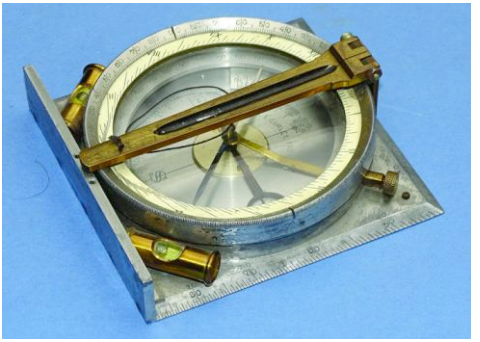
19. UNUSUAL LUNAR / SOLAR TABLE DIAL, German, c. late 17th / early 18th century, signed cryptically "IFK.DM." Mounted to a substantial oak base is a brass plate 5-3/4" x 6-7/8" (15 x 17 cm) boldly engraved with a 4am - 8pm chapter ring marked every half hour but, unusually, with transversal readout divided each minute. There is a folding spring-loaded upright divided both sides for every degree of latitude 30° - 53°, with hachured intervals, and pierced for string gnomon settings at about 47.°8, 48.°5 , and 49.°6 north latitude. The upright holds a plumb bob hung within a design of opposing arcs. A central rose is surrounded by circular scales of hours (0 - 12 twice CCW) and of days of the lunar month (0 - 29-1/2 CCW). Within these is a rotating lunar volvelle engraved with CW twice-12 scale, and with small window though which one views, one reading at a time, a curious somewhat unequally divided 0 - 12 - 0 scale (0 at south, 12 at north) on the main plate. Another window reveals, at full moon, a small inset glazed compass with cardinal directions marked in Latin, this useful for aligning the sundial in the meridian. The volvelle is centered by an astrological *aspectarium* design. Construction is slightly primitive, by an as yet unidentified maker. The z-shaped "2" is suggestive of a German origin. The Roman numeral "X" has a sinuous branch, seemingly distinctive of this maker. Condition is fine, the brass cleaned but not polished.

This interesting sundial permits readouts to better than one minute, and can be used at night with a bright moon, using the volvelle to correct for its position in its orbit, i.e., the moon's "age." $4950.

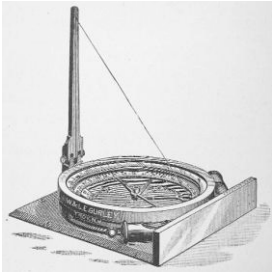




20. PORTABLE NOON SUNDIAL, Japanese, c. first half 19th century. Finely made of brass 2-1/4" (5.7 cm) long, the dial has hinged support plate for the string gnomon, inset glazed compass with the four principal directions engraved in Kanji, and leveling feet. A plumb bar hangs vertically within a slot in the upright plate. Condition is very fine throughout, the brass slightly darkened. In use one orients the dial north/south, levels it by centering the bar within the slot, and waits for the shadow of the string to cross a scribed center line on the base plate. It works at any latitude, and enabled correct setting of clocks and watches once per day. A rare example of an Asian noon dial, with lovely engraved decoration to the main plate. $1200.

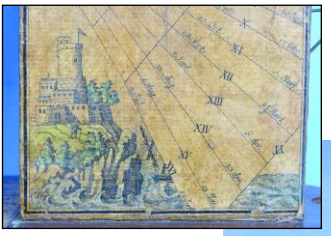


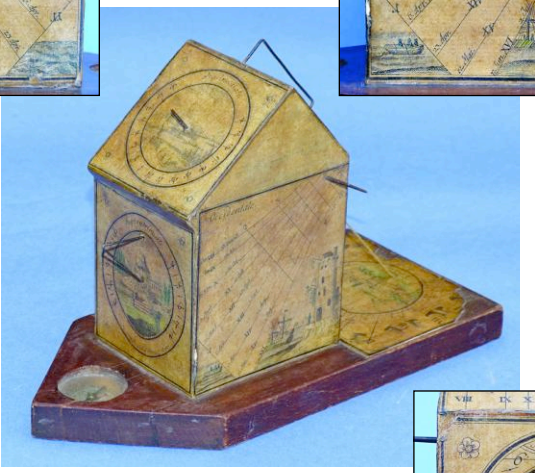
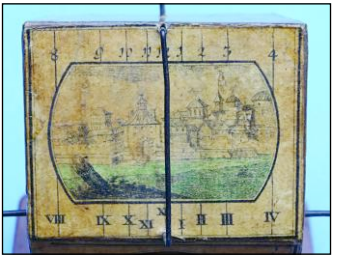
21. GURLEY'S SUNDIAL -- THE "ALUMINUM DIAL COMPASS," American, c. 1900, signed "W. & L.E. Gurley, Troy, N.Y., constructed on a 4" (10 cm) square plate of aluminum (for lightness), with lacquered brass fittings and folding sight. There are crossed spirit levels, inset glazed compass (with declination offsets, one with vernier, degree scales, internal inclinometer, and needle lifter), hinged sight vane with string gnomon, and, mounted above the compass glass, a chapter ring divided every five minutes from 6am to 6pm. There is no staff mount provided. The gnomon angle (i.e., the design latitude, is a northerly 47°, likely for the northern U.S. iron mining areas of Minnesota, etc). Condition is good, noting some stains to the base plate. Not present is a supplementary fixed sight which could insert into two small holes opposite the present sight vane, thus bypassing the sundial and useful for simple plane table surveying.



(Gurley catalogue)

This good sundial is particularly useful for determining the meridian in areas of local magnetic attraction from, e.g., bodies of iron ore. $850.




22. SEVEN SUNDIALS IN ONE -- A COMPLEX POLYHEDRAL DIAL, German, c. late 18th century, signed "G. (or J.) C. Gütle, mech., Norimb., fecit exc." The somewhat boat or raft-shaped thick wood base is 4-1/2" x 9-1/2" x 3/4" (11 x 24 x 2 cm), sporting an inset glazed compass with printed paper rose, a horizontal dial with string gnomon, and a wooden tower block with two slanted and four vertical sundials. All dials are laid out for the indicated latitude of 48.5° (e.g., Augsburg), beautifully designed, printed on laid paper, lightly hand colored, pasted and varnished to the various surfaces. Each is labeled with the respective direction the dial faces, and is embellished with a fine scene of cities, castles, or ports. There are straight pin gnomons and bent wire gnomons. Condition is fine, the papers with tan color and slight wear, all complete but for edge losses to the horizontal dial paper.

This is a fine example of the polyhedral dial, which represented, over the centuries, a tour-de-force of the dialmaker's craft. They range from a 16th century 30-sundial polyhedron on the shoulders of Atlas (A. Turner, 1987, *Early Scientific Instruments,* Plate VIII) to the well-known Beringer cube dial (**Tesseract** Catalogue 37 Item 22). Little is recorded of our maker. We find in Zinner and in the Websters' index only a listing of Konrad Gütle, for a 1797 table dial in the Brecker collection.

Seven dials for the price of one. $4500.

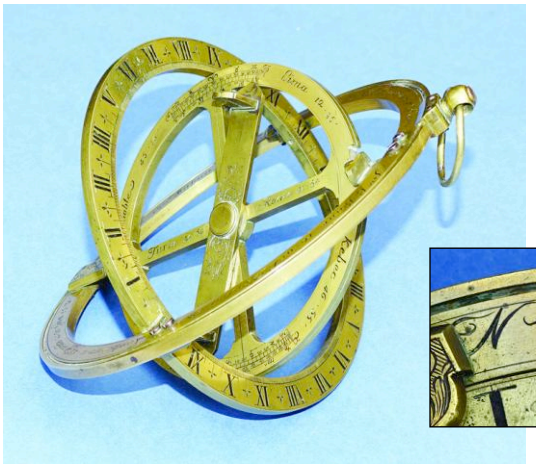
23. WONDERFUL TRIPLE-RING UNIVERSAL SUNDIAL BY NICOLAS BION, French, c. early 18th century, signed "N. Bion à Paris." This exceptional instrument is made of brass, 6" (15 cm) in diameter, and assembled with steel screws as typical of French ring dials of the period. The little suspension mount rides in grooves on both sides of the outermost ring, the meridian ring, and can be set for the observer's latitude against a 0° - 90° scale precision divided to half degrees. The next ring, the equinoctial hour ring, opens 90° and runs full circle twice twelve hours, divided every two minutes of time. The inner ring, whose axis of rotation will be parallel to the earth's axis, can be varied in its opening at will, and carries an alidade with slit and pinhole sights at each end, the alidade swiveling to be set against twin trigons of signs, i.e., solar declination scales divided every ten days on scales of months and of Zodiacal houses (the first point of Aries, the vernal equinox shown as 20 March).

The suspension mount and hinge plates and stops and alidade are all beautifully engraved with foliate decor, and all other available surfaces are finely engraved with no less than 38 worldwide cities and their latitudes. They range from Paris to Cairo to Stockholm to Nanjing to Quebec to Lima to Aleppo to Jerusalem, allowing correct settings to the local latitudes for a world traveler.

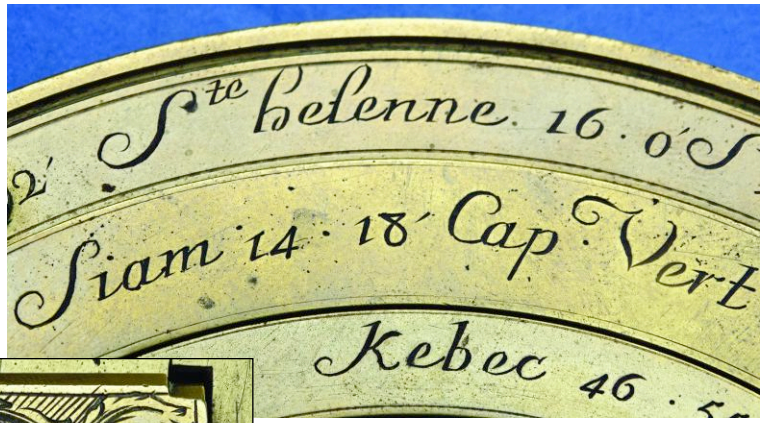
A full description of the construction of use of this sundial, which functions throughout the world without need of a compass, was published by Bion himself in 1709 in *Traité de la Construction et Principaux Usages des Instruments de Mathématique* (and in expanded English translation by Edmund Stone). Bion likens his triple ring dial to an armillary sphere.

In use set the suspension point to your latitude, set the alidade to the date, and with the dial suspended, turn the inner ring, and also the whole assembly, until sunlight falls through the sights at the two ends of the alidade. A circumferential scored line on the inner ring will show the precise apparent solar time on the hour ring.

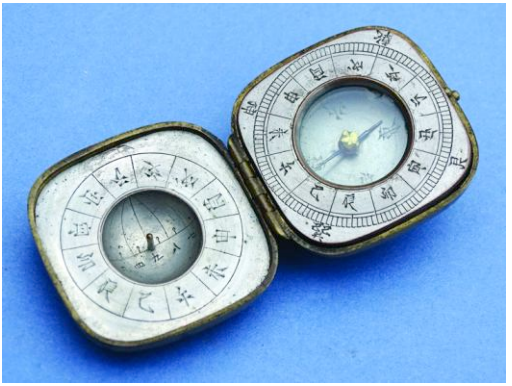
The inventor craftsman was the famous Nicolas Bion (1655 - 1733), appointed Engineer to the King. The present fabulous instrument is the only example we know of a Bion triple ring dial. $24,000.




N. Bion Paris


Ste Helenne. 16. 0′
Siam 14. 18′ Cap. Vert
Kebec 46.


Bonne Esperance 35



24. NETSUKE-FORM POCKET COMPASS / SCAPHE SUNDIAL, Japanese, c. first half 19th c. Measuring 1-5/16" (3.3 cm) on a side, the flattened brass form is like that of a *Kagami buta* type netsuke. Both sides are engraved with numerous little stars, both as borders and within writhing foliate engraving. The rounded square case is hinged, set with latch and suspension ring. It opens to silvery-gray metal, with an inset glazed compass on one side, surrounded by various directionals, including a ring of 12, each divided in 10 parts. Opposite is a scaphe sundial, with again a ring of 12 characters (running in the opposite sense), and within the hemispherical cup a gnomon and an arc of six hours, divided by halves and with numbering 5, 4, 9, 8, 7. This is the old Japanese system of six daytime temporal hours, starting when clocks struck 6 at sunrise, 9 at noon, finally 6 again at dusk. Condition is fine, the external brass now with a light brown patina and light stains. An excellent example of the Japanese pocket dial. $1350.

25. FINELY CRAFTED POCKET SUNDIAL, English, c. 1730, signed "J. Fowler fecit". The brass case with pull-off cover is 2-9/16" (6.5 cm) in diameter and contains a glazed compass with eight-point floral rose engraved directly on the brass base. This is mounted with a sundial with folding gnomon, exquisitely engraved throughout with running leaf tip and floral designs. The chapter ring is divided every *eighth* hour from 4am to 8pm. Condition is very fine, the exterior with a medium tan patina.

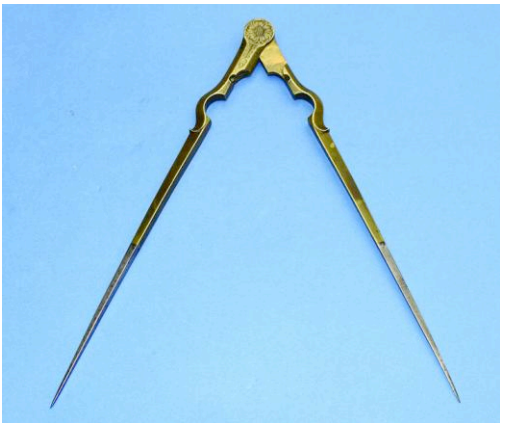
John Fowler is recorded as mathematical instrument maker working c. 1721 - 1750, under the trade sign of "The Globe" near the Royal Exchange, London. He had apprenticed to Samuel Saunders, made free in 1720. His work is rarely encountered but he was a superb craftsman, contemporary with and comparable to Thomas Heath in quality (and compare the splendid universal dial by Fowler, **Tesseract** Catalogue 49 Item 15). $1600.

26. FINE ANALEMMATIC DOUBLE DIAL, c. early 18th century. This brass sundial has a 3-3/4" x 4-3/4" (9.5 x 12 cm) baseplate with four small fixed feet and chamfered corners. It is mounted with two sundials, one with hand-engraved chapter ring, divided every quarter hour 5am to 7pm, with floral center, and with a spring-loaded folding gnomon (cut at 51° and thus consistent with several cities at that latitude, including somewhat south of London, or Salisbury, or even Brussels, Cologne, Dresden), the gnomon bearing a plumb line with bob, and well decorated (by wax etchings, apparently) with intertwined foliate patterns on one side, and on the other with a charming young putto sitting on a cloud, holding long scythe and winged sand glass. The other dial is hand-engraved with an arcuate 5am - 7pm chapter ring divided each quarter hour, and set with a folding vertical pin gnomon on mount which slides against a scale of the sun's Zodiacal position (and date) throughout the year. Condition is very fine throughout, the brass with a deep tan patina.

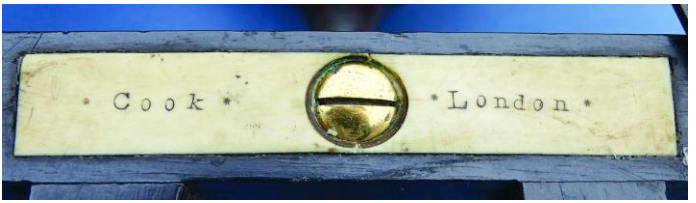
The double analemmatic dial was described by J.L. Sieur de Vaulezard in 1640. Its big advantage was its independence of knowledge of north direction, and thus independence of the magnetic compass. Knowing the date, one places the vertical pin gnomon in the appropriate position, sets the dial on a horizontal surface, and rotates it until both sundials read the same time, which is correct apparent solar time. The double dial is particularly interesting, and has been constructed in various forms (see for example Thomas Tuttell's version, **Tesseract** Catalogue 50 Item 20). Much more information is found in *The Analemmatic Sundial Sourcebook (*F.W. Sawyer III, ed., 2004). $6800.

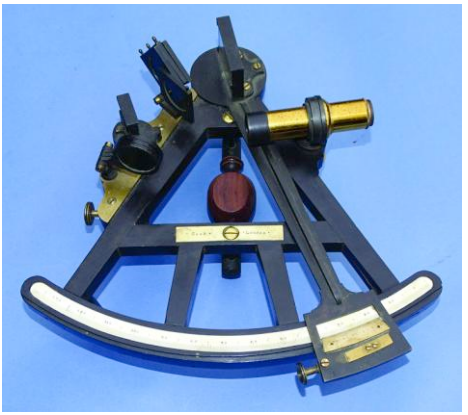
27. ANDREW ROSS SPYGLASS, English, c. mid-19th century, signed in elegant script "A. Ross, London." Opening from 5-5/8" to 16-3/8" (14 - 42 cm) with three drawtubes, it is constructed of plated brass with main tube and sliding sunshade bound in fine black leather. The eyepiece has a dust shutter, and the telescope gives fine erect images of moderate magnification. Condition is very fine noting only that the sunshade is rather tight to slide.

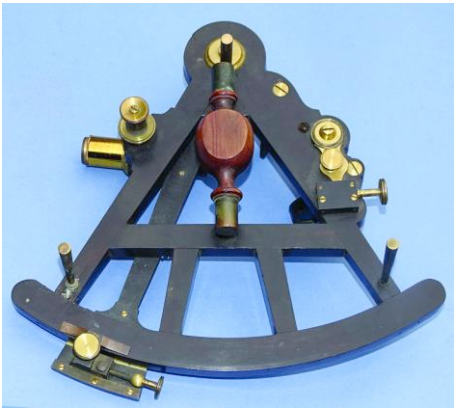
Andrew Ross (1798 - 1859) was an important London optical instrument maker, a founding member of the Microscopical Society of London. $650.



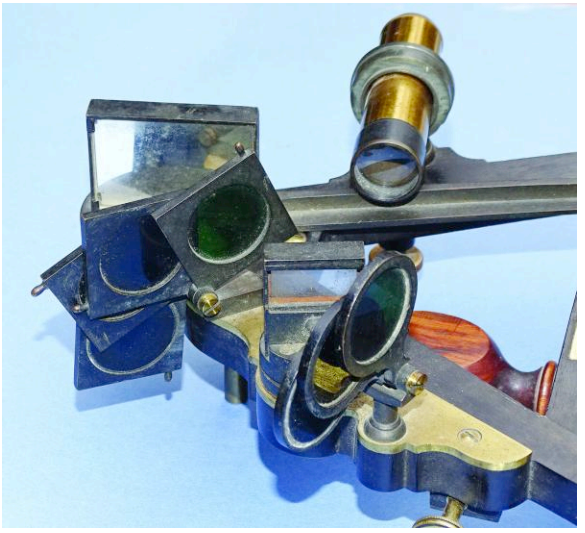
28. LARGE SINGLE-HANDED DIVIDERS, probably English, c. 17th century, 10-3/8" (26 cm) tall, of beautifully shaped brass with five-leaf hinge and inset steel tips. The head is engraved on both sides with lovely five-lobed roses. Condition is very fine, the brass with a tan patina. This form, with its distinctively shaped handhold, appears in the cartouches of early maps, and globes. The form is depicted in the right hand of that famous early craftsman of scientific instruments, Elias Allen (c. 1602 - 1653), in his portrait by H. van der Borcht (see *e.g.,* its 1666 engraving reproduced in J. Brown, 1979, Fig. 6.) $2500.







29. A FINE *SEXTANT* OF *EBONY,* English, c. early 19th century, signed "Cook, London." Constructed of ebony with fittings of blackened and clear lacquered brass, and measuring 11" (28 cm) in overall height, it is equipped with reinforced all-brass index arm with clamp and tangent screw, telescope mount with thumbscrew height adjustment, achromatic telescope, two mirrors, seven filters of reds and greens, and finely grained hardwood handle. The horizon mirror has thumbscrew adjustment for rotation (and thus correct setting at 0° mark). The fine inset scale is divided every third of a degree from -5° to +139°, and the right-zero vernier reads to 30 arcseconds. Condition is very fine, noting hairline cracks around two brass legs.



The maker was probably William Cook (working 1799 - 1819) or son(?) George (listed 1821 - 1836). William had numerous apprentices, according to Clifton. Ebony sextants are relatively rare, transitional between the common octant, usually of wood, and the common sextant, usually of brass. A fine example. $1800.

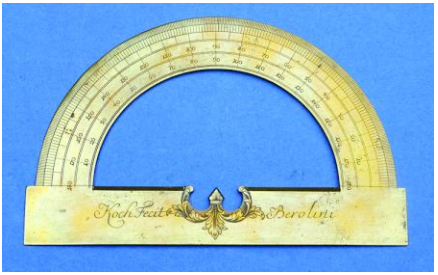
30. SILVER-MOUNTED IRON-BOUND TERRELLA, English, 1774, signed "T. Hay, 19th Janry. 1774." A 1.1" (2.8 mm) diameter sphere of magnetite is mounted between shaped iron side pieces screwed onto a silver spindle and tied together with broad silver brace with central hub and double suspension rings. Overall width is 1-5/8" (4 cm). It is complete with the original iron keeper, its ends labeled N & S, as are the iron side pieces, in order to maintain polarity of the field, and thus maximize effectiveness of the keeper. It is housed within the original beautifully shaped wood case completely bound in grey fishskin and retaining traces of red velvet lining. Condition is very fine throughout, the iron surfaces with light oxidation.

"Terrella" (i.e., "little earth") is the name given to a chunk of magnetite which has been cut into a sphere. It must be a naturally magnetic chunk of the mineral, and as a sphere it simulates the earth with its north and south magnetic poles. William Gilbert, scientist and royal physician to Queen Elizabeth I, used a terrella to demonstrate the field directions of a magnetic earth, and published his research in *De Magnete* in 1600.

Very few terrellas were made and survive. We note an example on stand in *Early Scientific Instruments, Europe 1400-1800,* p.150, by A. Turner (1987). The present one is embellished to serve as a lodestone, applied with iron cups and pole pieces to "arm" the stone and thus focus its strength, and constructed with mounts and suspension of silver. An identical form, complete with the little turned silver bridge joining the iron caps, is described by McConnell (1980, *Geomagnetic Instruments before 1900*).

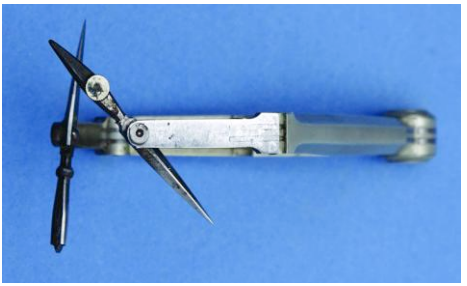
The result is a most attractive design, coupled with its original shaped case. Our fine craftsman was unknown to Clifton and the Websters. Extremely rare. $12,000.

*** * * * * SURVEYING AND DRAFTING * * * * ***



31. ELEGANT PROTRACTOR FROM BERLIN, German, c. 1750, signed "Koch Fecit Berolini." This 5-1/4" (13 cm) wide brass semi-circular protractor is divided with scales 0° - 180° and back again, all subdivided by intervals of 5°, 1°, and 0.5°. The centerpoint surround has finely designed and engraved foliage. Condition is very fine noting a couple of very slight dents.

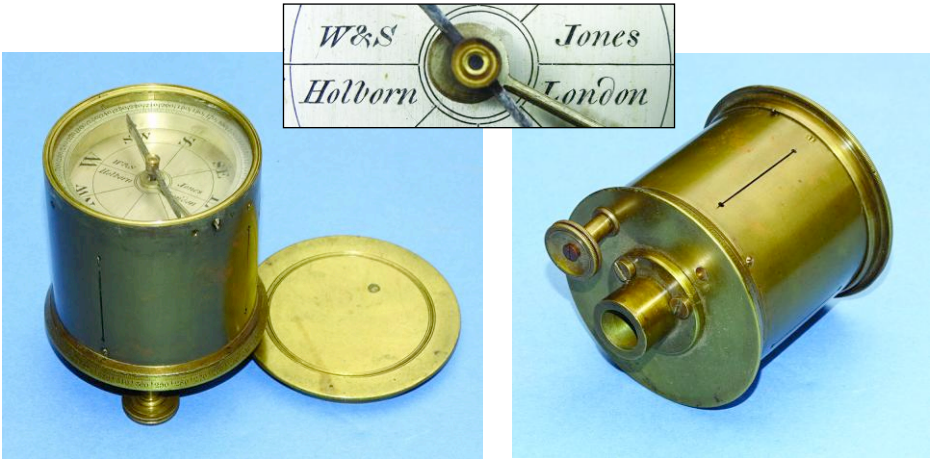
Instruments by this fine Berlin maker (Berolini being the Latin name for Berlin) are rarely seen. We catalogued one other instrument by Koch (**Tesseract** Catalogue 77 Item 25), that a 1753 graphometer with eagle heads, and the Websters recorded only four instruments bearing his name. $850.



32. NAPIER COMPASSES, English, c. 1850, signed in the leather case "Elliott & Sons, Opticians, 56 Strand." The compact multifunction compasses measure 2-11/16" (7 cm) closed, of electrum and steel, and open with reversible tips with points, pencil holder, and adjustable ink pen. The double ended dark Morocco leather case contains a turned holder for spare leads, and is a bit scuffed. The compasses are very fine.

This is an fine example of Napier compasses, exalted by W. F. Stanley (in his *Mathematical Drawing and Measuring Instruments* of the third quarter 19th century) for their compactness and portability due to the clever design of hollowed out legs and multiple articulations. He describes construction criteria, and ends with "they are a difficult instrument to make perfectly." Here we have an example of their perfection.

$250.

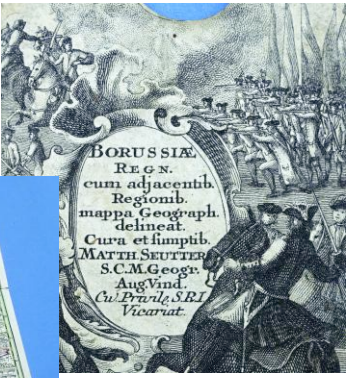


33. PRECISION HORIZONTAL SURVEYING INSTRUMENT -- AN ELABORATED SURVEYING CROSS, English c. first half 19th century, signed "W. & S. Jones, Holborn, London." Standing 3-5/8" (9 cm) tall, the cylindrical drum of this all brass "surveying cross" has four fine vertical slit sights and is rotatable (by thumbscrew to pinion and ring gear) on the baseplate with staff mount below. The base is finely divided and numbered with a 360° scale on a canted silvered surface, which is read against a vernier on the drum reading to three arcminutes. Atop is a glazed compass with edge bar needle and fine silvered face with compass directionals and circumferential 360° scale. The original cover activates a needle lifter automatically,

The very active business of William and Samuel Jones is listed under their combined names c. 1791 - 1859. Here we have a good example of their work, much more versatile than a simple surveying cross. $1450.

34. MULTIPLE GUNNERY LEVELS, probably German, c. 18th century. The fine black-fishskin-covered wood case is lined in chamois leather and fitted to compactly store two brass leveling devices. One stands 3-5/8" (9.2 cm) tall with striding base, and has a substantial finely shaped bob reading against a 0°±45° scale. Its support is pierced with a column of five sighting holes, also for cannon inclination. The other measures 2-5/8" (6.7 cm) square, and is a most unusual double level, with on each side an identical plumb bob reading against a 0°- 90°CW scale. The two bobs are hung from adjacent corners, and the device thus functions for inclination readout over a continuous 180° range. The only inconvenience is one must read opposite sides for angles of elevation and depression, respectively. A tiny threaded screw extends from one corner, possibly for a handle, but with no extra space for one in the case. Condition is very fine throughout, the brass now darkening.

A variety of forms of the gunner's level are shown by Bennett and Johnston (1996, *The Geometry of War, 1500-1750*). $2400.



35 MATTHAUS SEUTTER POCKET MAP OF THE BELGIAN FEDERATION, German, Augsburg, c. 1762, signed in the printed map and the card cover. The 10-1/2" x 8-1/8" (27 x 21 cm) printed map is hand colored and folds within a card case with wonderful printed cover with battle scenes of infantry an cavalry. The highly detailed map itself depicts modern day Netherlands, NW Germany, and northern Belgium with the Brabant, as well as insets of the province of Limburg and of the East Indies. The wonderful title surround shows splendid maritime symbolism. Condition is fine, the original hand coloring quite fresh.

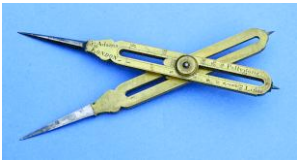
This is an example of a pocket version of the prolific Matthäus Seutter's (1678 - 1757) map of the low countries, published in this size by his son-in-law Tobias Conrad Lotter c. 1762. $750.

36. ELEGANT EARLY QUANTITATIVE DIVIDERS, English, c. early 18th century. The steel-tipped brass dividers stand fully 11-7/8" (30 cm) tall, opening on a five-leaf brass hinge against a 90° arc with clamp screw. The arc is graduated in English inches and quarters from 0" to 15", corresponding exactly to the linear separation of the points. This permits direct reading or plotting of distances on a map or sea chart, without reference to a linear scale or rule. Most wonderfully, it is engraved throughout with floral and verdant decor, including various leaves, eight-petaled flowers, opposing arrows, etc. Condition is very fine noting slight bending of the legs.

The decor and numerals are consistent with c.1700 English work, notably of Edmund Culpeper and Thomas Tuttell. Splendid direct-reading pair of dividers. $5500.

37. IMPORTANT VERY EARLY ADAMS PROPORTIONAL DIVIDERS, English, c.1730's, signed "G: Adams, London," of thick brass with gracefully shaped steel tips, 6-3/8" overall. There are hand-divided scales for "Pollygons" and "Lines," and an adjustable clampscrew with lovely brass butterfly nut. Condition is very fine.

Based on the engraved outlining, the shape of the signature, the early spelling "Pollygons," the little crossbar on the lower case "l", the heavy brass, and the shaping by the steel points, we feel them to be very early, in fact the earliest Adams piece we have had. They must date from the 1730's, noting that George Adams (senior) was apprenticed to the instrument maker Thomas Heath(!) in 1726/27, and received his freedom in 1733. By 1734, Adams had taken his own workshop in Fleet Street. The Jost Burgi style of proportional dividers, with heavy rectangular shanks, appeared in the late 16th century, and continued in fashion into the 18th century (cf. the pair by Rowley at Oxford, as well as illustrations in Bion and Leupold, etc.) The mid-18th century brought the familiar design with rounded and shaped terminals to the brass. Adams' somewhat transitional design must be one of the earliest surviving examples of this style, and one of Adams' earliest works. $1950.



THE ONLY KNOWN SURVIVING INSTRUMENT BY THE IMPORTANT "MECHANICAL PHYSICIST," FRANÇOIS BIENVENU

38. EIGHTEENTH CENTURY PROTRACTOR, French, c. late 1780's, elegantly signed "Bienvenu à Paris." Measuring 6-5/8" (17 cm) across, and finely shaped, the protractor is divided every degree 0° - 180° and back. Condition is very fine noting a little edge bend.

This humble protractor is the only known instrument signed by the remarkable François Bienvenu (1758 - 1831), who reinvented himself periodically according in part to the pressures of the turbulent Revolutionary times. Much is known about Bienvenu (see Patrice Bret, 2004, "Un bateleur de la science: Le 'machiniste-physicien' François Bienvenu et la diffusion de Franklin et Lavoisier," in *Annales historiques de la Révolution française,* 338, pp. 95-127), who was inventor, instrument maker, dealer, itinerant demonstrator, professor of physics, popularizer of science. Among many other achievements, Bienvenu is credited with the invention of the first practical helicopter. He associated with great scientists of the period (Lavoisier, Berthollet, etc.), offered for sale all manner of scientific instruments, advertised free demonstrations of electric and physics phenomena in his shop, and lectured throughout France, Italy, and Spain. Bret makes a case for the importance of this scientific nomad, this adroit communicator.

A significant survival for what it represents. $1850.

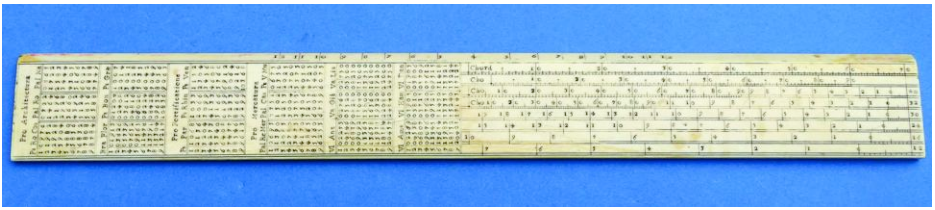
AN EXTRAORDINARY CONNECTION

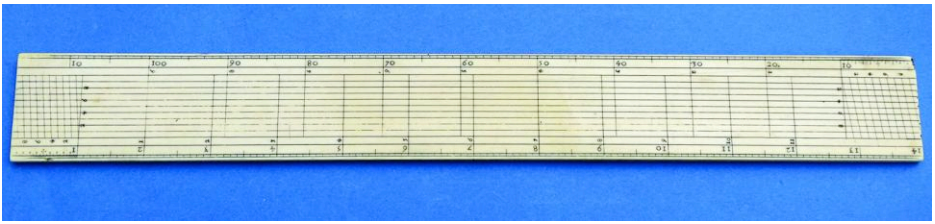
39. ORIGINAL CHECK ISSUED DURING THE CIVIL WAR, BY W. & L.E. GURLEY TO THEIR LOCAL ENGRAVER, American, 1864, the 3-1/4" x 7-3/4" (8 x 20 cm) thin paper check printed for the Market Bank of Troy and with the bold Gurley transit logo, issued 4 March 1864 to Myron King, and bearing a signed 2¢ U.S. Internal Revenue tax stamp, and with King's endorsement to the reverse. In very fine condition, it is now mounted under glass in an old photographer's frame. (*and see back cover*)

The recipient, Myron King (1800 - 1878), was a well-established engraver of steel and copper plates, with his studio just above the "Troy Budget" newspaper. Incidentally, this is the paper which first published, in 1823, Clement Moore's "*Twas the night before....*" Published as a little book in the 1830's, it was replete with illustrations by our Myron King! His engraving of a flying sleigh with reindeer and driver is acknowledged as the creation of "Santa Claus"! $350.

*** * * * * CALCULATION * * * * ***

ONE OTHER EXAMPLE KNOWN



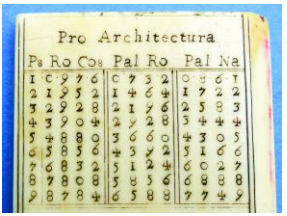


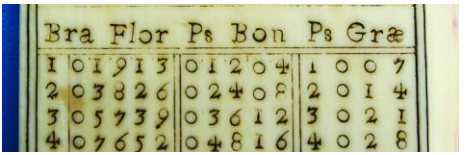
40. ALL PURPOSE AIDE MEMOIRE / ARCHITECT'S RULE, English, c. early 18th century, the 14" (36 cm) long rule with one beveled edge and divided both sides with a wide variety of mathematical scales and entries. One face has 0"-14" linear scale divided to tenths and with transversal grid to hundredths of an inch, *plus* a similar 0-110 scale subdividing an English foot into tenths, hundredths, and with transversals, thousandths of a foot. The bevel is divided non-linearly by units, 12-4-12 (for polygons?) The other face is complex, including chart reduction scales of 1:12, 16, 24, 30, 32, 40, plus four scales of chords, plus grids of entries for "Architectura," "Fortificatione," and "Mercatura," each with elaborate tables of numerical entries with cryptic headings (worthy of considerable further research). Condition is excellent.

We know of exactly one other example of this fine rule, that in the mathematical instrument case of Roger North, preserved at Jesus College in Cambridge, England. It is illustrated and described in Gunther, 1937, *Early Science in Cambridge,* and is pictured in Hambly, 1988, *Drawing Instruments 1580-1980.*

Roger North (1651 - 1734) was a remarkable polymath, a lawyer, biographer, musician, prolific author, student of perspective, book collector, etc. Among his thousands of pages of writing, he produced, c. 1690's, a memoir, sort of autobiographical reflections, entitled *Notes of Me*. This survived his death, and was finally published in 1887, and available recently (2000) in a fine annotated version. Important for us are the dozen pages North devotes to very detailed descriptions of drawing instruments, some of which he designed and ordered specially. For example "I also caused to be made an archetonicall sector, whereby one might draw any order after Paladio, to the minutest parts without help of any book of memoriall but what was there." He continues "...the revers of this sector is dedicated to a table of the 5 orders...." These ideas are clearly reflected in the North rule at Cambridge, and our apparently identical one.

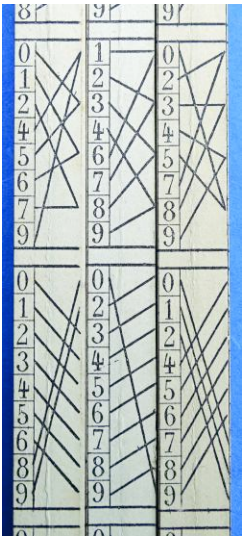
As to maker, a good possibility is John Rowley (free 1690, died 1728), who produced some unusual rules for Charles Boyle, 4th Earl of Orrery (1676 - 1731), and who used not dissimilar numeral shapes (see A. Turner, 1987, *Early Scientific Instruments Europe 1400-1800,* especially pp. 243 & 251). $9500.





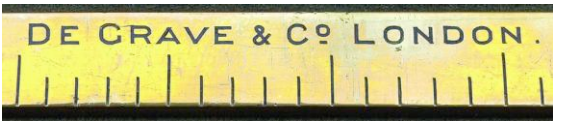
* * *

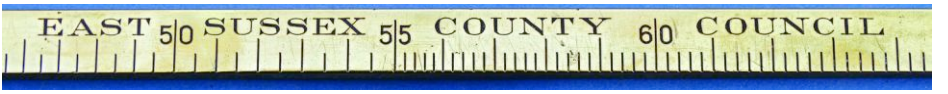
41. GENAILLE'S "FINANCIERES" RODS -- A PERFECTED FORM OF NAPIER'S BONES FOR COMMERCIAL CALCULATIONS, French, 1885, signed on the card box "Les Réglettes Financières, Appareils à Calculs Exacts et Instantanés pour Simplifier les Calculs Financiers et Commerciaux...Inventés par Henri Genaille et Perfectionnés par Edouard Lucas." The ten wood rods, each a rectangular column 6-7/8" (17 cm) long, are covered on four sides with printed paper columns, and are used in conjunction with the fixed rod to compute interests on any sums on a daily basis, annual basis, etc. The set is complete, in fine condition, the original box with instructions.



One can calculate the interest due on sums of many significant figures, for rates of 3, 4, 4-1/2, 6, and 9 percent, and for in-between rates by adding in fractional parts of these rates, using the rows marked 1/2, 1/4, 1/6, 1/8, 1/9, 1/12. The process requires following a trail of geometric lines across the panel.

A very rare, ingenious variant of Napier's bones, with the look of modern art. $2600.

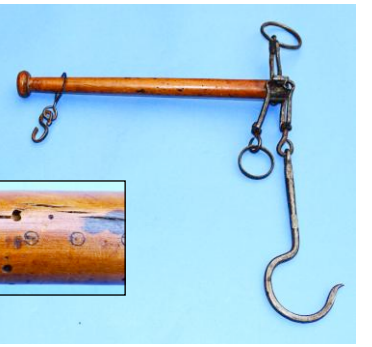




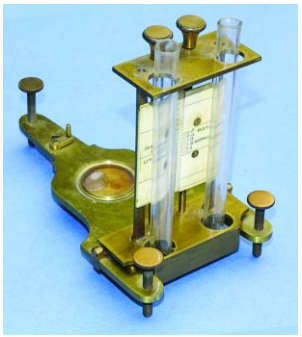
42. CALCULATING STANDARD RULE FOR VERIFICATION OF VOLUME MEASURES, English, 1897, signed for the maker "De Grave & Co., London," for the owner "East Sussex County Council," and with a "portcullis" certification stamp and date. This 22" (56 cm) brass rule is divided on one side with a strongly *non-linear* "Diameter" scale 0 - 75, with subdivisions, and on the other side similarly with "Depth" 0 - 41. It is clear that the scales apply to the calculation of volume of any given cylindrical vessel, and thus for verification of the sizes of vessels used in commerce. The instructions for use are well engraved along the two edges: "Measure the diameter with the scale marked 'Diameter' and take the reading. Measure the depth with the scale marked 'Depth' and take the reading. Add the two readings. The sum will be 10 for 1/2 Gill, 20 for Gill, 30 for 1/2 Pint, 40 for Pint, 50 for Quart, 60 for 1/2 Gallon, 70 for Gallon, 80 for Peck, 90 for 1/2 Bushel, 100 for Bushel." Condition is excellent, the original substantial fitted mahogany case fair to poor. An unusual calculating rule, by the pre-eminent English scale and weight manufactory. $1650.

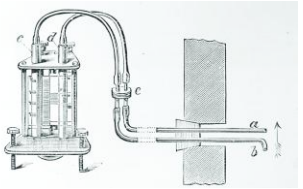
*** * * * * DEMONSTRATION, EXPERIMENTATION, ETC. * * * * ***

43. GOOD SINGLE-ARM BALANCE, French, c. 18th century, the balance with an 11" (28 cm) long tapered wood beam and hand-forged iron fittings There are alternate suspension rings on opposite sides (mounted at different fulcrum points) along with two corresponding scales on the beam, calibrated in Roman numerals and divided every unit 0 - 30 (and every two units 0 - 60). At the end is hung (on a flip-over mount) a large attractive iron hook for hanging products to be weighed. And riding along the beam is a suspension for a weight (not present). Condition is fine noting some very old hairline cracks to the wood.

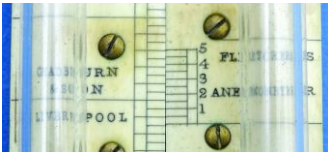


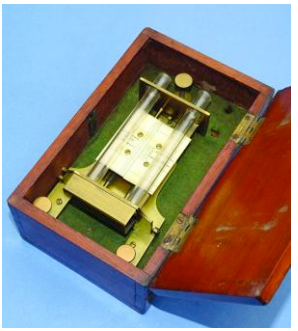
Sometimes called a "turn-over" type of "steelyard" balance, this early pre-Revolutionary example has a wonderful primitive folk art presence. $450.





(Baird & Tatlock, 1897)



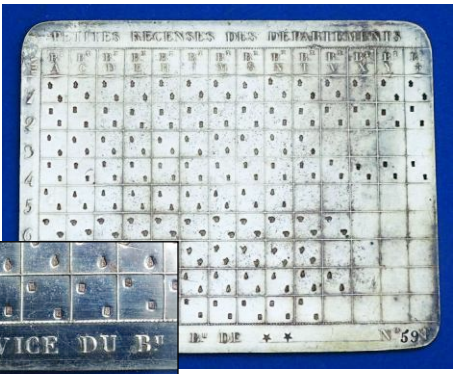


44. FLETCHER'S ETHER ANEMOMETER MANOMETER, English, c. last quarter 19th century, signed "Chadburn & Son, Liverpool; Fletcher's Anemometer." Standing 5" (13 cm) tall when erect, it is constructed of bright lacquered brass, the base with three leveling screws and inset circular spirit level, the upper hinged assembly incorporating glass U-tube and twin plaques each engraved with linear scales, the plaques adjustable independently by twin long screws. Condition is excellent but with no air sample tubing, and is in its original mahogany case.

This manometer is the design of A.E. Fletcher, and is capable of measuring extremely low differences in air pressure and thus very low flow rates of gases (e.g., in a chimney). The U-tube would be partially filled with fluid (the best here being liquid ether) and attached to tubing inserted into the air flow.

A fine example of a rarely seen instrument. $1450.

45. HALLMARK INSPECTOR'S CONTROL PLAQUE, French, 1823, the 3-1/4" x 2-11/16" (8 x 7 cm) heavily silvered copper plate formed with a 9 x 14 grid replete with labels and column and row headings. Pairs of tiny, very finely shaped hallmarks (poinçons) have been hand-punched within each of the active squares of the grid.



For an object being approved (and taxed!), different hallmarks were specified depending on its material, size, region of France (as the purity requirements for the silver or gold objects varied with the district), purpose of guarantee (e.g., export vs. import vs. transit), and even the year (to some extent). Regulations were very specific as to exactly where the mark should be placed on each type of object (e.g., for Holy Water Sprinklers three punches on the ball, rose and ring; for Tongue-Scratchers on one of the ends).

This plate is in very fine condition, a significant survival of a controller's "plaque d'insculpation" bearing the proofs, the guarantees, of the legitimate marking required on objects made of precious metals (e.g., silver Butterfield sundials!) $350.

46. COMPLEX CLOCKWORK SUNTRACKER -- THE HELIOSTAT OF SILBERMANN, French, c. mid-19th century, signed "J. Duboscq à Paris, No. 141." This major instrument (total weight 24 lbs = 11 kg) is constructed of brass, standing 17" (44 cm) tall (when set for 90° latitude, 0° solar declination, and mirror plane horizontal) on a 7.5" (19 cm) diameter baseplate with spirit level and three large external leveling screws. The whole rotates, the baseplate's north point zone divided 0°±10° by halves. Massive verticals support a trunnion plate which carries the entire heliostat assembly. The plate swivels, its tilt being measured, and clamped, against a 0(0.5)90 degree latitude scale with one-arcminute vernier readout. The heliostat assembly itself is constructed on a massive polar axis carrying the mirror in its complex linkage (of blackened brass) which is attached at the ends to each of two arcs. The eight-sided metal mirror is 3" x 6-1/4" (76 x 160 mm) overall. Its linkage consists of two yokes that maintain the mirror at an angle exactly bisecting, at all the times, the angle between the arc ends. The large arc, adjusted by geared motions in rotation and elevation, is an arc of "convenience," as it sets the *fixed* exit direction of the reflected beam. The small arc, the declination arc, supports the other end of the mirror linkage, and the position of the arc is set and clamped against a date scale (calendar on one side, solar declination on the other with five-arcminute vernier). This arc is fitted with pinhole sight and target for solar alignment. The small arc assembly is free to rotate about the polar axis, and in doing so articulates the mirror's linkage. When this free rotation is clamped (its position shown by index with one-minute vernier against a twice-12 hour scale with five minute divisions and with East, West, Noon and Midnight marked in French), it is driven by clockwork. This drive, within the cannister at the base of the polar axle, is signed internally "Paul Garnier, Paris, 8145." It is spring wound (winding key present) and has twin readouts against silvered scales of seconds and minutes. There is a lever to engage the drive, and a "slow / fast" adjustment.

Condition is fine and functional. We have had the clockwork cleaned and lubricated by a professional. The external brass surfaces have not been touched, although must have been cleaned, but not polished, long ago.

For such a complex construction, initiation seems fairly straightforward, as follows: level it, rotate base until *approximately* N / S, tilt and clamp polar axis to one's latitude, tilt and clamp small arc to correct date, rotate and clamp small arc to the exact time, wind clock and set in motion, rotate base slightly until solar sights align thus insuring true N / S, and finally adjust the large arc for the most convenient permanent direction of the reflected sun beam. With these settings the resultant motion of the declination arc and its mirror yoke mimic the apparent motion of the sun across the sky, for the particular date and place. The other yoke is fixed. The mirror then reflects *from* the momentary sun's direction, *to* the fixed direction, and thus directly into the laboratory or observatory. The heliostat provided a universal light source (except on cloudy days!) for optical bench studies, microscopy, spectroscopy of the sun and of the earth's atmosphere, etc. Dr. Curtis of the U.S. Army Medical Museum wrote, in 1867, of his excellent photomicrography of tissue specimens captured on 7" plates. Sunlight through his Silbermann heliostat was so bright he could afford to limit it to the violet, and use objective lenses best corrected for those wavelenths, for the highest resolution and least optical aberration in his photographs.

This very efficient and practical form of heliostat was invented in 1843 by Jean Thiébault Silbermann (1805 - 1865). The maker was Louis Jules Duboscq (1817 - 1886), successor of J.B.F. Soleil's scientific instrument enterprise. Duboscq was especially well known for his production of such Silbermann heliostats.

A fine example. $18,000.

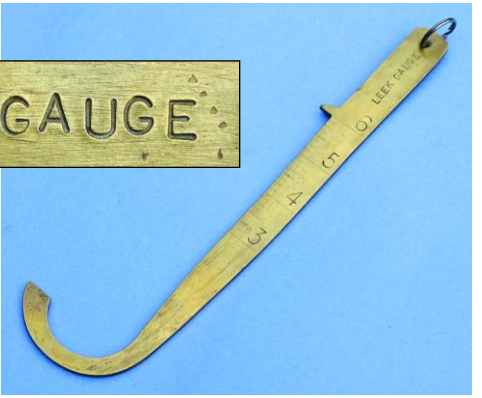

PAUL GARNIER
PARIS


J. Duboscq

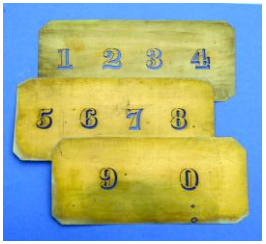
47. THE "METROPOLITAN ARGAND BURNER NO. 2," English, 1907, serial #308, by Alexander Wright & Co., engineers of Westminster. The 10-3/4" (27 cm) long fabric-covered wood box contains the complete adjustable coal gas burner in black-finish brass, a cylindrical chimney with Wright's name and that of the Jena glass maker "Schott & Gen.," and original instructional certificate. The burner has gas pipe or hose fittings, many-orifice burn port, adjustable air intake, handles, and chimney clips, and an attached lead seal of the "Metropolitan Gas Referees." All is in excellent, unused condition.

The efficient design of this burner was adopted by the London Gas authority for testing the purity and illuminating power of the gas supplied throughout the city. $295.

48. MENSURATION OF LEEKS, English, c. mid-20th century, stamped "Leek Gauge" and "T. Hall." Made of brass, this unusual 9-1/2" (24 cm) long rule is formed with a large hook on one end and suspension hole on the other. Marked on both sides is a linear scale of English inches running from 3" to 6" and divided every eighth. The zero point is the inside of the hook. Condition is excellent.



Apparently the cultivation of leeks has been a major activity in Northumberland in NE England, and official annual competitive "Leek Shows" were held as early as the 1880's. Of prime importance was the volume of the blanched stem or barrel, determined by measuring the circumference with a tape, and the height (from the base of the leek to the "button," where the leaves divide) with our veritable "leek gauge." A remarkable addition to any rule collection. $250.



49. EXCEPTIONAL STENCIL SETS, English, c. 1880's, signed in the case "G. Baker, Improved Stencil Plate Manufacturer, 22 Orpingley Road, Hornsey Road, London, N." The 10" (25 cm) wide mahogany box contains 12 labeled paper sleeves, each containing a set of of approximately 6" wide copper sheets delicately pierced with stencil forms. Sets range from two sheets to nine sheets, for a total of 64 sheets. The complexity of the forms ranges from very simple letter and number fonts to most complex geometric designs. Condition is very fine to excellent, seemingly unused

The maker of this remarkable intact survival was a specialist. We find, e.g., his 1883 and 1889 journal ads "To Engineers and All who Draw Plans...A magnificently executed Set for Lettering Plans, etc." $850.

50. EARLY AMERICAN GAS FLOW METER, c. 1850, signed "S. Down, New York" on the enameled dial. This fine mechanical device is 8" (20 cm) tall, made of steel enameled maroon with gold outlining. Six curved glass windows reveal the inner workings, where three diaphragms have a complex linkage to the double dial readout. Condition is fine, noting slight chipping to the enamel and one cracked window.

Samuel Down first produced gas meters in New York in 1841, and was succeeded (before 1863) by the firm of Down & Merrifield.

An attractive form, and very early example of this American technology. $1500.

51. LIGHTNING ROD "THISTLE TIP" FINIAL, American, c. 1900, measuring 8-3/8" (21 cm) tall, of plated brass. This shapely device has a hollow bell-shaped body with female threads, to be mounted atop a lightning rod on a house. Five threaded tapered rods, each nearly 5" long, screw into the body, and terminate in sharp points providing easy electrical conduction. Condition is good, with some bends to the rods, and considerable loss to the plating. It makes for a sculptural object, a good conversation piece, and is possibly useful for serving hors d'oeuvres! $240.

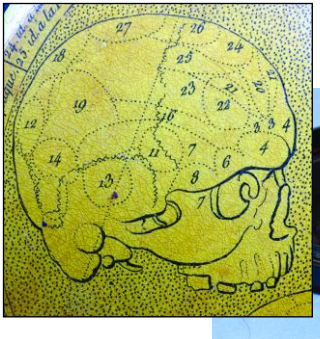
52. COMPLEX FOUR-LEGGED DIVIDERS OF A SCULPTOR, French, c. 19th century, signed "Benjamin Seteers Sculpteur." With an overall height of 13-5/8" (35 cm), it is constructed with a highly articulated brass body and long tapered iron legs in clampable fixations and thus removable. One leg simply hinges outward. Two others are fixed as a pair of dividers, but free to swivel together. The fourth leg maneuvers the most flexibly, its long iron shaft riding up and down in a sprung slot, the slot mechanism connected to a curved arm which has ball joints on each end. All settings have clamp screws, and all manner of geometries are possible. Condition is fine, noting oxidation to the iron parts, and a tan patina to the brass.

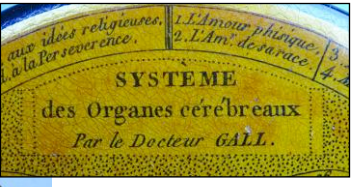
With these dividers, any sculptor could transfer the morphology of a plaster model, for example, to a block of marble. A rare example of four-legged dividers. $2800.

(Wells, 1870)

53. COCCIUS' DOUBLE ARM OPHTHALMOSCOPE, German, c. third quarter 19th century, signed in the case "Paetz & Flohr, Optiker u. Mechan., Berlin." The 5-1/2" (14 cm) wide case contains this handheld ophthalmoscope, with its central mount containing slightly convex pierced mirror on one side, and blackened brass eye surround on the other. Attached are two double-hinged lens holders, one for a choice of two 1-1/4" (3 cm) diameter biconvex illumination lenses, the other accepting any one of five 3/4" (2 cm) diameter lenses, each marked with its correction in diopters (+4, -3, -4, -5, -6.5) and superposable over the eye aperture. Condition is fine complete with the good original shaped and fitted wood case bound in leather with stamped foliate designs, and lined in dark blue velvet.

This is one of a number of unusual and rare ophthalmoscope designs by the innovative Prof. Adolf Coccius (1825 - 1890) (see Schett, 1996, *The Ophthalmoscope, Part 1,* pp. 32-36), although the origins of the double arm idea can be traced to Zehender. It permitted the practitioner to fix the relation between illuminating lens and viewing aperture, allowing one-handed use. $2800.





54. DR. GALL'S PHRENOLOGY PATCH BOX, French, 19th century, measuring 3-1/2" (9 cm) in diameter, of black enameled wood, the top applied with a wonderful printed depiction of "Système des Organes cérébreaux Par le Docteur Gall." Three views of the cranium are shown, labeled with 27 areas identified in the legend, in French (e.g., L'Amour phisique; Dispositions aux Mathematiques; Dispositions au Meurtre; Dispositions a la Pantomime; Distinctions des Couleurs; etc.)

Dr. Franz Joseph Gall (1758 - 1828), born in Tiefenbronn, Germany, is considered the founder of phrenology. He noted correlations between physiognomy and mental characteristics, and systematically researched the form and structure of the brain in question through dissection. He found, indeed, a strong correlation between skull shape and brain shape, and first lectured on the new subject in 1796.

A rare form of phrenology box, in very fine condition. $1150.

X-RAY VISION

PRISMATIC STEREOSCOPIC VIEWERS FOR LATERALLY INVERTED X-RAYS, each pair 4-1/4" (11 cm) wide, in the original case, and providing images reversed right-for-left. The angle between lines of sight for the two eyes is adjustable. The design resembles the viewers invented by Stumpf and by Pirie (see Judge, *Stereoscopic Photography*).

55. ATTRACTIVE EARLY EXAMPLE, American, c. early 20th century, signed "The Wm. Meyer Co., Chicago, U.S.A.", with spring and long screw adjustment, the body of blackened brass. Condition is fine with light wear, the case fair. The Meyer company was established in 1904, specializing in all manner of X-ray apparatus (see Davis & Dreyfuss, 1986, *The Finest Instruments Ever Made*.) $850.

56. PRISTINE EXAMPLE, English, c. mid-20th century, signed "Solus, London." Constructed of cream-colored brass, with central hinge and black fittings, it is in mint condition. $495.

REFLECTIONS

Years ago we would close each issue with a column on recent activities, state of the market, etc. As we prepare our 111th (!) catalogue for the printer, 20 years into the "new" millennium, we have observed many changes in our field.

Most obvious is the internet, giving worldwide access to goods, buyers, sellers, and research worldwide. This expands our market, at the same time increasing competition. There are still thousands of bricks-and-mortar antique auctions -- just look at the hundreds if not thousands of listings every week in e.g., "Arts and Antiques Weekly" (U.S.), "Antiques Trade Gazette" (U.K.), and "Gazette Drouot" (France). And fairs are still quite active, although in our field we have seen the biannual London instrument fair, at which we exhibited over 50 times, dwindle away, despite courageous efforts on the part of various organizers. One trend is to combine specialty fairs to gain critical mass, so for the past few years the annual (early November) "Paris Map Fair, Globes & Instruments" has included half a dozen good instrument dealers. Antique shops are giving way to clothing stores which will pay the high rents. We note the recent passing of one of the great old-time dealers, Dominique Delalande, but his shop in Paris, located in the true "antique quarter," will continue in the able hands of Eric and Anna.

We also notice changing habits of the young, in their virtual, mobile world. Our teenage granddaughter announced she doesn't want "stuff" but rather "experiences." And moneyed young collectors may buy mid-century-modern furniture, or even a Banksy painting, while ignoring good 18th century furniture and Old Master paintings.

More and more museums are publishing fine catalogues of their instrument holdings, noting the recent 474pp book on the Adler sundial collection (S. Schechner, 2019). And the Metropolitan Museum of Art just held the exhibition "Making Marvels," including the most extraordinary (and largely unknown to us) instruments, made for the Courts of Western Europe. When such early objects, of the highest quality, complexity, and rarity, do appear on the market, they command surprising prices. In the past year, we saw an 18th century brass inclining sundial, in its case bearing the arms of Louis XV, sell at Christie's for no less than $2,278,553, against a seemingly aggressive auction estimate of almost $95,000. It had been owned by a Rothschild, and the Royal provenance must have helped a bit! And from the estate of one of the great rare book dealers, Nico Israel of Amsterdam, came a c. 1300 medieval brass horary quadrant, selling for $965,250, and perhaps the earliest surviving pocket-cased globe (c. 1630) for $379,170. So the market is mixed; the clientele, and the ways of doing business, continue to evolve.

RITTENHOUSE JOURNALS AND TESSERACT CATALOGUES

57. RITTENHOUSE, JOURNAL OF THE AMERICAN SCIENTIFIC INSTRUMENT ENTERPRISE, 1987-2009, the complete 23-year run of volumes 1 through 23 (70 issues total). A FEW FULL SETS STILL AVAILABLE. $900.

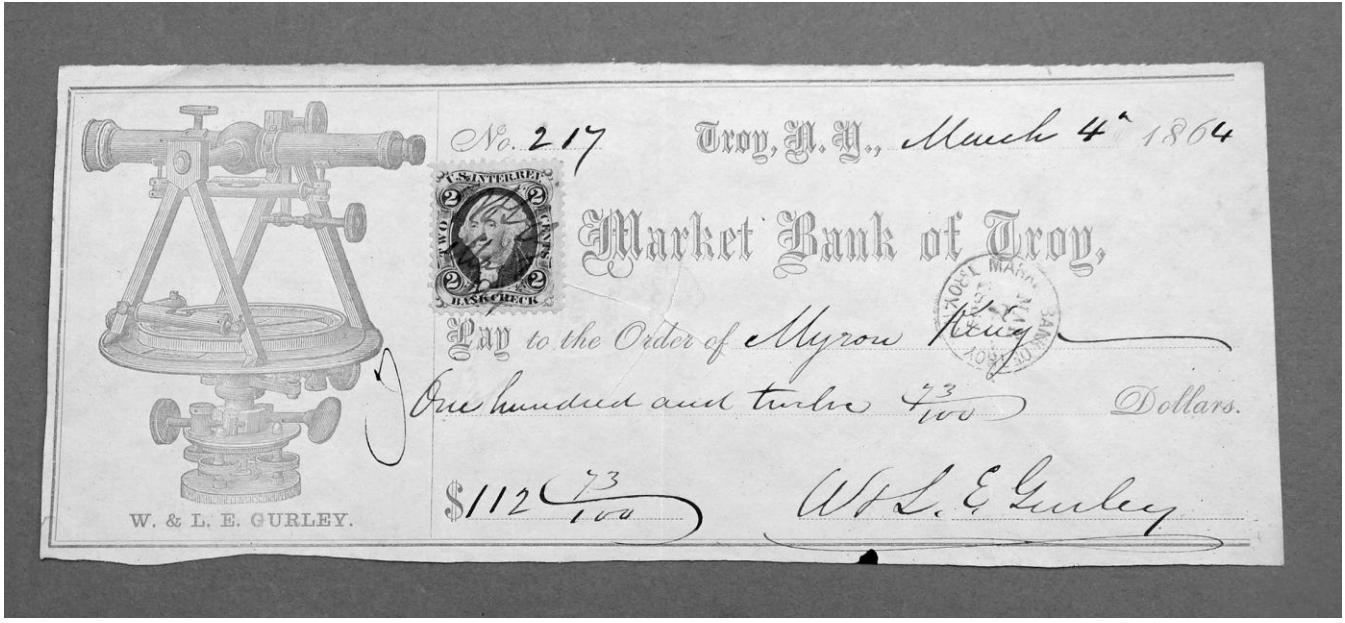
58. TESSERACT CATALOGUES, back issues still available: -,-,C,D,E,F,-,H,9,10,11,12,13, 14,15,16,17,18,19,20,21,22,23,24,25,-,-,-,29,30,31,32,33,-,35,36,37,38,-,40,41,42,43, 44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70, 71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97, 98,99,100,101,102,103,104,105,106,107,108,109,110. $6.ea.

* *

TESSERACT CATALOGUE SUBSCRIPTIONS -- $35 for the next four issues.

* *

We would be pleased to send copies of the current catalogue to your interested friends.


No. 217
Troy, N. Y., March 4th 1864
Market Bank of Troy,
Pay to the Order of Myron King
One hundred and twelve 73/100 Dollars.
$112 73/100
W. & L. E. Gurley
W. & L. E. GURLEY.

item 39