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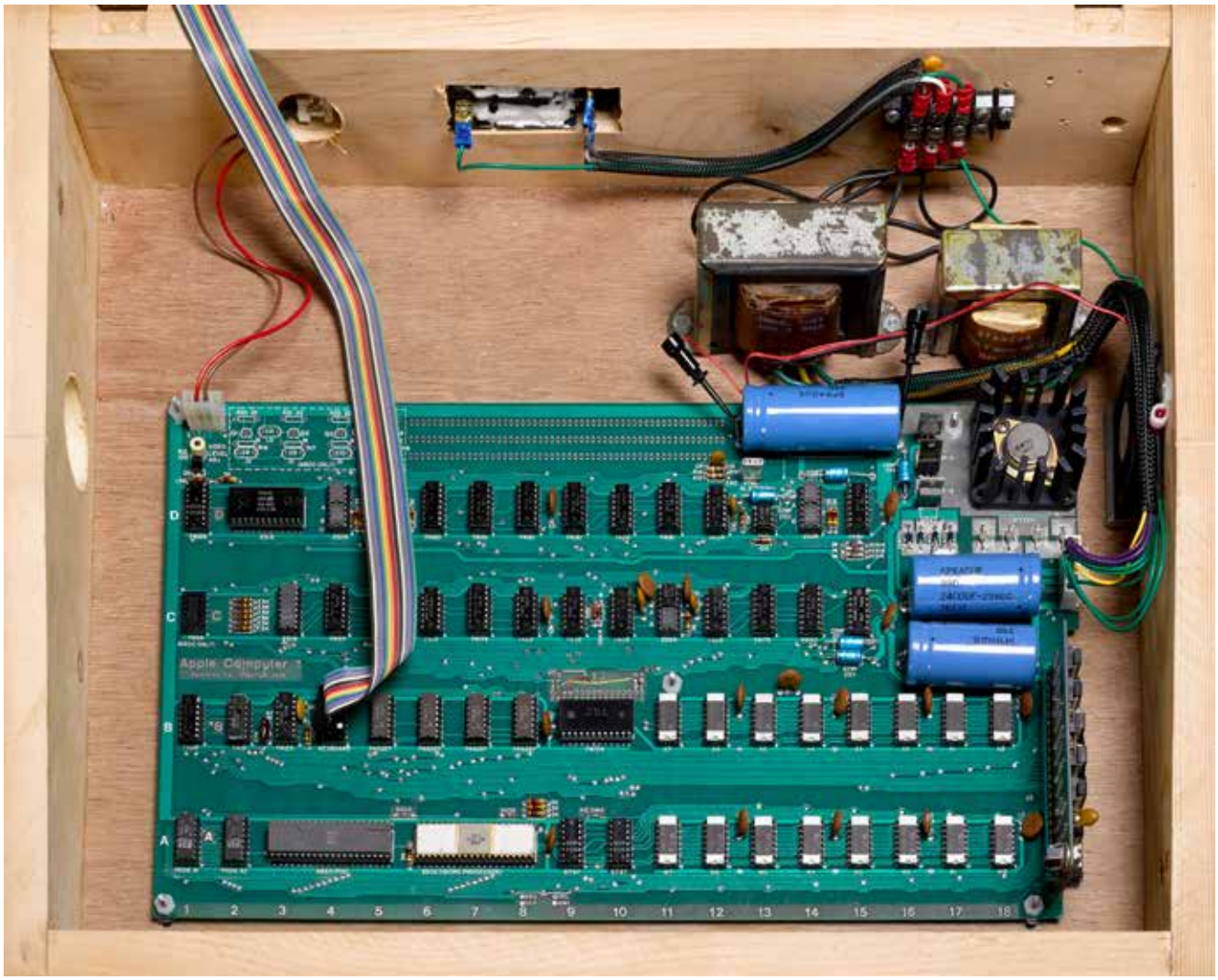
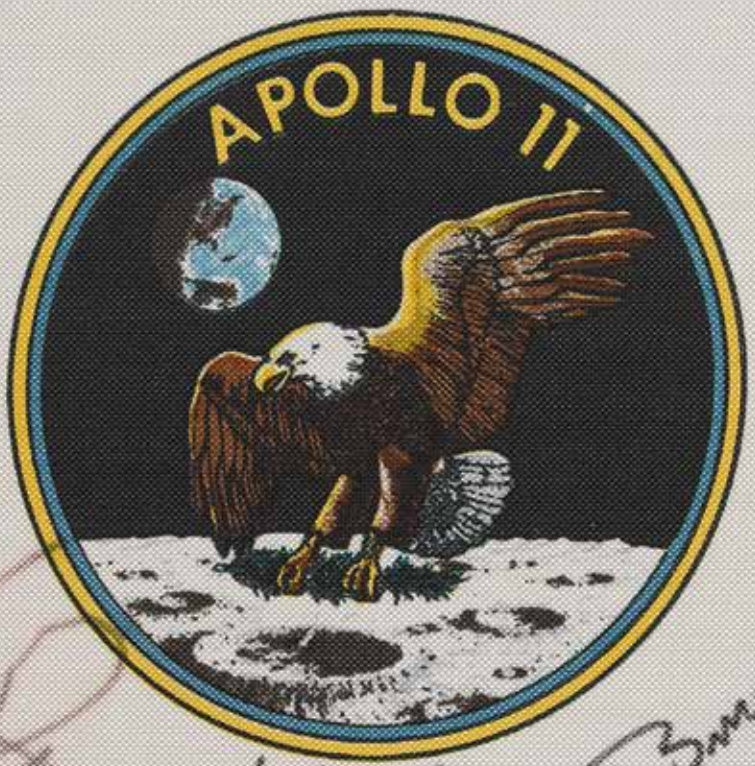


History of Science and Technology

New York I December 5, 2018

Carried to the Moon aboard Apollo XI
July 1969



Michael Collins

Buzz Aldrin

History of Science and Technology

Including Space History

New York | Wednesday December 5, 2018, at 2pm

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Please see pages 135 to 138 for bidder information including Conditions of Sale, after-sale collection and shipment.
All items listed on page 138, and/or marked W next to the lot number will be transferred to off-site storage, if not removed by Thursday 6 December, 2018 by 5pm.

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ILLUSTRATIONS

Front cover: Lot 630
Inside front cover: Lot 464
Inside back cover: Lot 545
Back cover: Lot 456

SESSION PAGES

Session page 1: Lot 442
Session page 2: Lot 481
Session page 3: Lot 500
Session page 4: Lot 525A
Session page 5: Lot 641

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WELCOME TO OUR ANNUAL HISTORY OF SCIENCE AND TECHNOLOGY AUCTION.

This is the largest sale we've put together in a few years, perhaps because we've consolidated our Space History material with Science and Technology. As the race to the moon represents one of the greatest achievements of applied science and technology of the 20th century (or for that matter, any century), it fits in well with the story we're trying to tell here.

We open the sale with an offering of globes from a New York collector. Along with the fine and rare globes and imprints on globemaking, we have quite a few unused gores including the extremely rare set by Willem Nicolai for his *Nova et integra universi Orbis descriptio* (lot 402) and lot 406, which includes two sets of gores by Matthaeus Greuter for both a terrestrial and a celestial globe. The centerpiece of the collection is the 56-inch tall "Colossus Globe" by Malby and Son, *Malby's Terrestrial…* (lot 442), impressive in its size and set in a handsome wooden stand.

We follow this with a selection of scientific instruments from various owners that includes material from the 18th century through the beginning of the 20th century, ranging from sundials to a Culpeper-type compound microscope to a rare American-made turn of the 19th century Chandlee surveyor's compass – of which only 22 are known to exist (lot 451). We're also pleased to offer wonderful curiosities like an Auzoux papier-mache model of the human brain and a full-size Jean-Antoine Houdon bronze sculpture of *L'eorche* [Anatomical Man] (lot 456).

Our Books and Manuscript section, while smaller than last year, is among the best selections that we've put together since we inaugurated this sale category. Highlights include the discoverer of Euclidean Geometry Janos Bolyai's copy of Georg Freyherrn von Vega's *Vorlesungen uber die Mathematik…* (lot 457); an Albert Einstein autograph manuscript "*Zu Kaluzas Theorie des Zusammenhanges von Gravitation und Elektrizität (Zweite Mitteilung)*" ("*On Kaluza's Theory of the Connection between Gravitation and Electricity (second article*"), a mid-career essay moving toward a unified field theory (lot 464). The section continues with a signed and inscribed advance copy of Richard Feynman's *"Surely You're Joking, Mr. Feynman!"* (lot 476), an exceptionally rare archive of correspondence and notes from 20th century logician Kurt Gödel (lot 478), and an attractive uncut copy of *Harmonices mundi libri V* by Johannes Kepler (lot 481).

Our Aviation section covers a wide swath of history from 18th century ballooning through to the Wright Brothers and on the Hindenburg disaster. The section makes a fine gateway for the Space History section that follows.

With the 50th anniversary of the Moon landing looming, the timing seems perfect to offer a collection of material from Granville E. Paules III, an Apollo program guidance officer and member of the "Trench" during Apollo 11 and other Apollo missions. The Paules collection includes his notebooks detailing his account of training for the moon landing (lot 518) and his circular slide rule used during Apollo 7 (519). The Space History section continues with an original full-size Gemini boilerplate capsule (525A), an LEM computer table used by many of the Apollo astronauts during training (530), a captivating selection of images taken by the Lunar Orbiter V, A flown Apollo 11 checklist (lot 544), and a flown Apollo 11 beta cloth emblem signed by all three astronauts (lot 545).

The sale ends with a large selection of 20th and 21st century technology, as we trace the development of communications advances from the Poulsen Arc Transmitter to mobile and satellite phone technology with a dip into the surveillance world and even on to the IBM Simon, what many consider to be the first smartphone. The section also charts the history of information storage with early wire recorders, video tape and video discs, early hard drives, DRAM, and solid state flash storage. The computing selection is particularly robust this year with a number of lots related to Seymour Cray, his company and the supercomputers he developed. Our cover lot is a working Apple-1 gifted to the consignor by Steve Jobs (lot 630), as well as an amazing letter from Jobs to the same consignor marketing the Apple-1 (lot 631), but we follow those high spots with some of the othe notable 8-bit machines of the era, such as the Altair 8800, the Intel Intellec 8 and the Imsai 8080. Closely following these lots is the Apple Lisa (lot 641), this a rare working example with fully functional "Twiggy" drives.

We close the sale with two forward-looking and exciting areas – Virtual Reality and Robotics. We've uncovered some of the most notable examples of VR from the early 1990s with material from VPL, Virtuality, N-Vision, Liquid Image and, most notably, a pair of Virtuality Cyber 1000CS arcade game pods (lot 649). The selection of robots include examples for industry, research and consumers.

This is just a sampling of the auction highlights. We encourage you to take a closer look in the following pages. Please do not hesitate to contact me or any member of the department with questions.

Adam Stackhouse.
Senior Specialist

ORDER OF SALE

400-445	A Collection of Globes, Property of a New York Collector
446-456	Scientific Instruments, Property of Various Owners
457-485	Books and Manuscripts
486-511	Aviation
512-592	Space History
593-658	Technology

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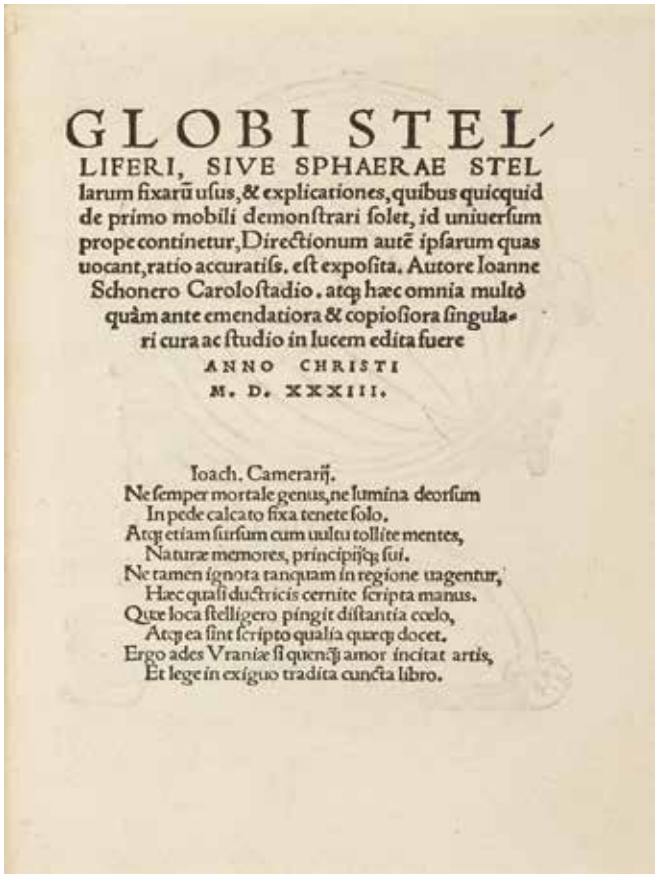
Items indicated in the catalog as "framed" have not been examined out-of-frame, unless specifically stated.

A Collection of Globes

Property of a New York Collector

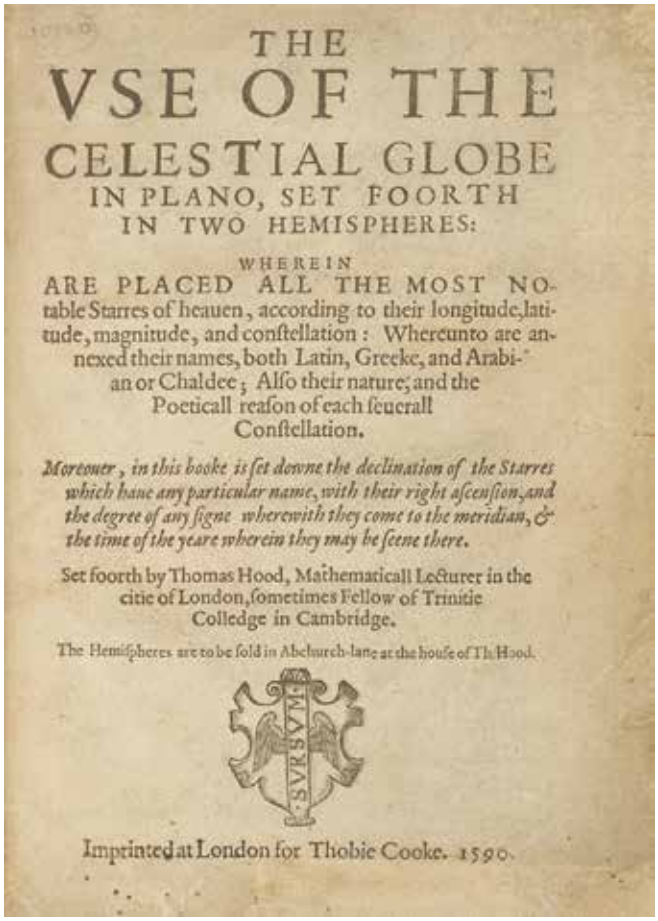
Lots 400-445



GLOBI STEL-
LIFERI, SIVE SPHAERAE STEL
larum fixarū usus, & explicationes, quibus quicquid
de primo mobili demonstrari solet, id uniuersum
prope continetur, Directionum autē ipsarum quas
uocant, ratio accuratiss. est exposita. Autore Ioanne
Schonero Carolostadio. atq; hæc omnia multò
quàm ante emendatiora & copiosiora singula-
ri cura ac studio in lucem edita fuere
ANNO CHRISTI
M. D. XXXIII.

Ioach. Camerarij.
Ne semper mortale genus, ne lumina deorsum
In pede calcato fixa tenete solo.
Atq; etiam sursum cum uultu tollite mentes,
Naturæ memores, principijq; sui.
Ne tamen ignota tanquam in regione uagentur,
Hæc quasi ductricis cernite scripta manus.
Quæ loca stelligero pingit distantia cœlo,
Atq; ea sint scripto qualia quæq; docet.
Ergo ades Vraniæ si quem̄ amor incitat artis,
Et lege in exiguo tradita cuncta libro.

400



THE
VSE OF THE
CELESTIAL GLOBE
IN PLANO, SET FOORTH
IN TWO HEMISPHERES:

WHEREIN
ARE PLACED ALL THE MOST NOtable Starres of heauen, according to their longitude, latitude, magnitude, and constellation: Whereunto are annexed their names, both Latin, Greeke, and Arabian or Chaldee; Also their nature; and the Poeticall reason of each seuerall Constellation.

Moreouer, in this booke is set downe the declination of the Starres which haue any particular name, with their right ascension, and the degree of any signe wherewith they come to the meridian, & the time of the yeare wherein they may be seene there.

Set foorth by Thomas Hood, Mathematicall Lecturer in the citie of London, sometimes Fellow of Trinitie Colledge in Cambridge.

The Hemispheres are to be sold in Abchurch-lane at the house of Th. Hood.

SVRSVM

Imprinted at London for Thobie Cooke. 1590.

401

A COLLECTION OF GLOBES PROPERTY OF A NEW YORK GENTLEMAN

400
SCHOENER, JOHANN. 1477-1547.
Globi Stelliferi sive sphaerae stellarum fixarum usus. Nuremberg: [J.Petreius], 1533.
4to (195 x 140 mm). 28 leaves, A-G4. Full-page woodcut of a globe on verso of the title, woodcut diagram on G3 verso. The copy clean and washed, modern olive green morocco by Lobstein-Laurenchet, g.e.

A fine and rare copy of Schoener's book on celestial globes, published to accompany his own 1533 celestial globe. Just one copy, selling in 1971, is recorded in the auction market in modern times. Schoener, the foremost globe maker of the 16th century, produced his first pair of globes in 1515 (the first printed celestial globe extant), a manuscript globe in 1520, other printed globes in 1523 and a pair in 1533. Although the gores for the celestial were completed in 1533 (the same time as this book), the stands of surviving examples can be dated to 1534 and 1535. Sabin 77801.

$4,000 - 6,000

401
HOOD, THOMAS. 1556-1620.
The Use of the Celestial Globe in plano, set foorth in two hemispheres: wherein are placed all the most notable Starres of heaven. London: [by John Windet] for Thobie Cooke, 1590.
4to (185 x 133 mm). Letterpress title incorporating woodcut printers device, without the two folding star charts (often lacking). Title slightly soiled and lower margin carefully restored not affecting letters, Very light occasional spotting to early leaves. Red levant morocco, gilt, by Sangorski and Sutcliffe, covers with two line gilt ruled border, spine gilt in 6 compartments, gilt inner dentelles, g.e.

A finely bound copy of one of Hood's rarest works, with just 4 examples appearing at auction in the last 80 years, and all of these copies were without the two folding celestial plates. Thomas Hood was an English mathematician and physician and the first lecturer in mathematics to be appointed in England in 1588. In later life he lived in London and practiced as a physician, selling copies of his celestial charts to add to his living. From 1597 he is known to have made a number of astrological instruments. STC 13697.

$3,000 - 5,000

402

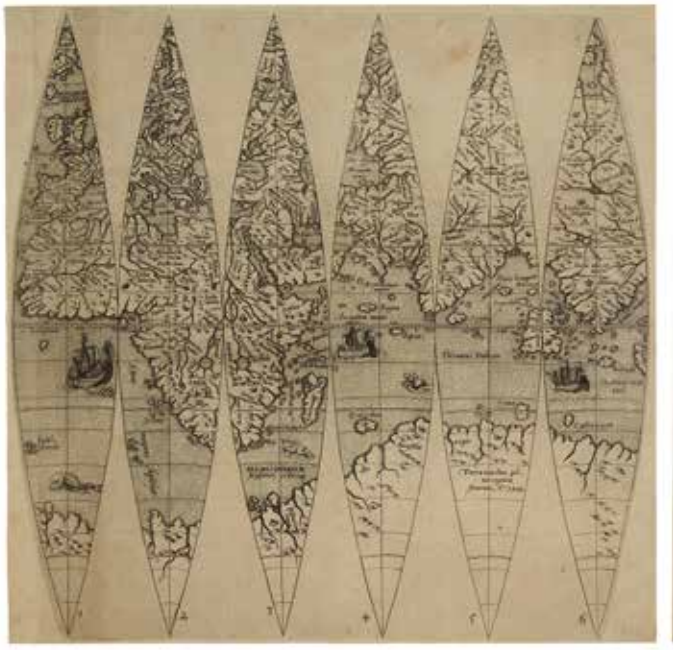
402

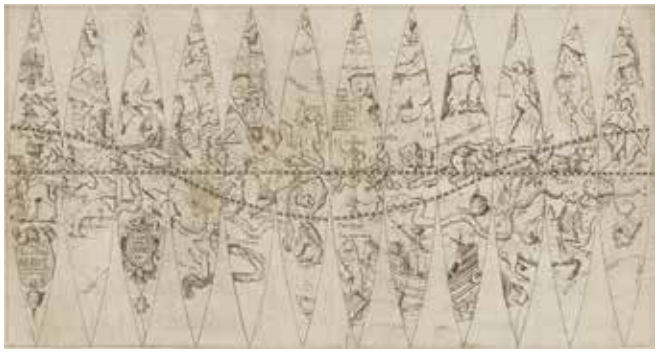
NICOLAI, WILLEM. 1573-1613.

Nova et integra universi Orbis descriptio. Lyons: 1603.
A set of 12 engraved gores on two sheets, 6 gores to each sheet numbered 1-12, each sheet 260 x 255 mm. The gores forming a terrestrial globe with a diameter of 170 mm (7 inches), title cartouche in gore 11, and place, name and date in a cartouche on gore 12. Lower right corner of the second sheet neatly restored not affecting the map.

A rare and important set of globe gores, possibly one of 3 known sets. They pose somewhat of a cartographic puzzle since they are clearly archaic in style and also very similar to a set of gores by Joannes Oterschaden of Antwerp. See Shirley's *Mapping of the World* 237 (Oterschaden) and 241 (Nicolai). It is generally agreed that the geography is based on globes by Demongenet, c.1560, and Vopel, c.1536. As to known examples of the globes, the National Maritime Museum, London (Dekker GLB0119) has a pair of Oterschaden 7 inch globes; 3 sets of the gores are recorded in Shirley; and for the Nicolai there was an example of the globe in a Sotheby's sale, London July 2010 (sold 19,000 pounds). Just one example of the gores are recorded in the University of Leiden, Holland.

$18,000 - 25,000





403

403

SPIRINX, NICOLAS. FL.1606-1643.

[Celestial globe gores.] [Lyons]: Dated 1610.
A single engraved sheet of 12 gores making up a celestial globe, sheet size 190 x 365 mm, diameter of globe 116 mm. First gore with dedicatory cartouche and the 3rd gore with maker's name and date. Several repaired tears, the sheet backed on archival paper, one small hole in gore 10 repaired, light surface marks. In a window mount.

A rare celestial globe sheet. Shirley *Mapping of the World* 271 records two sets of globe gores, both celestial and terrestrial, in the Newberry Library, Chicago and at Yale University. Shirley looked at both of these sets and considered both were 19th-century pulls. This sheet is a strong sharp impression with a flattened plate mark on an archivally preserved sheet of paper.

$3,000 - 5,000

404

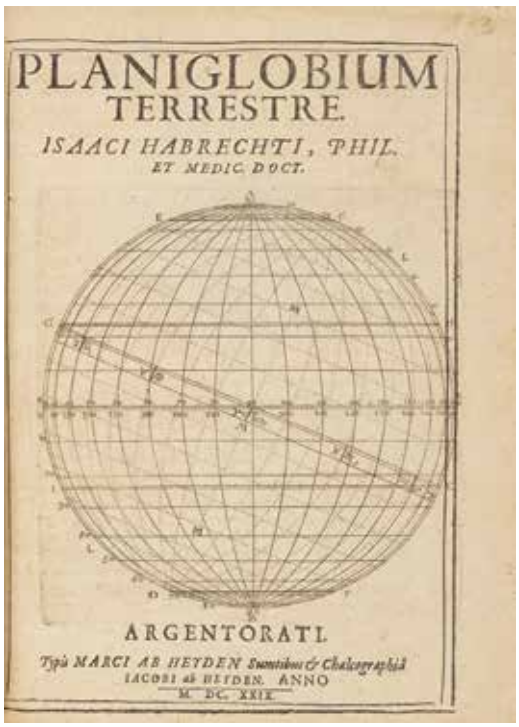
404

ANGELOCRATOR, DANIEL. 1569-1635; & NICOLAAS VAN GEELKERKEN. C.1610-?1657.

Novum Orbis Terrarum Schema, in plano sic descriptum ... inventum Daniele Angelocratore ... sequitur Nic Geilekerck. [Frankfurt: 1628.]
Engraved map of the world set as four globe gores, 285 x 540 mm. Title set along upper margin with the four gores engraved below. In a window mount.

A curious and rare four-gore version of a spherical world. Angelocrator, a German pastor, included this map in his work on surveying, *Doctrina de Ponderibus, Monetis et Mensuris,* published in Frankfurt in 1628. He claimed the 4 gore concept as his own and borrowed the map details from the Amsterdam cartographer Nicolaas Geelkircken, as he states on the title. Shirley *Mapping of the World*, 320, rated R; See J. Keuning *Imago Mundi* 1954, 11:1, pp 174-177, for a discussion on Geelkerken.

$2,000 - 3,000



405

405

HABRECHT II, ISAAC. 1589-1633.

Planiglobium Coeleste, et Terrestre. Strasbourg: Marcus and Jacob von Heyden, 1628-1629.
2 parts in one volume. Small 4to (210 x 150 mm). Part 1 with typographical title set in a woodcut border, part 2 title with an engraved model of the globe and two woodcut diagrams in the text. Modern calf, bound to 17th century style, with the bookseller's label of "Libraire Thomas-Scheler, Paris."

FIRST EDITION of Halbrecht's *Planiglobium*, his work on the construction of celestial and terrestrial globes. Halbrecht was the son of Isaac Halbrecht I and nephew of Josias Halbrecht, both clock makers from Switzerland, but Isaac took a different path and was Court physician to the Counts of Hanau-Lichtenberg. He rose to become a Professor of Mathematics and Astronomy at Strasbourg University, but died of the plague soon after taking the post. He published a celestial and terrestrial globe at 12 inches diameter, c.1621, and these were reissued by Furst in the 1660s in Nuremberg, and again by Weigel after that. He introduced several constellations that were adopted by Plancius, and other celestial constellations which became obsolete. Zimmer 5089.

$1,500 - 2,000

406

406

GREUTER, MATTHAEUS. 1564-1638.

[Two sets of globe gores for a Terrestrial and Celestial Globe, diameter 490 mm (19 inches).] Rome: the Terrestrial dated 1632, the Celestial 1636.

48 engraved gore sheets, making up two globes, each globe made up of 24 engraved globe gores, each gore sheet on a tall piece of paper 420 x 140 mm, both globes signed by Greuter in the cartouches. Some light discoloration and spotting of the northern "Western Europe" and the celestial "title cartouche" gore sheets, other sheets with occasional light spotting or staining mostly to the blank margins. Each sheet mounted on paper guards, modern speckled calf, bound to style, spine gilt in seven compartments.

A rare original Greuter globe pair gore set for the 1632/36 terrestrial/celestial 19 inch pair. Although there have been a number of Greuter globe pairs coming up for auction, the last at Christie's London, December 2013, (80,000 pounds), but for engraved gore sets the last to appear was in Christie's in Italy in December 1998 (25 million Lire). Matthaeus Greuter was born in Strasbourg and worked as an engraver in Avignon and Lyons before arriving in Rome in 1606. The 1632/38 pair and the 10 inch 1636/38 pair were the only globes he completed in his lifetime, both based on Blaeu. His celestial globe depicts the constellations in 1635 using star patterns from Tycho Brahe. After Greuter's death in 1638, Giovanni de Rossi and Domenica de Rossi republished the small and large pairs of globes.

$30,000 - 50,000

407

407
GUNTER, EDMUND. 1581-1626.
The description of the Sector, Crosse-staffe &other Instruments.
London: W.J. ... sold by James Boller, [1636].
Four parts in one volume. 4to (174 x 135 mm). Engraved general title, letterpress section titles, with one engraved plate, one woodcut plate with diagrams recto and verso, 2 slips (?of 3, table for use of the chain, and scale of chords), one volvelle, and numerous woodcut illustrations throughout, a few annotated in an early hand. Slight staining and shaving to upper margins throughout, Engraved title with restoration to upper and right margins, the engraved date partially obscured. Old speckled calf, neatly rebacked, red edges.

The second edition of Gunter's important work on Instruments. STC 12523; ESTCS103555.

$2,000 - 3,000

408

408
BLAEU, WILLEM. 1571-1638.
Institution Astronomique de l'usuage des globes et Spheres Celestes & Terrestres Amsterdam: J. and C. Blaeu, 1642.
4to (200 x 155 mm). 2 parts in one volume, letterpress general title with woodcut printers device, two section titles with globe diagrams, numerous woodcut illustrations. Some light worming to lower margins throughout some touching text, occasional light browning. Contemporary Dutch calf, rubbed and bumped, foot of spine chipped, upper joint cracked, lower joint starting.

FIRST EDITION in French of Blaeu's popular treatise on the astronomical use of globes. The work was first printed in Dutch by Willem Blaeu in 1620, but here reissued by his two sons, as an adjunct to their cartographical business selling atlases and globes. Houzeau/Lancaster 9714.

$1,200 - 1,800

409

409
BLAEU, WILLEM I. 1571-1638.
Tweevoudigh onderwiis van de hemelscche en Aerdshe Globen.
Amsterdam: Joan Blaeu, 1655.
4to (195 x 155 mm). 2 parts in one vol. General title with woodcut printers device, two section titles with diagrams of globes, 32 woodcut diagrams in the text. Very light marginal browning. Contemporary vellum, lightly stained, upper board slightly bowed. *Provenance*: J H Verheyen (19th century signature to front free end-paper); Otto Orren Fisher (bookplate).

Willem Blaeu's guide to the making of globes, first published in 1620, here reprinted by his son, Joannes. Houzeau/Lancaster 9714.

$1,200 - 1,800

410

HABRECHT II, ISAAC. 1589-1633.

Planiglobium Coeleste ac Terrestre ... Johannis Christophori Sturmii ... edita. Nuremberg: Christopher Gerhard, [1666].
4to (205 x 150 mm). 2 parts in one volume, general printed title, titles to Coeleste and Terrestre sections with engraved figures of globes, 14 folding engraved plates after Jacob von Heyden, a few tears along folds, with final blank SS4, 5 engraved illustrations, the dedication leaf browned and some early leaves spotted. Contemporary calf, rubbed, joints cracked, lacking front free endpaper.

The 3rd edition of the *Planiglobium*, Habrecht's work on the construction of globes. This edition has the 14 folding engraved plates, 10 concerning a celestial globe (2 of the celestial planes, 8 of the construction of the stand) and 4 concerning a terrestrial globe (2 of north and south polar projections). These plates are mostly dated to 1666, excepting one dated 1628. They were first published in *Tractatum de Planiglobi* (Strasbourg: 1628), but here updated by Habrecht's pupil Sturm in Nuremberg, this work to be issued alongside Paulus Furst's reissue of the Habrecht 1621 globes. Shirley *Mapping of the World* 324 discusses the terrestrial plates of the 1628 issue. Auction records record just 3 complete copies of this work at auction since 1979: the Honeyman copy in 1979, the Macclesfield copy in 2004, and a folio-sized copy with unfolded plate sheets at Christie's in 2010 for 10,000 pounds. Houzeau and Lancaster 3039.

$3,000 - 5,000

410

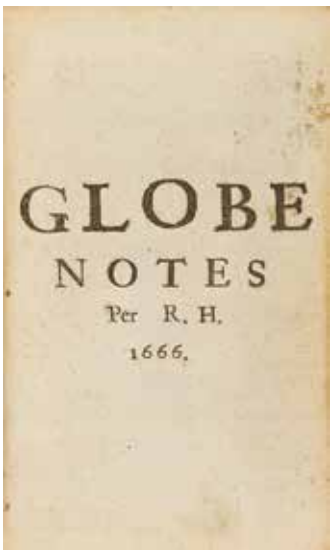
411

ENGLISH WORKS ON GLOBES.

[Holland, Richard.] *Globe Notes per R.H.* [Oxford]: 1666.
Small 8vo (140 x 85 mm). with the 11 line letterpress addenda slip inserted between pp 14/15, contemporary notes on constellations on verso of front free endpaper. Contemporary speckled calf, neatly rebacked.
Provenance: Dupplin Castle, Perth and Kinross, Scotland (with library shelf number on front paste-down).

FIRST EDITION of Holland's rare work on globes.
Together with 10 other works by English authors on globes and globe construction including:
Moxon, J. *A Tutor to Astronomy and Geography ... Globes Celestial and Terrestrial*. London: 1686. 4to. Contemporary calf. 4th edition.
Martin, B. *The description and Use of both the globes, the armillary Sphere and Orrery*. London: [1773]. 2nd edition. 8vo, contemporary calf, rebacked. Horblit Copy.
[Mead, Braddock]. *The Construction of Maps and Globes*. London: 1717. 8vo. Engraved plates, contemporary paneled calf, rebacked. Horblit Copy; and another copy of the same in modern binding;
And 6 other works on Globes by Harris, Adams, Jennings, and Wright, most later editions in modern bindings. (11) Wing H-2431a.

$2,000 - 3,000



411

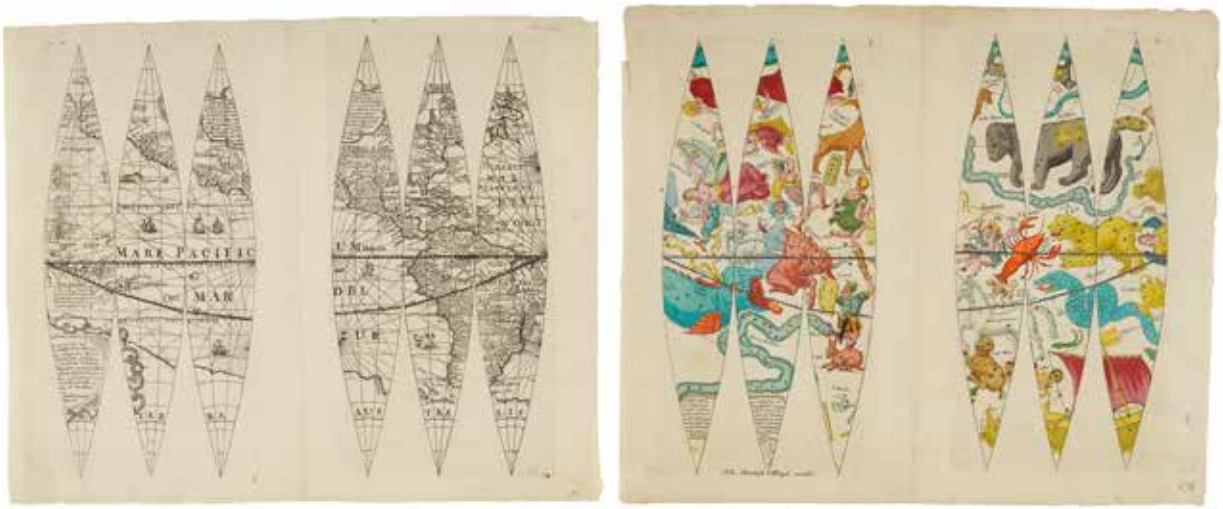
412

BLAEU, WILLEM. 1571-1638.

Institutio Astronomica de usu Globorum & Sphaerarum Caelestium ac Terrestrium. Amsterdam: J.Blaeu, 1668.
8vo (190 x 110 mm). 2 parts in one volume. Woodcut printer's device on title, two section titles with woodcut diagrams, numerous woodcut illustrations. Modern morocco-backed marbled boards, Houzeau and Lancaster 9714.
WITH: Valk, Gerhard. 1650-1726. *'t Werkstellige der Sterre-konst*. Amsterdam: Leonard Valk, [1730]. 4to. 4 folding engraved plates, full deckle edges. Modern vellum backed boards.

Two important treatises on globes by Blaeu and Valk.

$1,200 - 1,800



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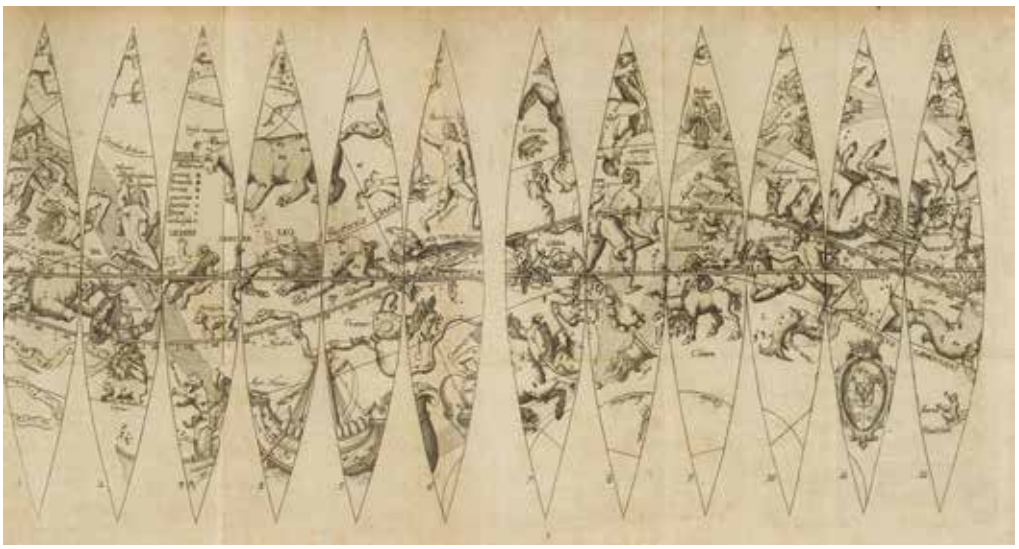


414

413

HABRECHT, ISSAC II; & CHRISTOPHER WEIGEL.

Engraved globe gores for a pair of 20 cm (8 inch) diameter globes. Nuremberg: J.C. Weigel, engraver, [c. 1675].
Two sets of 12 globe gores on 4 sheets, together with 2 uncolored sheets of the meridian ring, horizon and compass cap for the two globes, each sheet 360 x 420 mm. The terrestrial uncolored, the celestial gores with contemporary(?) hand coloring, all the sheets signed "Joh. Christoph Weigel excudit." Very light discoloration to margins.

A fine set of the Habrecht globe gores originally issued in 1621/1625 but here re-engraved by Johann Christoph Weigel (1654-1726), a Nuremberg engraver and map seller, in the later part of the 17th century, probably around 1675. Auction records list just one celestial set in the last 25 years sold in Germany in 2003. See Stevenson II 50; see Shirley *Mapping of the World* 314.

$4,000 - 6,000

414

SCHEFFER, VITUS. 1648-1717.

Coelum Poeticum, seu Sphaera Astronomica. Prague: The widow Catharine Czernoch, 1686.
4to (193 x 145 mm). Engraved allegorical frontispiece by Groot incorporating globes, dedication to Johann Mark Georg, Count of Clary-Aldringen, large folding sheet with 2 engravings, each with 6 celestial gores (285 x 535 mm), bound in at the end, and two smaller terrestrial and celestial gore sheets, celestial dated 1686, each 180 x 315 mm, both tipped onto the final two leaves O1 and O2, double-page engraved diagram of globe horizon bars bound in after the title, incorporating dedications. Some light browning heavier on a early leaves. Later limp vellum.

FIRST AND ONLY EDITION. A rare complete copy of this obscure work on globe-making by a Jesuit priest from Prague, Vitus Scheffer. The text explores the allegorical interpretation of constellations and their mythological background. Scheffer was born in Austria, became a member of the Jesuit Order, and was a prolific writer on theology, mathematics and philosophy. He taught at several Jesuit Gymnasiums, and studied in Prague many times. Houzeau/Lancaster 178.

$9,000 - 12,000

415

CORONELLI, VINCENZO MARIA. 1650-1718.

[Two celestial globe gores for the 108 cm diameter globe.] [Venice: 1688 or later.]
Two hand-colored engraved gores, each 660 x 310 mm (max), one for the northern hemisphere (sheet 9 showing Hercules), and one for the southern celestial hemisphere (sheet 9 showing the Serpent and Scorpion), the coloring later, in window mounts.

$800 - 1,200

415

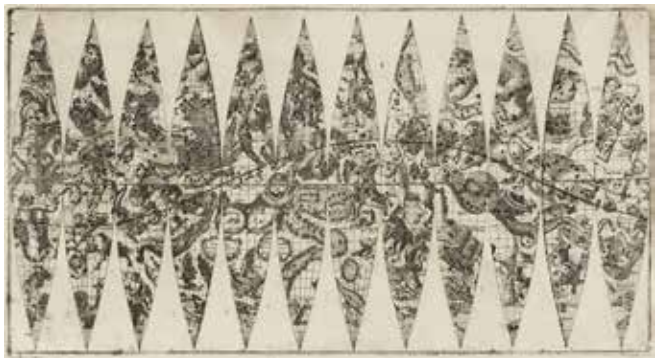
416

CORONELLI, VINCENZO MARIA. 1650-1718.

[A set of Terrestrial/Celestial globe gores, diameter 6 inches (150 mm).] [Venice]: the celestial dated 1700.
Two uncolored globe gore sheets, 250 x 470 mm. Each sheet of 12 gores making up a globe of 6 inches diameter. The celestial with a cartouche dated 1700, the terrestrial undated. The two sheets presented in a double window mount.

A fine set of celestial and terrestrial gore sheets for the 150 mm diameter Coronelli pair with strong, heavily inked impressions. These sheets likely taken from Coronelli's published book on globes, *Libro dei Globi*. Coronelli was one of the most influential Italian mapmakers, the son of a tailor, he established a Geographical publishing house in Venice. His success with his large printed globes, and the patronage of the King Louis XIV of France and other European Nobility made him one of the leading mapmakers of his day. See Osher collection for a similar pair, www.oshermaps.org/map/532 and 11765.0001.

$4,000 - 6,000



416

417

BION, NICOLAS. 1652-1733.

L'Usage des Globes Celestes et Terrestres et des Spheres.
Amsterdam: Francois Halma, 1700.
4to (215 x 170 mm). Title printed in red and black with colored vignette, head-piece and initial on opening page, double-page engraved celestial chart, 3 single page diagrams of globes, and 10 folding plates (of 11), all colored in a contemporary hand, one heightened in gold. Title lightly browned and laid down on paper, small hole at lower margin, preliminary leaf *4 misbound after title page, some light browning. Modern calf bound to style; Together with an 8vo printing of the same work, Paris, 1799.

Second edition. A fine hand-colored wide-margined copy of Bion's classic work on globes. Bion was the Royal Geographer and Instrument maker to the French King. Houzeau and Lancaster 9735.

$1,200 - 1,800

417

418

419

418

BION, NICOLAS. 1652-1733.

Globe Celeste [two sheets of Celestial globe gores for the 13 inch (330 mm) diameter globe]. Paris: dated 1700.
Two hand-colored engraved sheets, one 400 x 390 mm, the second 310 x 385 mm (plate mark), each with 6 celestial gores, one sheet with the addition of the two polar calottes, making up a globe with a diameter of 330 mm. With title, dedication and imprint cartouches and key to the stars. Paper lightly browned, old creases down center folds.

An attractive and rare celestial globe by Nicholas Bion, one of the foremost globe and instrument makers in France in the early 18th century. Bion was the Royal Geographer and Instrument maker to the King.

$3,000 - 5,000

419

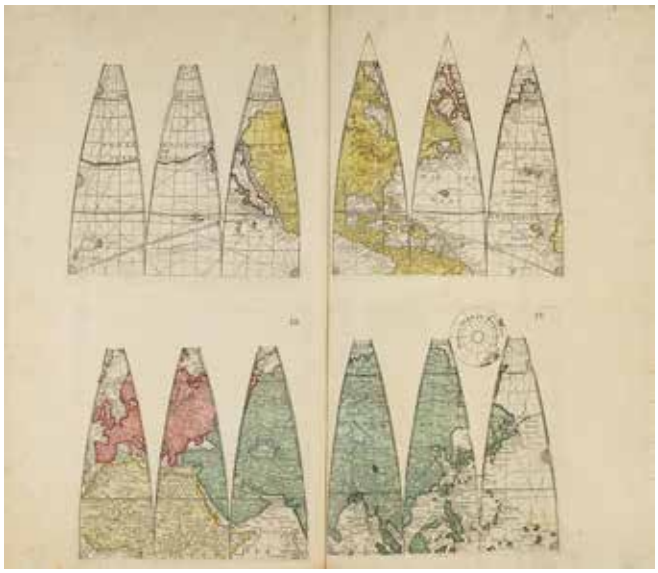
ANONYMOUS.

[Miniature gilt metal globes: A Terrestrial Globe enclosing a Celestial Globe.] [Holland or Germany?: c.1700.] A 6 cm diameter gilt metal terrestrial globe, engraved with a depiction of the world, the interior lined in red velvet and when enscrewed enclosing a 5 cm diameter gilt metal engraved celestial globe. The geography of the terrestrial c.1700, with just Western Australia and the Western coast of New Zealand drawn in, and California marked as an island, various names of seas and oceans as well as other regional names on the land, with hanging wire from the North Pole. The celestial with a depiction of some of the principal stars, the astrological figures without names. The inner celestial in fine condition, but the outer terrestrial globe slightly tarnished, and with a small minor indent, inner velvet slightly worn.

A fine and charming miniature pocket globe pair, unsigned but probably constructed by an instrument maker in Holland or Germany around 1700. The names used on the terrestrial globe are somewhat archaic, using “Oceeanus Aethiopicus,” Africa with names such as “Benamataxa,” “Dancali,” “Hoden” and “Avaman.” There may well be a connection with a Jesuit maker.

$12,000 - 18,000

420



421

420

ROSSI, GIUSEPPE DE. 1570-1639, AND DOMENICO DE ROSSI. 1659-1730. AFTER JODOCUS HONDIUS.

[A set of 12 engraved gores to make a 21 cm diameter (8 inch) terrestrial globe.] Rome: Dated 1615, but reissued by Domenico de Rossi, [c.1700].
Two engraved gore sheets comprising 12 gores, to make up a 21 cm diameter terrestrial globe, each sheet 325 x 325 mm (plate mark). The sheets with full deckle edges, old vertical creases, but no signs of guards on versos, very light soiling and spotting mostly to the margins. Bound in modern calf.

A fine and rare set of globe gores, a reissue by Domenico de Rossi in Rome of Giuseppe de Rossi's 20 cm diameter terrestrial globe issued in Milan/Rome in 1615, itself a straight copy with a new Roman dedicatee of the Hondius's 1601 terrestrial globe made in Amsterdam. A fine example of the habit of Italian plagiarism in the 17th century globe market. The engraved plates of the 1615 terrestrial globe were inherited by Giovanni Giacomo de Rossi, his son, who came to be based in Rome. Domenico de Rossi, born Domenico Freddiani, was adopted by Giovanni in 1679, trained him as an engraver and made him his heir, with Domenico taking over the running of his shop in Rome from about 1691. These two copperplates were obviously rediscovered in that period, and re-issued around 1700. There appear to be few, if any, of either the constructed globe or gore sheets in institutional hands, with just one gore sheet example, misattributed to 1644, being offered on the market in recent years. Domenico is better known for his view books of Rome. See Shirley *Mapping of the World* 289 (Giuseppe's version 1615); see Dekker *Globes at Greenwich* GLB0153.

$3,000 - 5,000

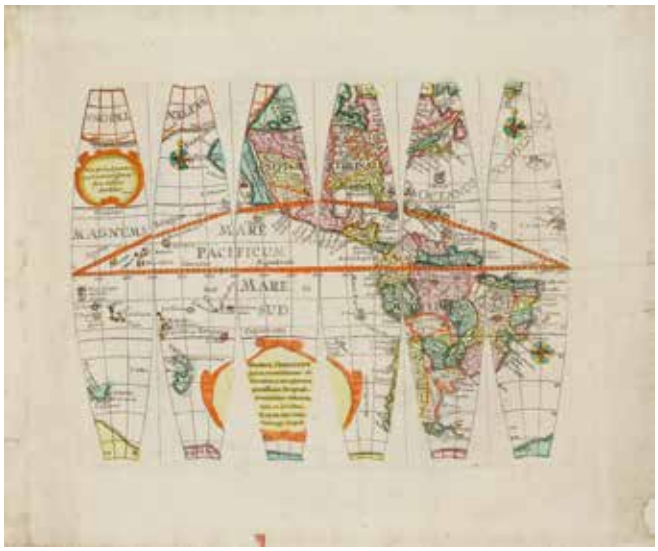
421

EIMMART, GEORG CHRISTOPH. 1638-1705.

[Terrestrial and Celestial gores for a pair of 30 cm diameter globes.] Nuremberg: Terrestrial dated 1705; [Celestial c.1704].
A complete set of gores for a pair of 30 cm (12 inch) globes, comprising 4 sheets, each approximately 570 x 660 mm, each sheet with 4 engraved parts, each part with 3 gores, making up two globes each of 24 gores. The terrestrial gores numbering 24, both North and South, all hand-colored, with a dedicatory cartouche signed and dated by Eimmart, and with the two polar calottes on the final sheet; the celestial similarly arranged with 24 gores, the celestial figures uncolored, but with the stars colored in yellow, and with the two polar calottes, the dedicatory cartouche describing the star configurations as taken from Hevelius, with star positions as of 1700. The sheets with full deckle edges, some very light staining to margins. Bound in modern calf.

Eimmart was born in Regensburg, studied in Altdorf and in Jena, and from 1660 onwards moved to Nuremberg, to become the Assistant Director of the Nuremberg Academy of Painting. He was also a keen astronomer and in 1677 built his own private observatory just outside Nuremberg which he equipped with the latest instruments, some of which he constructed himself. His 30 cm globes, which he did not issue until the end of his life, may well have been modeled on Valk. His collaboration with J.B.Homann, meant that after his death, the plates for his globe gore sheets were acquired by Homann, and are sometimes included in Homann's atlases. This set, with their uncut deckle edges, have never been bound in atlas form. These globe gores are rare on the market. In the last decade just three incomplete sets of gores have been offered. Dekker (Op. cit.) records 5 sets of these engraved globe gores in institutional hands. She goes on to record the rarity of Eimmart's mounted globes, with just 3 pairs, 4 celestial and 2 terrestrial, recorded in the Literature. See Dekker *Globes at Greenwich* pp 330-332.

$6,000 - 8,000



422

423

422
SEUTTER, GEORG MATTHAUS. 1678-1757.
Globus Terrestris; Globus Celestis. Augsburg: [c.1710].
6 hand-colored engraved gore sheets, 2 sheets for the terrestrial comprising 12 gores, with a sheet for the meridian circle and the calottes, and the celestial likewise on 3 sheets, each sheet 245 x 325 mm (plate mark), deckle edges to the sheets, some light soiling and a few tears to the outer margins.

A fine and rare hand-colored set of the terrestrial and celestial 20 cm globes by Seutter. Seutter was born in Augsburg the son of a goldsmith, but began his career as an apprentice engraver with the Homann firm in Nuremberg. He moved back to Augsburg in 1707, set himself up in competition with Homann in 1710. The 20 cm globe pair were the first pair of globes he made. Dekker *Globes at Greenwich* GLB0112.

$7,000 - 10,000

423
HILL, NATHANIEL. FL. 1746-1768.
A New Terrestrial Globe. [London]: dated 1754. Hand-colored engraved terrestrial pocket globe, diameter 2.75 inches (70 mm). The globe made up of 12 gores with two polar calottes, light varnish, graduated meridian circle, slight cracking at south pole. The globe mounted in a later 4-legged fruit-wood stand to style, later meridian circle, some repairs to stand. height 100 mm.

An attractive early pocket globe by Nathaniel Hill, here set in a small stand. Hill was part of a long line of London globemakers, being apprenticed to the globe maker Richard Cushee, and later serving as mentor to Thomas Bateman and Leonard Cushee. This pocket globe was reissued by Palmer and Newton in 1783. Cf.Dekker *Globes at Greenwich* GLB0029.

$3,000 - 5,000

424

424

CARY, JOHN AND WILLIAM.

Cary's Pocket globe agreeable to the latest discoveries; New Celestial Globe. London: J. and W. Cary, April 1791. A pair of pocket globes, both diameter 3 inches (77 mm), each with 12 hand-colored engraved gores over a plaster base. The terrestrial with the title in a plain cartouche set in the southern Indian Ocean, the globe showing the track of Cook's second and third voyages, original light varnish, metal pinions, the lower hemisphere with a few repaired cracks and minor abrasions to varnish. The celestial very lightly browned. Both contained in an original imitation shagreen covered case, metal clasp, the interior of the case lined with hand-colored engraved gores, one side depicting "The WORLD as known in CAESAR'S Time agreeable to D'Anville" and the other hemisphere lined with "A table of latitudes and longitudes of places not given on this globe."

An attractive double-pair of pocket globes. John Cary was an engraver and map seller, who started his globe business in 1791 when together with his brother William, an instrument maker, they began to produce a variety of sizes of globes from 3 inch to 21 inches for the English market. William had been an apprentice to Jesse Ramsden. Cf van der krogt Car 1; Dekker *Globes at Greenwich* GLB0001.

$6,000 - 8,000

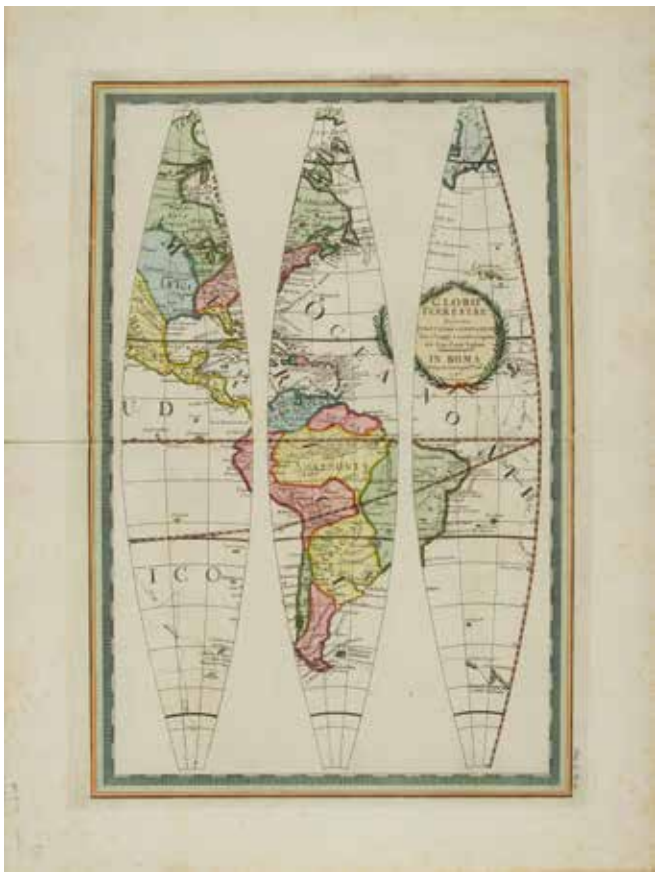
425

CASSINI, GIOVANNI MARIA. 1745-1824.

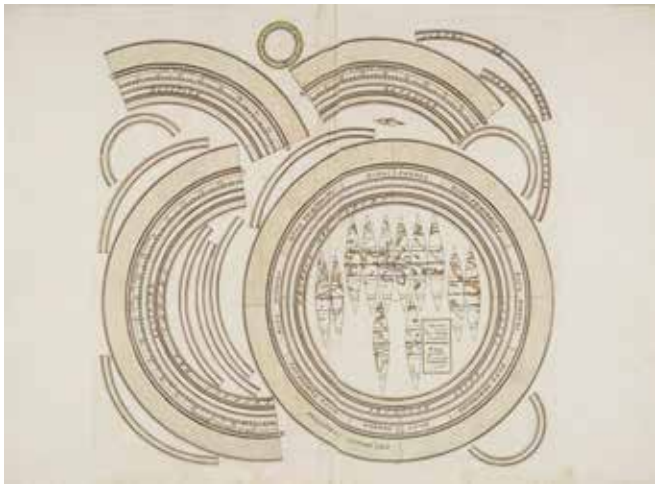
Globo Terrestre; Globo Celeste [30 cm diameter globes]. Rome: Presso la Calcofrafica Camerale, Dated 1790-92.
10 hand-colored double-page engraved gore sheets, 4 sheets comprising 12 gores for each globe, with separate sheets for the horizon bars and calottes, making a globe of 30 cm diameter, each sheet 450 x 600 mm, and set within ruled borders, lettered with volume numbers at upper right; together with two additional sheets of meridian circles, each sheet 570 x 660 mm. Some light spotting to margins. Bound in modern calf.

A fine set of gore sheets, these examples extracted from the *Nuovo Atlante Geografico Universale* published 1790-1801. The original gore sheets for Cassini's globes have a different border and are without volume numbers. Online David Rumsey Collection; Dekker *Globes at Greenwich* GLB0145 (mounted terrestrial globe).

$5,000 - 8,000



425



426

426
[CASSINI, GIOVANNI MARIA. 1745-C.1830.]
Circolo per formare la sfera Armilare [armillary sphere]. Rome: Presso la Calcografica Camerale, 1795.
Two hand-colored engraved sheets, comprising the components to create an armillary sphere, with miniature terrestrial globe gores, hand-colored in outline, meridian bars, zodiacal designs, and other circles and bars, each sheet 410 x 570 mm. Some light staining to the lower margin of one sheet, creasing down center fold.

A rare armillary sphere gore set engraved by an Italian engraver, Bernardino Olivieri, for G.M.Cassini, the sheets printed at the business address of Giovanni Maria Cassini, and engraved under his direction. The paper is Dutch, watermarked Van Der Ley. Only one set of these gore sheets has appeared at auction in the last two decades. Christies Exhibition, *The World in your Hands* (London: 1994), 6.6.

$1,200 - 1,800

427

427
WRIGHT, THOMAS II? FL.1730-1773.
Wright's New Improved Terrestrial Globe. London: Sold by W.& S. Jones, [c. 1795]. Terrestrial table globe, diameter 8 inches (205 mm). the globe made up of 12 hand colored engraved gores laid over a plaster sphere. The varnish rubbed and slightly pitted, gores discolored, some light abrasion, horizon bar rubbed. Mounted in its original "English style" stand of ebonised oak, with 4 legs and cross-stretchers. Overall height 13 inches (330 mm).

A "Wright Family" globe (there were five Thomas Wrights between 1718 and 1842), this globe having passed on to Jones who attached an overlabel with their name and address on this example. W. & S. Jones were active in London, 1791-1859.

$2,000 - 3,000

428

428 W
[DELAMARCHE, CHARLES FRANCOIS. 1740-1817.]
Ptolemaic Armillary Sphere. [Paris: c.1800.] With a small 2 inch diameter earth-ball at the center, the black and white printed gores slight restored, surrounded by sun and moon discs on metal quadrants, and a series of pasteboard circles (the equator tropics and plane of the ecliptic), each with a green painted face, the reverse with a engraved papered surface, all joined by a equinoctial and solstitial colure and surrounded by a planar zodiac band. The armillary structure, diameter 12 inches (30 5mm), mounted on an ebonised wooden stand with central column and turned wooden base. Slight rubbing and scratches on some surfaces. Overall height 18 inches (460 mm).

An attractive late 18th century French Ptolemaic armillary sphere (i.e., with the earth at the center of the cosmos) of the Delamarche School. The 18th century French globe makers such as Vaugondy and Delamarche were adept at producing these scientific instruments which were both decorative and functional, just as English globe makers of this period specialized in pocket globes for the use by gentlemen. See similar examples, Christies Exhibition, *The World in your Hands*, 4.32; 6.3.

$2,000 - 3,000

429

430

429

NEWTON, JOHN.

Newton's New Terrestrial Globe. [London]: 1818. A 2-inch (50 mm) diameter terrestrial pocket globe, made up of twelve hand colored engraved gores, the equatorial graduated in degrees, the ecliptic graduated in days and showing the symbols of the houses of the zodiac, the meridian labelled "Meridian of London," the oceans showing the track of the third voyage of Captain Cook and the homeward return by Captains Clark and Gore. Original varnish, very lightly rubbed at south polar regions, set inside its original fishskin covered case with 2 clasps, the inner engraved gores showing the phases of the sun.

A delightful 2-inch diameter Newton globe, one of the smallest of Newton's range of globe sizes, ideal to carry around in your pocket. In this globe Newton does not include his address in Chancery Lane. Dekker *Globes at Greenwich* pp 422-425.

$3,000 - 5,000

430

EBSWORTH, [RICHARD]. FL.1820-1835.

Ebsworth's New Portable Pocket Orrery. [London: c.1825.] A miniature portable pocket orrery, diameter 100 mm, with circular hand-colored engraved base diagram, with mechanism mounted centrally, and earth rotating around the sun, and moon around the earth, the whole mounted in a fruitwood base with a turned domed lid, the base with 3 small brassed acorn feet, and the inside of the dome with Ebsworth's original printed label. The lip of the base slightly cracked with some loss, otherwise in fine condition.

A charming and rare miniature portable orrery by Richard Ebsworth, a London optician and mathematician who is known to have made drawing instruments and a sundial. The concept of the miniature orrery is very rare, and this is a reduced-sized version of some of the Jones-type orreries and small tellurium that were being made in London in the early 19th century. Just as the pocket globe market expanded with the Cary and Newton families competing to provide the next and best pocket globe, so the many instrument makers designed miniature instruments to the burgeoning market of wealthy gentlemen. Clifton *Directory of British Scientific Instrument makers 1550-1851* p 92.

$8,000 - 12,000

431

431
NEWTON, SON AND BERRY. FL.1830-1838.
Newton's New and Improved Terrestrial Globe. London: [c.1830]. A 3-inch (77 mm) diameter pocket celestial globe, made up of 12 hand-colored engraved gores laid over a plaster base, metal pins, depicting the tracks of Captain Cook's second and third voyages around the world, and Captain Biscoe's track around the southern Ocean. A few old repaired cracks, some light abrasion of the varnish. Mounted in a contemporary turned fruitwood case, with domed lid. Dekker *Globes at Greenwich* GLB 0054.

$3,000 - 5,000

432

432
MINIATURE GLOBES.
[Newton Family.] *Collection of Miniature Globes.* [London: c.1830.] Three identical miniature globes, each 1 inch (27 mm) diameter, made up of 12 hand-colored engraved gores, over a plaster ball, varnished, iron axis. One mounted in a turned fruitwood case with domed lid, another in its original green morocco box, and the third in a contemporary red morocco box, both boxes with a clasp. One globe slightly chipped, the other two with light abrasion of the varnish.

These are some of the smallest obtainable miniature globes available in early 19th century England, most likely made by the Newton family both to sell cased, as here, and shown off as objects of curiosity, but also for use in larger instruments such as telluriums and armillary spheres where a small earth ball was required.

$1,500 - 2,000

433

433
WEINLING, A. AND CIE.
Brevet D'Inventions. Globe Terrestre dresse par L.Spies D'apres l'invention de A Weinling et Cie. Lith Simon P and F. Strasbourg: Marin and Schmidt, 1830. An inflatable Chamois leather globe with printed lithographic image of the world, hand-colored in outline, diameter 190 mm. The leather globe with a rubber(?) blow up device inside, and set in a constructed stand, comprising a wooden horizon bar and quadrant supports, set on a turned fruit wood single column pillar and base, height 360 mm. The parts all contained in a card circular box, diameter 23.5mm, the lid with a printed label titled "Globes Aerophyses terrestres & Celestes." Slight wear to the chamois globe, and slight rubbing to the edges of the box.

A charming and very rare educational inflatable globe assembled from a kit. The chamois globe is particularly inventive: the 12 gores of chamois leather are each separately printed in lithography with the geography of the world and glued together with polar calottes. The Bibliotheque Nationale has a pair of these inflatable globes dated 1830 (terrestrial) and 1833 (celestial).

$2,000 - 3,000

434

NEWTON, SON & BERRY. FL.1830-1838.

Newton's New and Improved Terrestrial Globe; Newton's Improved Pocket celestial Globe. London: 66 Chancery Lane, [c.1830]. A pair of pocket globes, each mounted on later Dutch style stands, globe diameter 3 inches (77 mm). Each globe made up of 12 hand-colored engraved gores laid over a plaster sphere, with axis pins and later brass meridian circle, terrestrial showing the tracks of Cook's Second and third voyages. Some light spotting to the terrestrial gores, some old restoration of cracks on both, a few newer cracks to the celestial and terrestrial, with slight chipping of varnish. Dekker *Globes at Greenwich*, GLB0054 (terrestrial).

$3,000 - 5,000

434

435

LEGRAND, AUGUSTIN. FL. 1800-1840.

Globe Artificiel et Mecanique a l'usage du Petit Geographe. Paris: [1830s]. A hand-colored engraved collapsible globe in 6 gores, height 170 mm, with green string draw-ties, the globe contained in a card folder with blue-papered covers, and fold out flaps containing 8 pages of explanation about the continents horizons and other globe concepts, with a single hand colored engraved card with diagrams of the globe. Back board slightly creased at upper left corner, and some spotting on verso, green ties, one broken.

A delightful geographical children's toy, part of Legrand's output of educational toys and devices, a few of which are advertised at the end of p 8. Issues with the blue boards appear to be rarer than the pale white card covers. Relatively few examples appear on the market, with rarebookhub.com listing 5 examples at auction in the last 35 years. This collapsible globe was also issued in Amsterdam in the 1840s and in Milan, Italy in the 1850s. Gumuchiian 1993.

$1,200 - 1,800

435

436

COX, [JAMES]. 1811-1857.

[Cox's Terrestrial Globe]; Celestial Globe. [London: c.1839.] A pair of miniature globes, terrestrial and celestial, diameter 2.75 inches (72 mm), each made up of 12 hand-colored engraved gores laid over a sphere, and mounted on later half meridian circles and turned wooden stands. The terrestrial with some restoration affecting the title and parts of the Pacific and Africa, both globes discolored. height (with stands) 6.5 inches (170 mm).
Clifton, *Dictionary of British Scientific Instrument Makers 1550-1851*, pp 68/69.

$900 - 1,200

436

437

438

437

NEWTON & SON. FL.1841-1861.

Newton's New and Improved Terrestrial Globe; New & Improved Celestial Globe. London: 66 Chancery Lane, [c.1840]. A pair of terrestrial and celestial globes, diameter 6 inches (152 mm). Each globe made up of 12 hand-colored engraved gores, and two polar calottes, laid over a plaster sphere, both with some old very light staining, and terrestrial with some crackling stains from the old varnish on the paper surface, brass half meridians. Mounted on companion turned mahogany stands, overall height 9.5 inches (240 mm).

A fine pair of Newton's 6 inch globes issued at the time when Newton and Berry had morphed into the new company Newton and Son. A contemporary published advertisement from Newton and Son, notes this 6 inch globe with mahogany pedestal selling for 7 shillings and 6 pence. Dekker *Globes at Greenwich* p 48 and GLB0074 (celestial).

$6,000 - 8,000

438

HARRIS, WILLIAM II. FL. 1829-1843.

Harris's New and Improved terrestrial Globe containing the latest Discoveries. [London]: 63 King William St, [c.1840]. Terrestrial globe, diameter 5.5 inches (140 mm). 12 hand-colored engraved gores, title set in the Northern Pacific, with analemma. Old varnish, slightly pitted and worn, in places rubbing the paper surface. Brass meridian circle graduated on one face, mounted in its original wooden tripod stand, the horizon bar papers rubbed. Cf. Clifton *Dictionary of British Scientific Instrument Makers 1550-1851* p 126.
WITH: Maddock, D.C. & A. [*Terrestrial Globe.*] Massachusetts: [c.1810]. Diameter 5 inches (130 mm), with makers label partly obscured. Papers and varnish browned, restoration at both poles. Later brass meridian circle, mounted in a contemporary 3-legged fruitwood tripod stand.

$1,200 - 1,800

439

NEWTON & SON. FL.1841-1883.

Newton's New and Improved Terrestrial Globe. London: [c. 1841]. A pocket terrestrial globe, diameter 2 inches (53 mm), made up of 12 hand-colored engraved gores over a sphere, marked with the track of Cook's second voyage, metal axis pins. Two minor cracks to the globe surface, a few very light abrasions, mounted in a turned fruitwood cup and domed lid.
WITH: J.G. Klinger. 1764-1806. *The Earth*. Nuremberg, c.1800. Miniature globe, 2.5 inches diameter (65 mm). 12 hand-colored engraved globe gores over a sphere. lightly browned, mounted in a later turned fruitwood case with domed lid.
AND WITH: two other 19th century miniature terrestrial globes on ebonised turned wooden stands, one 2.25 inches diameter, signed K[linger], the other, diameter 2 inches, signed J.L. & Cie, Paris. (4)

$1,500 - 2,500

439

440 W

[DELAMARCHE & CIE.]

A Copernican Armillary Sphere with Orrery. [Paris: c.1850.] Enclosing an internal orrery, diameter 12.5 inches (320 mm). the armillary with a central papered sun-ball, the planetary orbits of 10 planets from Mercury to Saturn represented by curved quadrant metal arms with papered discs at the end, earth presented as a metal ball on a fixed arm, the "orrery" set at the center of an armillary sphere, with red and blue painted pasteboard equinox and solstice meridians, the horizon band covered with reproduction(?) printed zodiac. Mounted on an ebonized wooden stand with turned central pillar and base. Overall height 21 inches (535 mm).
WITH: [Delamarche(?), F .C.] *A Copernican Armillary Sphere*. [Paris: c.1810.] Diameter 12 inches (305 mm). Central gold painted sunball, and metal armature with driving band to a small 20 mm diameter earth ball, with paper gores, four wooden circles presenting the courses of Earth, Mars, Jupiter and Venus. The internal orrery set inside Equinox and solstice meridians, with engraved papered scales and zodiacal figures. Mounted on an ebonized wooden stand, with turned central pillar and base. Overall height 21 inches (535 mm).

Two early 19th century "Delamarche type" armillary spheres with internal orreries, in fine condition.

$2,000 - 3,000

440

441

MALBY AND CO. 1843-1850.

Malby's Terrestrial Globe. London; John Charles Dennis, 122 Bishopsgate, 1852. Terrestrial globe, 3 inches (77 mm) diameter, Made up of 12 hand-colored engraved gores laid over a plaster sphere, original varnish, brass half meridian circle, mounted on its original turned fruitwood stand, overall height 5.75 inches (148 mm).

An attractive 3 inch diameter terrestrial globe issued by Malby before 1850, but with an engraved over-label on the title with the imprint of fellow optician and instrument maker John Charles Dennis fl.1833-1866. Although Thomas Malby III took over the business in London in 1851, it appears that some of the stock was sold on to other instruments sellers at the time of the death of Thomas II.

$1,500 - 2,000

441

442

442 W

MALBY AND SON. 1851-1860. REISSUED BY JAMES WYLD.

[Malby's terrestrial compiled from the latest & most authentic studies.] London: [James Wyld, 1867]. Terrestrial globe, diameter 36 inches (920 mm). The globe made up of two sets of 48 hand-colored engraved globe gores, with polar calottes, the surface with some cracks along gore edges, carefully restored in the Pacific and the Atlantic touching Brazil, with the title cartouche redrawn. Later graduated brass horizon meridian, later horizon paper, the horizon supported by a tripod veneered wooden stand, central wooden mahogany support, and base. Overall width 43 inches (110 mm), overall height 56 inches (1420 mm).

A monumental terrestrial globe, called the "Colossus Globe" by Wyld, the largest and one of the rarest globes to be issued by any British globe maker. In a sense it was the British version to the large Coronelli and Nolin globes of the late 16th and 17th centuries, constructed for the Royalty of Europe. In the early 19th century the economic successes of Britain on the world stage required an equally large globe for the upper class clientele of Britain. The first British 3-foot diameter globe was issued by Thomas Addison in 1825, after which the gores came down to Malby & Co. around 1845, who reissued the globe in 1849. Famously, a monumental pair were on show at the Great Exhibition in 1851. With the demise of the Malby firm in 1860, these gores passed on to James Wyld, who published the globe again in 1867. James Wyld was also captivated by large globes, renting a plot in Leicester Square, and building a walk-in Georama within a 20 meter diameter globe structure, which was in use from 1851 to 1862. Although this globe has no clear original title cartouche, we can date this example to its production by James Wyld by the style of the stand and the quality of engraving. Dekker *Globes at Greenwich* ZBA0353 (The Wyld 3 feet diameter terrestrial).

$50,000 - 80,000

443

MALBY & SON. FL.1851-C.1884.

Malby's Terrestrial globe compiled from the globes of the Society for the Diffu[sio]n of Useful Knowledge. London: 37 Parker Street, dated 1876. Terrestrial pocket globe, diameter 3 inches (77 mm). Made up of 12 hand-colored blue printed engraved gores laid over a plaster sphere, iron polar pins. Set in the lower half of a a green painted wooden case (without lid). Original varnish, lightly rubbed.

The firm of Thomas Malby continued under his son from 1851, and he was still in business as late as 1884. This pocket globe is a reissue of the gores of Thomas Malby's 3 inch globe of 1844, but with the lettering unusually printed in blue ink and then hand-colored. Thomas Malby closely allied himself with the Society for the Diffusion of Useful Knowledge as a way of marketing his products to the rising middle class of Britain. As a 1876 product it was slightly anachronistic, almost certainly one of the last British pocket globes of the 19th century to be produced. By 1876, the fashion for a gentleman to carry around a pocket globe had long passed.

$1,000 - 1,500

443

444 W

JOHNSTON, [W. & A.K.].

[Terrestrial Globe. Edinburgh and London: c 1880.] Terrestrial globe, diameter 18 inches (460 mm). Made up of two sets of 12 colored lithographic gores, the varnish discolored, several areas restored in the northern hemisphere, including the parts of the title cartouche. Brass meridian circle, mounted in a near contemporary mahogany stand, with central column and 4 curling feet. Overall height 46 inches (1170 mm).

$1,200 - 1,800

444

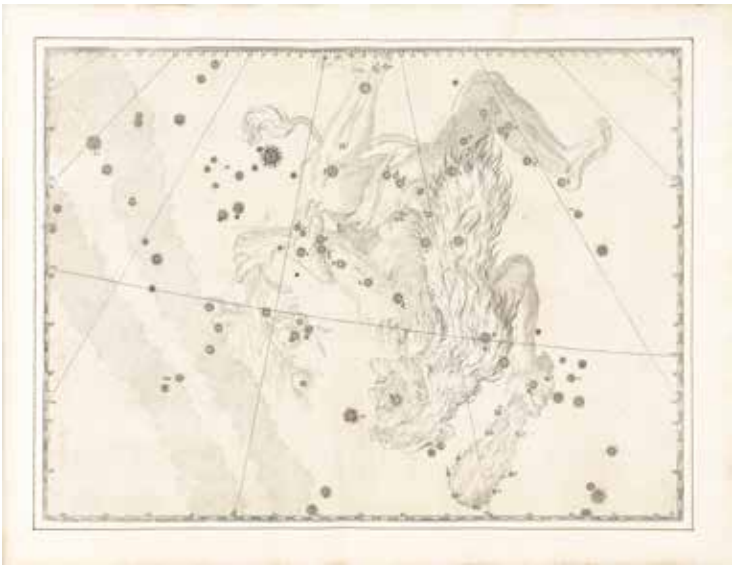
445

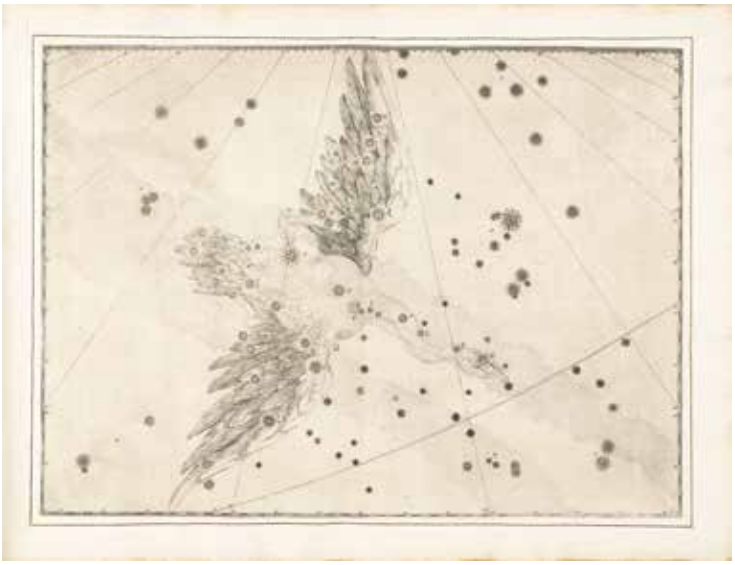
GLOBE CURIOSITIES.

Collection of 8 terrestrial globes, all with hinged lids, and used as everyday objects. Late 19th century. The collection comprises:
1. A tin globe made as a biscuit tin, marking English and French territories around the world, c.1890, diameter 180 mm (7.5 inches).
2. A French egg-like globe of wood and color-printed gores, for storing needles.
3. Two Clark and Company wooden globes for storing cotton reels, one resting on a turned wooden stand, c.1890, both 3 inch diameter (77 mm), the one on a stand height 140 mm, has a cotton ball inside.
4. Two Austrian inkwell globes, c.1880, diameter 2.5 inches (6 5 mm).
5. A copper globe, engraved with a depiction of the world, c.1870, diameter 2.5 inches (65 mm).
6, A German miniature propelling pencil, a loop at one end to attach to a bracelet. c.1880, diameter 20 mm.
See Christies. *The World in your Hands*, London: 1994. 8.16/17 (inkwells); 8.18 (pencil); 8.12 (Clarke's thread globe).

$1,500 - 2,000

445





446

PROPERTY OF VARIOUS OWNERS

446

CELESTIAL ATLAS.

BAYER, JOHANN. 1572-1625. *Uranometria, omnium asterismorum continens schemata, nova methodo delineata, aereis laminis expressa.* [Augsburg: Christophorus Mangus, 1639.]

Folio (435 x 330 mm). Engraved architectural title (285 x 191 mm) signed with monogram "AMF" [Alexander Mair Fecit] and dated 1603, featuring figures of Atlas and Hercules on pedestals flanking central title scroll, Apollo, Cybele, and Diana on pedestals above, and figure of Capricorn and vignette of the city of Augsburg below; manuscript star catalogue in Latin entitled "*Suprema ad Boream, Coeli pars Infima ad Astrum*" in an early hand to blank space on either side of title. 51 copper-engraved star charts (383 x 280 mm) featuring the 48 Ptolemaic constellations, 1 chart of the 12 new constellations unknown to Ptolemy, and 2 planispheres showing the northern and southern hemispheres, each unfolded, pressed, and mounted. Early vellum binding. Binding worn & soiled, some areas of loss to vellum at spine and edges; repaired tear to title, small area of loss at title scroll, a few other very small areas of loss at edges, one with lines drawn in in manuscript, fly-leaves soiled, some occasional soiling or spots to margins, overall plates fresh & bright.

Provenance: Early ownership inscription to title.

SECOND EDITION OF THE FIRST ACCURATE STAR ATLAS, with title page of the first edition of 1603. The first edition inconveniently printed the table of stars for each constellation to the verso of each plate. This not only made it impossible to consult the table while looking at the chart, but also, the letterpress showed through, spoiling the beauty of the plates. This problem was rectified in the second edition, which left the versos of the plates blank.

The *Uranometria* was the first book to render the maps of the constellations as an atlas, rather than as pictures, in order to present the 48 Ptolemaic constellations. Prior to Bayer, star charts used awkward verbal descriptions to identify the location of individual stars within the constellations. Bayers' great innovation was to instead use Greek nomenclature to identify the individual stars, which made locating stars with the naked eye immensely easier, a hugely helpful system at the time, as Galileo was not to introduce his greatly refined telescope for another seven years. Norman 142; Deborah Warner, *The Sky Explored: Celestial Cartography 1500-1800* pp 18-19; Zimmer 3951.

$10,000 - 15,000

SCIENTIFIC INSTRUMENTS

447

AN EIGHTEENTH CENTURY SUNDIAL.

English, second quarter 18th century, bronze horizontal sundial displaying the Equation of Time, signed "*T. Heath Fecit*," 8 inches in diameter. Fixed gnomon, the circular plate engraved with roman chapter ring enclosing ring giving the annual variation between Mean Time and Solar Time, labeled "*Watch Faster / Watch Slower,*" further engraved with a calendar ring and central compass rose labeled with cardinal and intermediate points.

Thomas Heath, a London instrument maker, worked from 1720-1753 at the sign of Hercules and Globe in the Strand.

$2,000 - 3,000

447

448

A PIERRE LE MAIRE BRASS BUTTERFIELD DIAL.

French, c.1740, signed "P le Maire a la Pierre d'Aiman," octagonal dial with inset compass rose, engraved with four hours scales and mounted with hinged gnomon with bird latitude indicator, the base engraved with European cities and their latitudes, in fitted leather case, 89 x 19 x 76 mm.

$1,000 - 1,500

448

449

A DOLLOND THREE-DRAW REFRACTING TELESCOPE.

English, late 18th century, stamped on one draw "Dollond London," the outer tube bound in shagreen, three stained green vellum drawtubes, objective with sliding brass cover, 45 x 45 x 222 mm.

$2,000 - 2,500

449

450

450 W

A RARE CULPEPER-TYPE COMPOUND MONOCULAR MICROSCOPE.

English, circa 1750, H 385 mm, attributed to James Mann of London, with brass eyepiece and sliding cover, lignum vitae body tube with green velum drawer and focusing points, outer cover of shagreen and raised on three cabriole supports above circular stage, mirror below with octagonal base with drawer fitted with a brass specimen wheel of ten apertures, fish plate, objective and stage forceps, in oak pillar case with brass ring loop handle, 203 x 457 x 203 mm.

Except for the wooden base which houses attachments, this instrument is very similar to one in the Armed Forces Institute of Pathology in Washington D.C. (item #518924-66-6196), that is signed “I. MANN Fecit.”

$12,000 - 18,000

451

451

GOLDSMITH CHANDLEE SURVEYOR'S COMPASS.

Glazed Brass Circumferentor, Winchester, Virginia, c.1800, 175 mm diameter, 367 mm length, engraved silvered dial with 8-point rose, dual inset vials, signed and with place in southern quadrants, original faded paper label on inside of lid, housed in early (original?) wooden case with two brass protractors and compass mount.
Provenance: W[illiam] Woolfolk (engraved nameplate on north compass arm). The papers of a Woolfolk family in Caroline County, Virginia are held at the College of William and Mary, which indicate that the family ran a stage line. It is known that there was a land survey done for a Paul Thilman by a Mr. Woolfolk in July 1793 in Hanover County, VA. It is likely that this was done by Thomas Woolfolk, Jr., judge and sheriff of Orange County, VA, who may have been the original owner of the compass before passing it to his son William, (the only family member known to have had a first name starting with "W").

Goldsmith Chandlee (1751-1821) was born in Nottingham, MD and apprenticed with his father Benjamin Chandlee, a notable clock and instrument maker. Goldsmith moved to Stephensburg, VA in 1775 and on to Winchester, VA, where this compass was made, in 1783. Only 22 Goldsmith Chandlee compasses are known to still exist according to the Smithsonian Museum of American History.

$12,000 - 18,000

452

453

452 W

AUZOUX, LOUIS THOMAS JEROME. 1797-1880.

Cutaway model of the human brain.

Papier-mâché with polychrome paint, cast iron stand, height 488 mm (including stand), removable panels with brass hook closures.

Provenance: Decal of "C.M. Stelting Co., Scientific Apparatus, Chicago U.S.A." on base.

Dr. Louis Auzoux was a surgeon from Normandy who was inspired by a visit to a papier-mâché workshop to start manufacturing anatomical models using the material. He opened a shop in his home town of Saint-Aubin-d'Ecrosville, and made models of human anatomical subjects, as well as zoological and botanical models.

$2,000 - 3,000

453

THOMAS E. DEXTER'S PORTABLE MUSEUM OF NATURAL SUBSTANCES.

Mahogany cabinet, 465 x 360 x 380 mm, with recessed brass carrying handle and hinged doors at the front opening to six drawers of specimens of minerals, metals, animal specimens and man-made articles, two labels on the inner doors printed *"Patronised by Her Majesty. Portable Museum of Natural Substances Raw and Manufactured from the Mineral, Vegetable and Animal Kingdoms,"* and *"Illustrative of the Imports, Exports, Productions & Manufacturers of Great Britain and her Colonies compiled by Thomas E. Dexter, Royal Military Asylum, Chelsea."* Together with an accompanying book by Dexter: *Animal and Vegetable Substances Used in the Arts and Manufactures....* London: A.N. Myers, [1860].

An amazingly varied assemblage of product specimens from the height of the British Empire. Thomas Dexter describes the cabinet in his preference to *Animal and Vegetable Substances:* "The collection will be found invaluable in pointing out the extent and variety of our import and export trade, the source of our commercial greatness, and useful in every branch of that sound and practical education which has for its object the preparation of the Pupil to enact his part in the busy scene of life" (p iv).

$2,000 - 3,000

454

455

454 W

CROCKER-WHEELER ELECTRIC MOTOR.

1/6 h.p. Direct Current Electric Motor, Ampere, N.J., 1891, cast-iron on wood base.
Provenance: H.S. Ludlow (engraved plaque on base, donated to Thomas Edison Museum in Milan, Ohio).

The plaque at the top gives the size as 1/6 D.M, the speed as 950, the amperage as .32 and the volts as 115/75.

$1,000 - 2,000

455 W

SELF-WINDING CLOCK COMPANY.

Timing Mechanism, labled "4.24.HR Circuits / 3 ½ volts / Prog. / Instmnt," Brooklyn, NY, c.1900, wood and glass cabinet containing metal and wire mechanism.

The Self Winding Clock Company was founded in 1886 after Chester Henry Pond was able to design the components of a reliable electric clock movement that utilized a motor to keep the clock wound, but also allowed for hourly correction via a telegraph signal from a master clock calibrated to the US Naval Observatory. The present item is a timing mechanism possibly used in an institution such as a bank, judging by the attractive cabinetry work, for timing the alarm.

$2,500 - 3,500

456

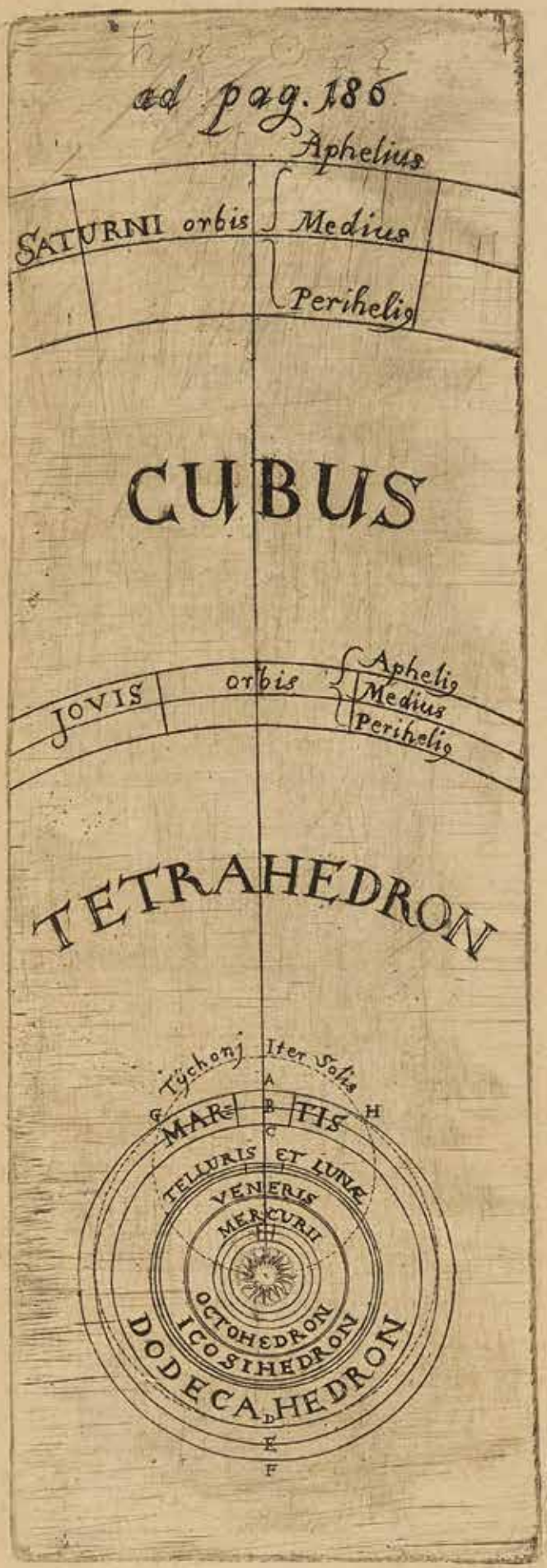
456 W

HOUDON, JEAN ANTOINE, AFTER. 1741-1828.

Full-size bronze sculpture of *L'ecorche* [Anatomical Man], cast from a composition of original parts by Paul Cavanaugh at the Paul King Foundry, stamped ("Gorham Founders"), 1900 x 1240 x 540mm. *Provenance:* Purchased from Paul Cavanagh, at the Paul King Foundry.

FULL-SIZE BRONZE CASTING OF HOUDON'S FAMED L'ECORCHE, created from castings of parts by Paul Cavanagh of the Paul King Foundry. Known as the "Flayed Man," and often referred to later as "Anatomical Man," the work is one of Houdon's most recognizable, and the creation of this piece was a 10-year labor of love by a prominent bronze artisan. After locating some castings of original parts at the Rhode Island School of Design, Cavanagh began a decade long search around the world for the remaining pieces to complete a close-to-authentic reproduction. In each case, he was granted permission from the owner (often institutional) to make a rubber mold of the particular piece, from which he made a plaster copy. Once he had located and molded each piece to form the full figure, he arranged the plasters, molded it, and finally cast it into bronze.
Paul Cavanagh is the founder of the Paul King Foundry in Providence, RI, and has worked with Paul Manship, Anna Hyatt Huntington, Jose Buscaglia, and Robert Shure, among others.

$10,000 - 15,000



Books and Manuscripts

Lots 457-485

Georg Freyherrn von Vega,

Landes-Mitstands des Herzogthums Krain, Ritters des mil. M. Th. Ordens,
Oberst-Lieutenants des k. k. vierten Feldartillerie-Regiments,
Mitgliedes der gelehrten Gesellschaften zu Berlin,
Erfurt, Göttingen und Prag,

Vorlesungen

über die

Mathematik

sowohl überhaupt zu mehrerer Verbreitung mathematischer
Kenntnisse in den k. k. Staaten, als auch insbesondere
zum Gebrauche des k. k. Artillerie-Corps.

Erster Band

die

Rechenkunst und Algebra

enthaltend.

Bolyai Gánosé mk.

Dritte, verbesserte Auflage.

Wien,

bey Christian Friedrich Wappler und Beck.

1802.

457

457

[BOLYAI, JANOS. 1802-1860.]

Vega, Georg Freyherrn von. 1754-1802. *Vorlesungen über die Mathematik ... Erster band.* Vienna: Wappler & Beck, 1802. 8vo. Contemporary calf-backed marbled boards, wear to joints and corners, rubbing to boards.

Provenance: Károly Szász (1798-1853, ink signature to title page, contemporary marginalia to 2 pages, likely in his autograph); János Bolyai (ink signature to endpaper, dated 1823; ink signature to title page); Farkas Sandorz (later ink signature).

A CRITICAL ARTIFACT OF THE DEVELOPMENT OF NON-EUCLIDEAN GEOMETRY, ONE OF THE MOST PROFOUND DEVELOPMENTS IN SCIENTIFIC HISTORY: THE JANOS BOLYAI-KAROLY SZASZ COPY OF VEGA'S LECTURES, WITH THE AUTOGRAPH OF BOTH.

"I HAVE CREATED A STRANGE NEW WORLD OUT OF NOTHING!" Janos Bolyai proclaimed in his famous 1823 letter announcing the discovery of Non-Euclidean Geometry, an achievement "every bit as significant as the Copernican revolution in astronomy, the Darwinian revolution in biology, or the Newtonian or 20th-century revolution in physics" (Coxeter, p viii). It would be almost 10 years before Bolyai's discovery appeared in print, a short treatise in Latin appended to a larger mathematical work by his father, Farkhas Bolyai, titled Appendix, Scientiam Spatii absolute..., translated to English as "The Science of Absolute Space." Given such an obscure beginning, it is hardly surprising that it would be decades before Janos's treatise gained any real attention and found the recognition it rightfully deserved. In 1891, Janos's short treatise was finally translated into English, and translator and mathematician G.B. Halsted recognized Bolyai's appendix as "the most extraordinary two dozen pages in the whole history of thought!" (Halsted, p XVIII).

As a young student in Vienna, Janos befriended a slightly older student, Károly Szász, who shared his passion for mathematics. The two began to explore Euclid's parallel postulate, even as his father warned him in a letter, "I have traversed this bottomless night, which extinguished all light and joy in my life. I entreat you, leave the science of parallels alone ...." It was Szasz, an unsung hero of scientific history, who first conceived the important and central non-Euclidean concept of the "asymptotic parallel." "From the conversations of the two friends were also derived the conception of the line equidistant from a straight line and the other most important idea of the Paracycle" (Bonola, p 97). Armed with such a new generalized conception of lines and curves, together they came to the enormous insight that Euclid's parallel postulate is true only when the paracycle is taken to be a straight line. When Szasz left Vienna in early 1821 to teach Law in Hungary, Bolyai carried their joint speculations further – both formally demonstrating the logical independence of the parallel postulate and further proving the validity and non-contradictory nature of the alternative non-Euclidean hyperbolic geometry.

Bolyai's breakthrough to non-Euclidean geometry in 1823 precedes Lobachevsky's related insight into hyperbolic geometry circa 1826. He clearly outlined the substance of his discovery in an 1825 letter to his father, and in 1826 he also sent a full statement of his new system of thought to one of his former professors, Wolther von Eckwehr. Unfortunately, both of these autograph statements are now lost. Farkhas had conceptual difficulties with Janos' generalization of geometry, and von Eckwehr never responded to the manuscript he received – with the result that Lobachevsky's work on non-Euclidean hyperbolic geometry saw print (in 1829-30) before Bolyai's work was actually published. However, despite the 1832 publication date of Bolyai's work, the manuscript was completed and authorized at the printer by 1829. Farkhas Bolyai himself refers to his *Tentamen* as "a latin work of 1829" (*Kurzer Grundriss eines Versuchs*, Târgu Mureş, 1851). Recognizing the ambiguity of the historical situation, historians of mathematics are inclined to acknowledge the respective merit of each man's achievement; and in a spirit of compromise, hyperbolic geometry has come to be called "Bolyai-Lobachevsky geometry."

Vega's *Lectures* were enormously influential on the younger Bolyai's mathematical development, and indeed they appear to have been

the launchpoint for his non-Euclidean investigations. First printed in 1783, Vega's *Lectures* was the most popular mathematical textbook ever published in Europe (going through more than 90 editions before 1924). It was decidedly the favorite textbook of Bolyai's father Farkhas, and it was in fact the very textbook with which Farkhas trained his own son Janos. Writing to Gauss in 1816, Farkhas boasted that Janos "completely knows the first two volumes of Vega (which I use in my courses), and he is also well versed in the third and fourth volumes." In fact, Bolyai's autograph note on his own copy of the *Tentamen,* suggests that it was an 1807 edition of Vega's *Lectures,* specifically von Hoffmann's *Critik Der Parallel-Theorie* in the second volume, that that initially stimulated Janos' interest in the parallel postulate.

Autograph material relating to the discovery of non-Euclidean geometry is of utmost raity in the marketplace, with no auction sales of such material recorded in the last 40 years. The bulk of Bolyai's manuscripts are preserved at the Teleki library (in Marosvasarhely, Romania), with a few of his books, and another small collection of books at the Hungarian Academy of Sciences in Budapest. This association copy of Vega's "*Lectures*," a book which had a profound effect on the young mathematician, contains both the autograph of Bolyai, as well as that of his early partner in the exploration of the parallel postulate, Karoly Szasz. A REMARKABLE DISCOVERY FROM BOLYAI'S PERSONAL LIBRARY, AUTOGRAPHED AND DATED IN THE YEAR OF HIS DISCOVERY OF NON-EUCLIDEAN GEOMETRY.

Bonola, Roberto. *Non-Euclidean Geometry*, New York, 1958; Coxeter, H.S.M. "Introduction" to Richard Trudeau's *The Non-Euclidean Revolution*, Boston, 1987; Halsted, G.B. "Translator's Introduction," *The Science of Absolute Space*, Austin, 1896; Snygg, John. *A New Approach to Differential Geometry*, New York, 2012.

$60,000 - 90,000

458

458

CHURCH, ALONZO. 1903-1995.

Collection of approximately 28 offprints and lecture notes, including:
1. *A Note on the Entscheidungsproblem.* Offprint from: *The Journal of Symbolic Logic,* vol 1, no 1, March 1936.
2. *Correction to A Note on the Entscheidungsproblem.* Offprint from: *The Journal of Symbolic Logic,* vol 1, no 3, September 1936.
3. *On Irredundant Sets of Postulates.* Offprint from: *Transactions of the American Mathematical Society,* vol 27, no 3, July 1925.
4. *On Irredundant Sets of Postulates.* Offprint from: *Bulletin of the American Mathematical Society,* November-December 1926.
5. *Alternatives to Zermelo's Assumption.* Offprint from: *Transactions of the American Mathematical Society,* vol 29, no 1, January 1927.
6. *Principia: Volumes II and III.* Offprint from: *Bulletin of the American Mathematical Society,* March-April 1928.
7. With Kleene, S.C. *Formal Definites on the Theory of Ordinal Numbers.* Offprint from: *Fundamenta Mathematicae,* vol XXVIII, 1936.
8. With Rosser, J.B. *Some Properties of Conversion.* Offprint from: *Transactions of the American Mathematical Society,* vol 39, no 3, May 1936.
9. *The Constructive Second Number Class.* Offprint from: *Bulletin of the American Mathematical Society,* April 1938.
10. *On the Concept of a Random Sequence.* Offprint from: *Bulletin of the American Mathematical Society,* February 1940.
Provenance: Collection of Dr. Martin Davis, with his occasional notes.

$1,200 - 1,800

459

459

DARWIN, CHARLES. 1809-1882.

The Descent of Man, and Selection in Relation to Sex. London: John Murray, 1871.
2 volumes. 8vo (184 x 120 mm). viii, 423, [1], 16 [adverts]; viii, [2], 475, [1], 16 [adverts dated January, 1871] pp. Illustrated. Original green cloth, spine stamped in gilt, edges trimmed; custom cloth chemise and green morocco-backed slipcase. A few faint spots mainly to preliminary and final leaves of first volume, ownership signature to second volume, volume 1 with rear hinge partially cracked before endpapers, spines somewhat darkened, head and tail of spine, corners and joints lightly rubbed, excellent copy overall.
Provenance: William Erasmus Darwin, son of Charles Darwin (bookplate in each volume).

FIRST EDITION, PRESENTATION COPY TO DARWIN'S SON.
Presentation issue with edges trimmed, "transmitted" first word in vol I, p 297, errata on verso of second volume title. Includes the first appearance of the word "evolution" in Darwin's works. William Erasmus Darwin wrote to his father on February 19, 1871 acknowledging receipt of the above work, mentioning: *"It is a very neatly got up book, and I like the plain white edges. Please keep all reviews and letters about it till I have seen them. The reviews will be fine fun no doubt."* Charles Darwin had favored machine-cut edges as they kept dust from collecting as much as they do as those cut with a paper knife. He wasn't able to convince his conservative publishers to have the edges cut on the regular edition, but was able to convince them to do so on the presentation copies. Garrison & Morton 170; Freeman 937.

$6,000 - 9,000

460

460

DARWIN, CHARLES. 1809-1882.

Signature ("Charles Darwin"), 19 x 70 mm (viewable), on paper, n.p., n.d., fine, framed with albumen print cartes-de-visite, by Herbert Rose Barraud, London, [1881], identified in pen on lower margin, evenly toned, edgewear.

A clean example of Darwin's signature paired with what is generally thought to be the last portrait of Darwin, taken before his death the following year.

$1,000 - 2,000

461

EDISON, THOMAS ALVA. 1847-1931.

Typed Letter Signed ("Thos A Edison"), 1 p, 4to, Orange, NJ, December 25, 1926, to Jesse L. Lasky, Jr., thanking him for sending a copy of his book of poetry, on Edison's letterhead, fold creases, adhesive residue on verso, minor spotting.
Provenance: Pat Silver-Lasky.

"*I did not know that there was a poet in your family. But, come to think of it, your father is far from lacking in imagination.*" Jesse Lasky, Jr. wrote 3 books of poetry, as well as 8 novels, 5 plays, and more than 50 screenplays. He was the son of film producer Jesse Lasky, who got his start in Broadway musicals, then teamed up with Cecil B. DeMille to produce films in Los Angeles. Edison had a hand in the motion picture industry himself, manufacturing cameras of his own design and establishing the Motion Picture Patents Company and the General Film Company in 1908 in order to dominate the production and distribution of films. This brought about an antitrust investigation which led to the breakup of the two companies in 1915.

$800 - 1,200


From the Laboratory of
Thomas A. Edison
Orange, N.J.

461

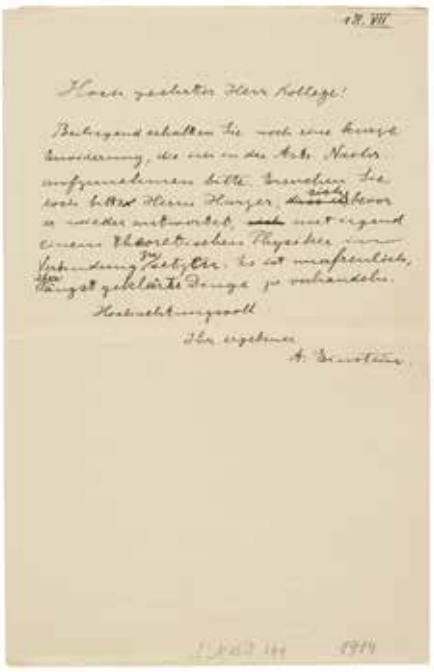
462

EINSTEIN, ALBERT. 1879-1955.

Autograph Letter Signed ("A. Einstein"), in German, 1 p, 4to, [Berlin], July 18, [1914], to an unnamed colleague, black ink on a folded sheet, some minor wrinkling.

Einstein's cover letter probably to the editor of the *Astronomischen Nachrichten* (Astronomical News) Hermann Kobold. Einstein is commenting on an article by Paul Harzer and is asking to print his short reply in their publication. Einstein is recommending that Harzer should get advice from a theoretical physicist. "*It is rather tedious to keep debating over matters which long since been settled.*" Paul Harzer (1857–1932) was a mathematician and astronomer best known for his papers arguing with Albert Einstein regarding the Sagnac effect and its relationship to Special Relativity.

$1,000 - 1,500



462

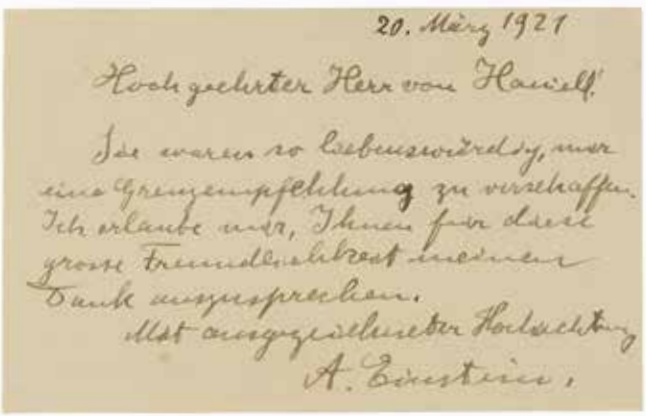
463

EINSTEIN, ALBERT. 1879-1955.

Autograph Note Signed ("A. Einstein"), in German, 1 p, 16mo, [Berlin], March 20, 1921, to Edgar von Haniel, black ink on verso of calling card.

Einstein thanks Edgar Haniel von Haimhausen (1870-1935) of the Foreign Office in Germany for the border travel recommendation ("Grenzempfehlung") for *HIS FIRST TRIP TO THE UNITED STATES*. It was in part a fundraising trip with Chaim Weizman, for the foundation of Hebrew University in Jerusalem. During his journey Einstein meet President Warren G. Harding and spoke to more than 8,000 people at the Sixth-ninth Regiment Armory in Manhattan.

$3,000 - 4,000


20. März 1921

Hochgeehrter Herr von Haniel!

Sie waren so liebenswürdig, mir eine Grenzempfehlung zu verschaffen. Ich erlaube mir, Ihnen für diese grosse Freundlichkeit meinen Dank auszusprechen.

Mit ausgezeichneter Hochachtung

A. Einstein.

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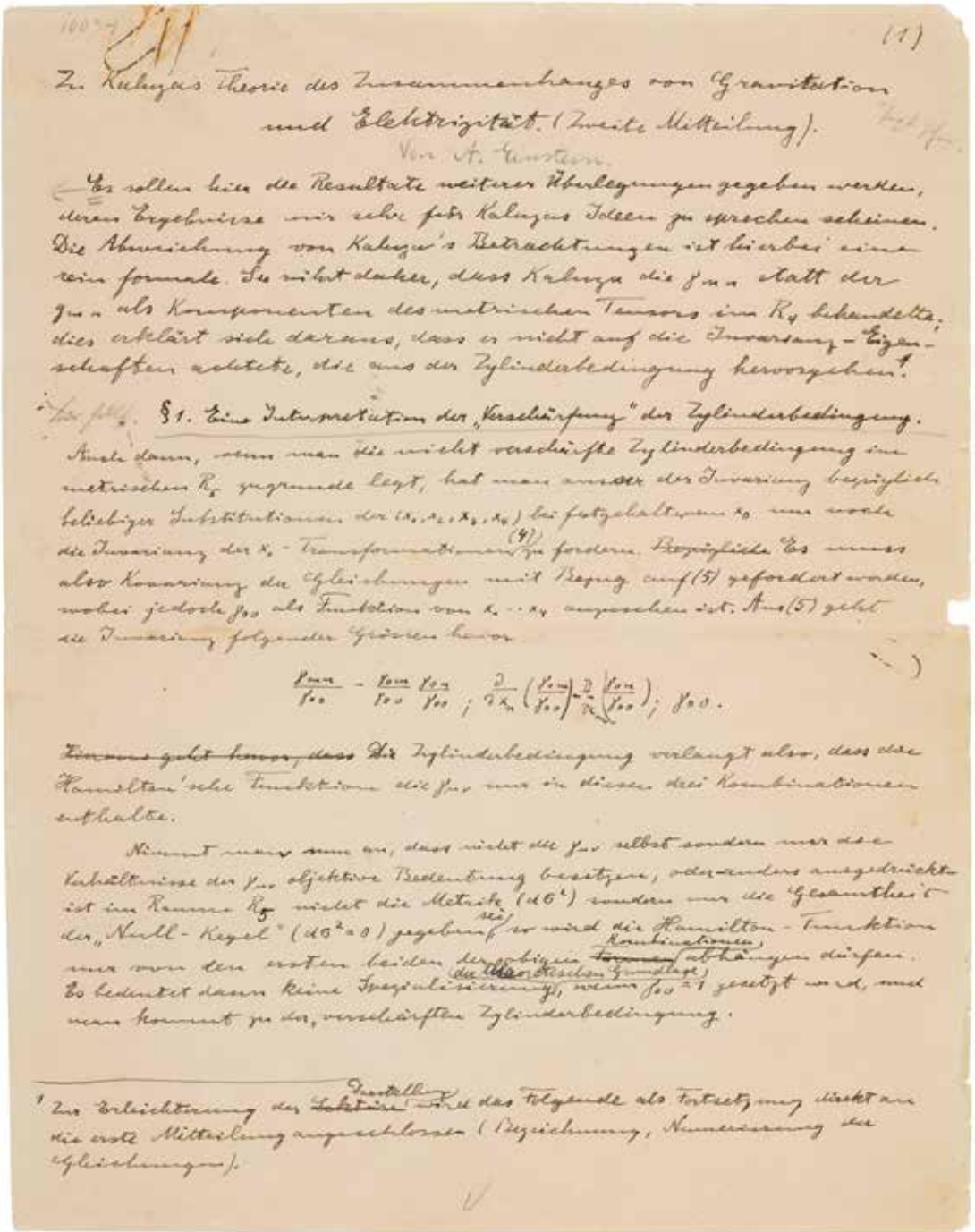

Zu Kaluzas Theorie des Zusammenhanges von Gravitation und Elektrizität. (Zweite Mitteilung).

Von A. Einstein.

Es sollen hier die Resultate weiterer Überlegungen gegeben werden, deren Ergebnisse mir sehr für Kaluzas Ideen zu sprechen scheinen. Die Abweichung von Kaluza's Betrachtungen ist hierbei eine rein formale. Sie rührt daher, dass Kaluza die $g_{\mu\nu}$ statt der $g_{\mu\nu}$ als Komponenten des metrischen Tensors im R_5 behandelte; dies erklärt viele daraus, dass er nicht auf die Invarianz-Eigenschaften achtete, die aus der Zylinderbedingung hervorgehen.[1]

§1. Eine Interpretation der „Verschärfung" der Zylinderbedingung.

Auch dann, wenn man die nicht verschärfte Zylinderbedingung im metrischen R_5 zugrunde legt, hat man ausser der Invarianz bezüglich beliebiger Substitutionen der (x_1, x_2, x_3, x_4) bei festgehaltenem x_0 noch die Invarianz der x_0-Transformationen zu fordern. Bezüglich (4) Es muss also Kovarianz der Gleichungen mit Bezug auf (5) gefordert werden, wobei jedoch g_{00} als Funktion von $x_1 \ldots x_4$ anzusehen ist. Aus (5) geht die Invarianz folgender Grössen hervor

$$\frac{g_{\mu\nu}}{g_{00}} - \frac{g_{0\mu}}{g_{00}}\frac{g_{0\nu}}{g_{00}}\,; \quad \frac{\partial}{\partial x_\alpha}\left(\frac{g_{\mu\nu}}{g_{00}}\right) - \frac{\partial}{\partial x_\beta}\left(\frac{g_{0\mu}}{g_{00}}\right)\,; \quad g_{00}.$$

~~Daraus geht hervor, dass~~ Die Zylinderbedingung verlangt also, dass die Hamilton'sche Funktion die $g_{\mu\nu}$ nur in diesen drei Kombinationen enthalte.

Nimmt man nun an, dass nicht die $g_{\mu\nu}$ selbst sondern nur die Verhältnisse der $g_{\mu\nu}$ objektive Bedeutung besitzen, oder anders ausgedrückt ist im Raume R_5 nicht die Metrik (ds^2) sondern nur die Gesamtheit der „Null-Kegel" $(ds^2 = 0)$ gegeben, so wird die Hamilton-Funktion nur von den ersten beiden der obigen Kombinationen ~~Formen~~ (der Verhältnisse) abhängen dürfen. Es bedeutet dann keine Spezialisierung, wenn $g_{00} = 1$ gesetzt wird, und man kommt zu der verschärften Zylinderbedingung.

[1] Zur Erleichterung der ~~Lektüre~~ Darstellung ist das Folgende als Fortsetzung direkt an die erste Mitteilung angeschlossen (Bezeichnung, Numerierung der Gleichungen).

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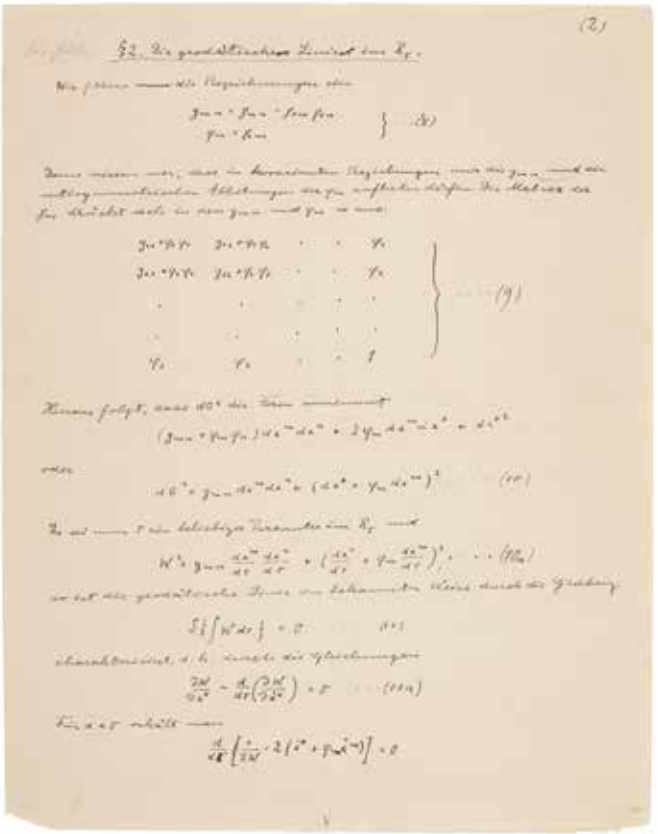
EINSTEIN, ALBERT. 1879-1955.

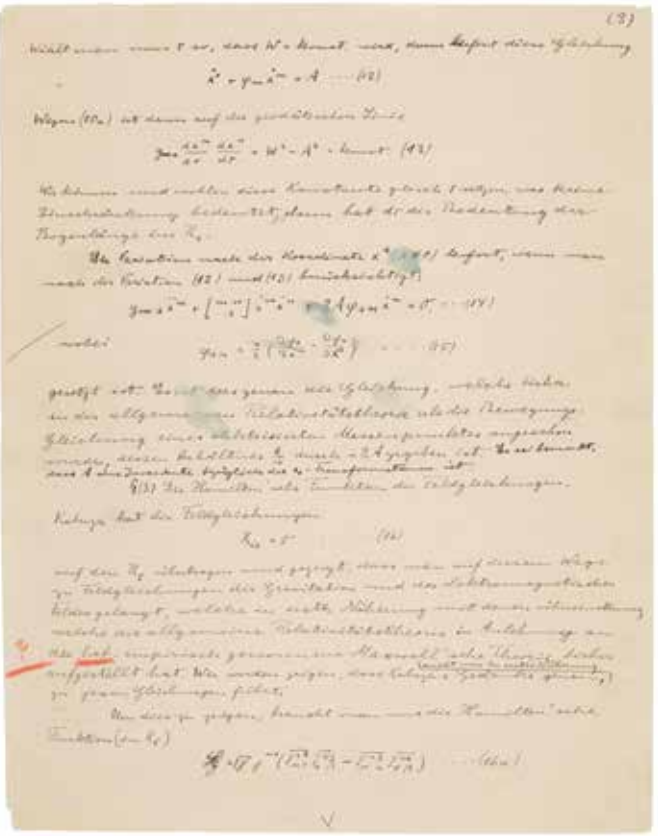
Autograph Manuscript in German signed twice ("A. Einstein," in pencil at beginning of p 1 and in ink at end of p 4), 4 pp, black ink on paper watermarked "M.K. Papier," 4to, [c.1925-27], entitled "*Zu Kaluzas Theorie des Zusammenhanges von Gravitation und Elektrizität (Zweite Mitteilung)*" ("*On Kaluza's Theory of the Connection between Gravitation and Electricity (second article*"), comprising the principal parts pages 26-29 ½ (of 30 ½) of the printed article published in *Sitzung der physikalisch-mathematischen Klasse vom 17. Februar 1927,* various corrections and crossed out sentences in pencil, a few ink splotches, first leaf with paperclip rust mark and minimal fraying at right edge.

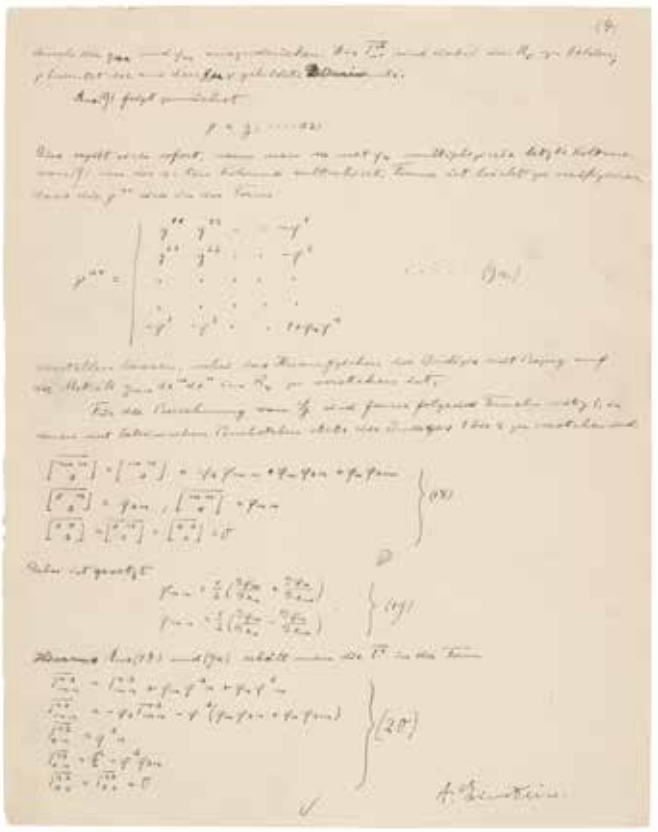
Provenance: Morris Rafael Cohen (1880-1947) philosopher of science (recipient of the manuscript from Einstein, according to Charles Hamilton Auction); Charles Hamilton Auction Number 75, (sold 21 February 1974, lot 157); Bonhams New York (sold 22 June 2011, lot 1073).

EINSTEIN WORKS TOWARDS A UNIFIED FIELD THEORY.

"The intellect seeking after an integrated theory cannot rest content with the assumption that there exist two distinct fields totally independent of each other by their nature" (Einstein Nobel lecture, 1923).



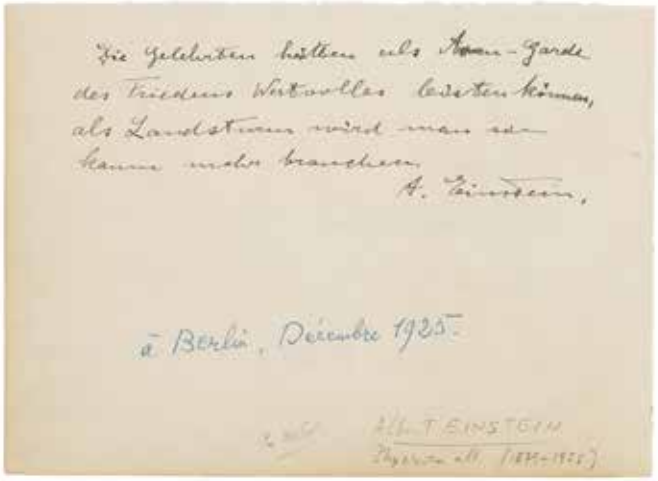




The last three decades of his life Einstein worked in theoretical physics towards the study of the Unified Field Theory. Einstein's manuscript deals with an extension of Kaluzas' ideas on the mathematical theory of space and matter. It is an attempt to extend Maxwell's field theory toward a unified mathematical concept of gravitation electricity, and matter. Einstein "published two papers on Kaluza's five-dimensional theory in which he showed that Kaluza's original results can also be obtained without the restriction to weak gravitational fields and slow velocities" (*Cambridge Companion to Einstein*, p 294). Einstein recognizes that "in Kaluza's theory the fifth dimension was introduced only in order to obtain new components of the metric tensor representing the electromagnetic field. Kaluza assumes the dependence of the field variables on the four coordinates x^1 x^2, x^3, x^4 and not the fifth coordinate x^0 when a suitable coordinate system is chosen" (Einstein, "On a Generalization of Kaluza's Theory of Electricity," in *Annals of Mathematics,* 3 July 1938, p 683).

"Recently there has been a resurgence of interest in trying to find a unifying force in nature. A growing number of scientists—Stephen Hawking, for one—believe that Einstein was not chasing a dream, that there may well be a unifying principle linking gravity with electromagnetism and both the strong and weak nuclear forces. This attempt at unification is the main theme in physics today, as Einstein believed, says Nobelist Chen Ning Yang." John Wheeler remarked: "Einstein's unified flied theory has come to life in an absolutely spectacular form in the last decade in superstring theory..." (Brian, *Einstein, A Life,* p 432).

$150,000 - 200,000



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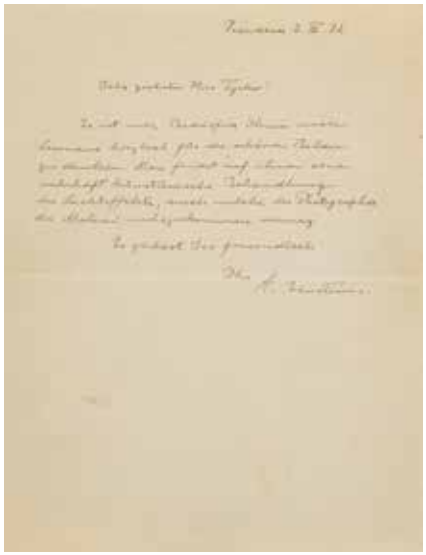
465
EINSTEIN, ALBERT. 1879-1955.
Autograph Note Signed ("A. Einstein"), in German, 1 p, 16mo, [Berlin, December, 1925], black ink on paper a half sheet, extracted from an album amicorum.

Einstein's philosophical sentiment for an album amicorum: "*As an avant-garde of peace, scholars would have achieved something valuable, they are not needed as a last defense.*" ("*Die Gelehrten haetten als Avan-Garde des Friedens Wertvolles leisten konnen als Landsturm wird man sie kaum mehr brauchen.*") Written according to a note at the foot of the page in Berlin in 1925.

$800 - 1,200



466

466
EINSTEIN, ALBERT. 1879-1955.
Autograph Letter Signed ("A. Einstein"), in German, 1 p, 8vo, Pasadena, March 2, 1932, to the photographer Aaron Tycko, black ink on a folded sheet.

Einstein was very fond of the portrait photographs Aaron Tycko took of him and occasionally gave signed copies to friends and admirers. This letter shows Einstein's understanding of photography and the importance of lighting: "*One finds in them a truly artistic treatment of the light effect through which photography approximates the art of painting.*" ("*Man findet auf ihnen eine wahrhaft kuenstlerische Behandlung der Lichteffekte, durch welche die Photographie der Malerei nahezukommen vermag.*")

$4,000 - 6,000

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467
EINSTEIN, ALBERT. 1879-1955.
Typed Letter Signed ("A. Einstein"), in German, 1 p, 4to, Princeton, March 1, 1935, to Jesse Mendheim.

A "*DISGRACEFUL MONUMENT OF GERMAN BARBARISM.*" Einstein comments on the German weekly newspaper *Der Stürmer* ("The Stormer/Attacker/Striker") published from 1923 to the end of World War II. It was a significant part of Nazi propaganda and vehemently anti-Semitic. Einstein had a large number of issues received directly from the editorial office of the Striker and writes: "*it would be very beneficial if my collection could be used to inform the local non-Jewish circles about the true nature of Hitler's regime. In my opinion, there is not enough happening here in that direction.*" With the mailing envelope.

$2,000 - 3,000

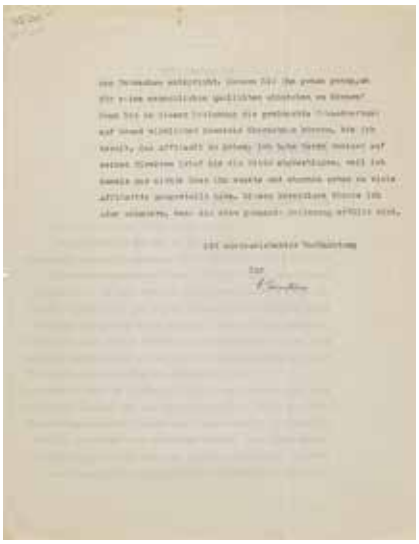
468

EINSTEIN, ALBERT. 1879-1955.

Typed Letter Signed ("A. Einstein") in German, 2 pp, 4to, Princeton, 1 June, 1938, to Josef Duenner, on his blind embossed Mercer Street letterhead.

Einstein is considering the sponsorship of a Mr. Roniger and is looking for a character reference before he signs an affidavit. The letter shows Einstein's deep involvement with the emigrant community and his careful consideration when giving an affidavit: "*But before I hand out an affidavit to someone, I must also be sure that I am dealing with a humanly irreproachable person, since he can make use of my sponsorship after he has immigrated to this country. Naturally, I take this responsibility very seriously.*" The recipient Josef Duenner was working for the American Jewish Joint Distribution Committee.

$1,000 - 1,500



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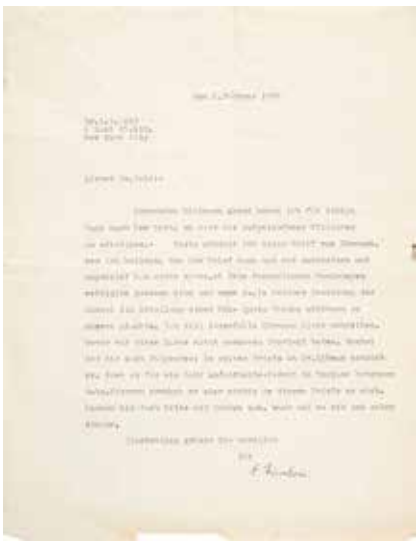
469

EINSTEIN, ALBERT. 1879-1955.

Typed Letter Signed ("A. Einstein"), in German, 1 p, 4to, Princeton, February 5, 1939, to Dr. Isidore Held, on blindstamped letterhead, wrinkled, tiny tears at bottom edges, old folding creases, staple holes at top edge.

Einstein writes to his friend Dr. Isidore Held (1876-1947) to arrange an upcoming meeting in the city and to discuss the situation of the German physician Rudolf Ehrmann, at one time Einstein's personal physician. Einstein encloses a letter from Ehrmann (not present) which he characterizes as "*short and imprecise*," and complains that one cannot see "*whether friendly efforts have been unsuccessful, and if so, why the consul saw fit to refuse granting a non-quota visa.*" He goes on to mention confusion over why, "*in his letter to Dr. Libman, he wrote that he received a permit for one years' residence in England. But he mentioned nothing of this in his letter to me.*" Einstein and Held were ultimately successful in helping Ehrmann and his family obtain visas, and they arrived in the United States later that same year.
An Austrian by birth and a physician at Beth Israel Hospital in New York, Held (1876-1947) became friends with Einstein through their efforts to help doctors and other members of the scientific community to emigrate from Nazi Germany and occupied territories.

$2,000 - 3,000



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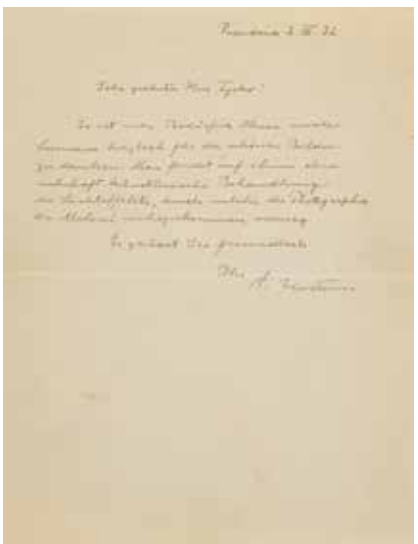
EINSTEIN, ALBERT. 1879-1955.

Typed Letter Signed ("A. Einstein") 1 p, 4to, Princeton, 23 May, 1939, to Mrs. Allen I. Dunn, on Institute for Advanced Study letterhead.

EINSTEIN EXPLAINS HIS UNIFIED FIELD THEORY, in this cover letter to Mrs. Dunn sending a copy of his offprint on Unified Field Theory (see below). "*Under separate cover I am sending you for your husband a copy of my paper concerning the unified field theory. It is a general scheme that gives hope to understand the structure of the elementary particles. It is not yet known to me whether it will really give the correct solution of the problem, not having been able till now to integrate these equations satisfactorily.*" WITH: EINSTEIN, ALBERT and PETER BERGMANN (1915-2002). "On a Generalization of Kaluza's Theory of Electricity." From: *Annals of Mathematics,* 3 July, 1938. 8vo. Original wrappers.

$3,000 - 5,000



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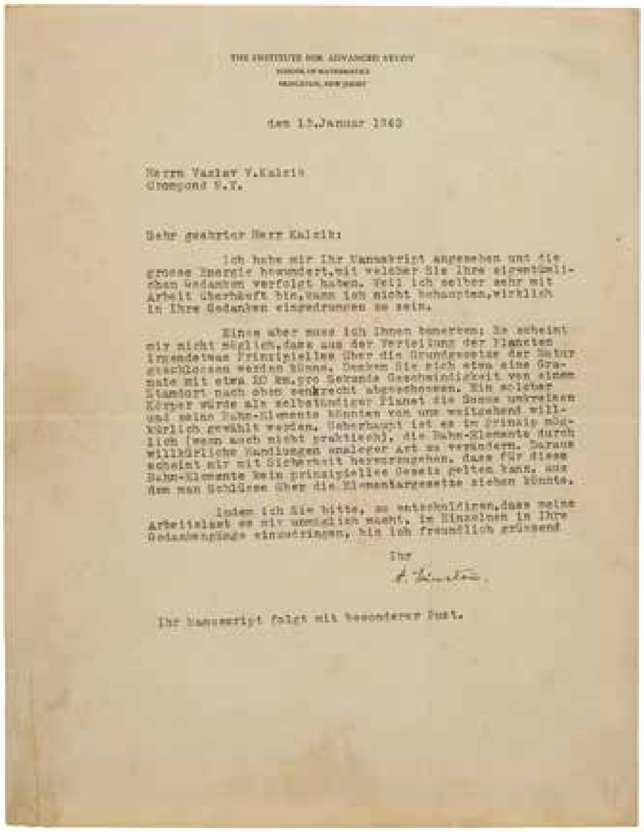

THE INSTITUTE FOR ADVANCED STUDY
SCHOOL OF MATHEMATICS
PRINCETON, NEW JERSEY

den 13.Januar 1942

Herrn Vaclav V.Kalcik
Crompond N.Y.

Sehr geehrter Herr Kalcik:

Ich habe mir Ihr Manuskript angesehen und die grosse Energie bewundert,mit welcher Sie Ihre eigentümlichen Gedanken verfolgt haben. Weil ich selber sehr mit Arbeit überhäuft bin,kann ich nicht behaupten,wirklich in Ihre Gedanken eingedrungen zu sein.

Eines aber muss ich Ihnen bemerken: Es scheint mir nicht möglich,dass aus der Verteilung der Planeten irgendetwas Prinzipielles über die Grundgesetze der Natur geschlossen werden könne. Denken Sie sich etwa eine Granate mit etwa 20 km.pro Sekunde Geschwindigkeit von einem Standort nach oben senkrecht abgeschossen. Ein solcher Körper würde als selbständiger Planet die Sonne umkreisen und seine Bahn-Elemente könnten von uns weitgehend willkürlich gewählt werden. Ueberhaupt ist es im Prinzip möglich (wenn auch nicht praktisch), die Bahn-Elemente durch willkürliche Handlungen analoger Art zu verändern. Daraus scheint mir mit Sicherheit hervorzugehen, dass für diese Bahn-Elemente kein prinzipielles Gesetz gelten kann, aus dem man Schlüsse über die Elementargesetze ziehen könnte.

Indem ich Sie bitte, zu entschuldigen,dass meine Arbeitslast es mir unmöglich macht, im Einzelnen in Ihre Gedankengänge einzudringen, bin ich freundlich grüssend

Ihr

A. Einstein.

Ihr Manuskript folgt mit besonderer Post.

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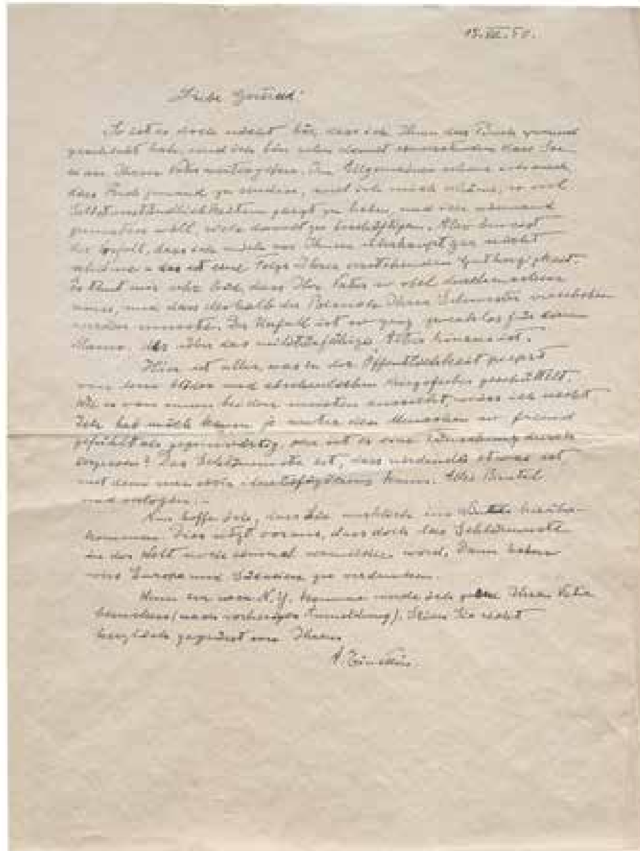

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EINSTEIN, ALBERT. 1879-1955.

Typed Letter Signed ("A. Einstein") 1 p, 4to, Princeton, 13 January, 1942, to Vaclav V. Kalcik, on Institute for Advanced Study letterhead, short closed tear, some light staining a few folds.

A patient Einstein response to confused theories presented in a manuscript by Kalcik: "*I have studied your manuscript and admire the energy you have invested to follow through with your peculiar thoughts....*" Einstein apologizes for not being able to comment in greater detail because of his own work load and remarks: "*But one thing I have to note: It does not seem possible to me, that we can infer fundamental principles of nature through the distribution of the planets.*"

$3,000 - 4,000

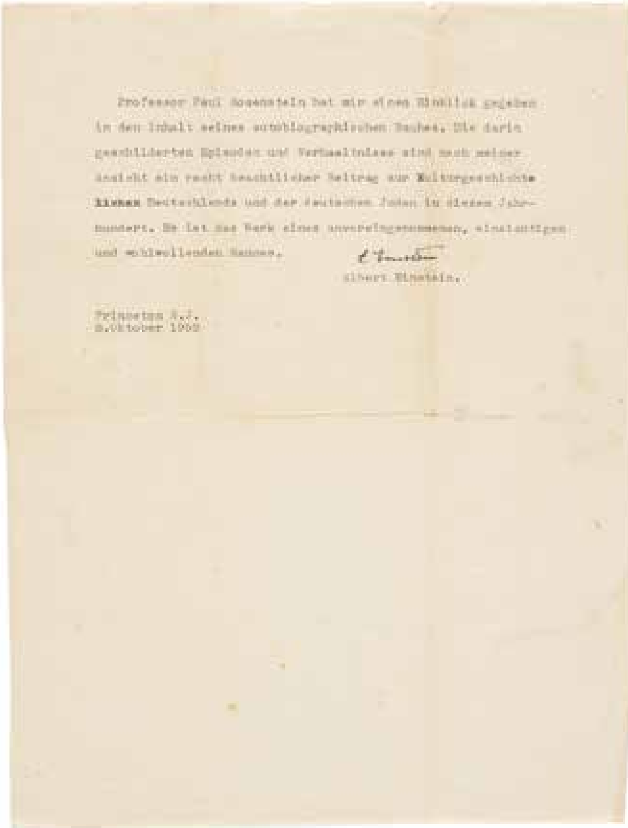
472

EINSTEIN, ALBERT. 1879-1955.

Autograph Letter Signed ("A. Einstein"), in German, 1 p, 4to, n.p., July 15, 1950, to Gertrud Warschauer, blue ink on a folded sheet.

Einstein clearly states his dismay about the McCarty era: "*I hardly ever felt as alienated from people as I do right now ... The worst is that nowhere is there anything with which one can identify. Brutality and lies are everywhere.*" Einstein's friend Gertrud Warschauer, the widow of a Berlin rabbi, escaped from Germany to London.

$6,000 - 9,000



Professor Paul Rosenstein hat mir einen Einblick gegeben in den Inhalt seines autobiographischen Buches. Die darin geschilderten Episoden und Verhaeltnisse sind nach meiner Ansicht ein recht beachtlicher Beitrag zur Kulturgeschichte Deutschlands und der deutschen Juden in diesem Jahrhundert. Es ist das Werk eines unvoreingenommenen, einsichtigen und wohlwollenden Mannes.

A. Einstein

Albert Einstein.

Princeton N.J.
8.Oktober 1952

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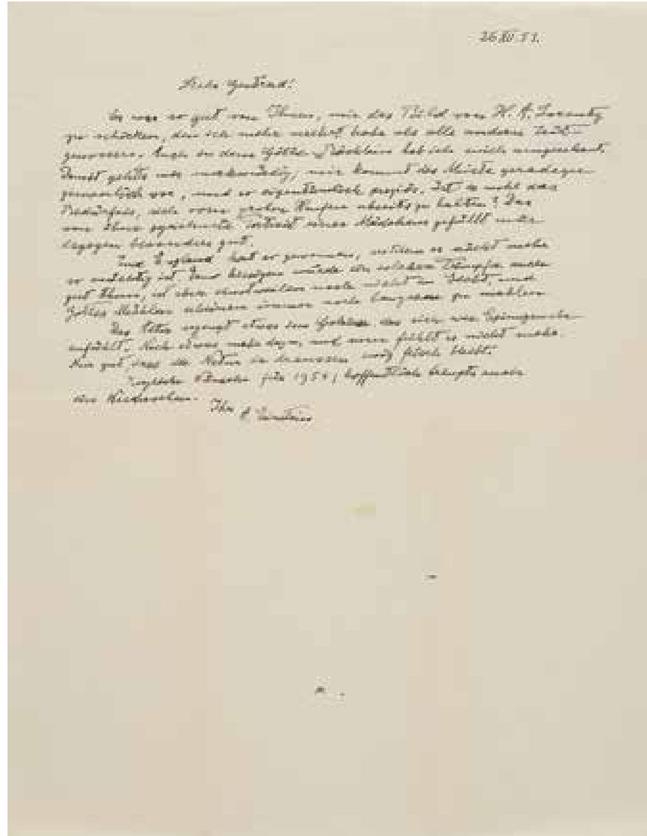

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EINSTEIN, ALBERT. 1879-1955.

Typed Letter Signed ("A. Einstein") in German, 1 p, 4to, Princeton, N.J. 8 October, 1952, a note recommending Professor Paul Rosenstein's autobiography, mailing folds.

Einstein's favorable recommendation reads: "*Professor Paul Rosenstein has given me an insight into the content of his autobiographical book. The episodes and circumstances outlined in it are, in my opinion, a rather considerable contribution to the cultural history of Germany and the German Jews in this century. It is the work of an unbiased, understanding and benevolent man*." Paul Rosenstein (1875-1964) a well established German-Jewish urologist and head of the surgical department of the Berlin Jewish Hospital until 1938, fled Nazi Germany and emigrated to Brazil (Rio de Janeiro) in 1940. His autobiography, *Narben bleiben zurück : Die Lebenserinnerungen des grossen jüdischen Chirurgen*, was published in Germany in 1954. Einstein's recommendation was printed and loosely inserted into the first edition.

$2,000 - 3,000

474

EINSTEIN, ALBERT. 1879-1955.

Autograph Letter Signed ("A. Einstein"), in German, 1 p, 4to, N.p., December 26, 1953, to Gertrud Warschauer, blue ink on a folded sheet.

An insightful Einstein letter to his friend Gertrud Warschauer. He comments on the political situation in the United States: "*Your England has gained so much since it is not so mighty anymore. This one [i.e. the United States] could use such a damper as well, but for now it's not in sight and God's mills still appear to grind slowly.*" Einstein also notes that "*Age produces something in the brain that feels like a cobwebs,*" and remarks that Goethe's writing "*makes me feel peculiar: most of it appears outright prim and so strangely delicate. Could it be the desire to keep apart from the crude masses?*"

$6,000 - 9,000


May 5, 1982.
To my friend
Al Seckel.

Feynman's Preface

These are the lectures in physics that I gave last year and the year before to the freshman and sophomore classes at Caltech. The lectures are, of course, not verbatim—they have been edited, sometimes extensively and sometimes less so. The lectures form only part of the complete course. The whole group of 180 students gathered in a big lecture room twice a week to hear these lectures and then they broke up into small groups of 15 to 20 students in recitation sections under the guidance of a teaching assistant. In addition, there was a laboratory session once a week.

The special problem we tried to get at with these lectures was to maintain the interest of the very enthusiastic and rather smart students coming out of the high schools and into Caltech. They have heard a lot about how interesting and exciting physics is—the theory of relativity, quantum mechanics, and other modern ideas. By the end of two years of our previous course, many would be very discouraged because there were really very few grand, new, modern ideas presented to them. They were made to study inclined planes, electrostatics, and so forth, and after two years it was quite stultifying. The problem was whether or not we could make a course which would save the more advanced and excited student by maintaining his enthusiasm.

The lectures here are not in any way meant to be a survey course, but are very serious. I thought to address them to the most intelligent in the class and to make sure, if possible, that even the most intelligent student was unable to completely encompass everything that was in the lectures—by putting in suggestions of applications of the ideas and concepts in various directions outside the main line of attack. For this reason, though, I tried very hard to make all the statements as accurate as possible, to point out in every case where the equations and ideas fitted into the body of physics, and how—what they learned more—things would be modified. I also felt that for such students it is important to indicate what it is that they should—if they are sufficiently clever—be able to understand by deduction from what has been said before, and what is being put in as something new. When new ideas came in, I would try either to deduce them if they were deducible, or to explain that it was a new idea which hadn't any basis in terms of things they had already learned and which was not supposed to be provable—but was just added in.

At the start of these lectures, I assumed that the students knew something when they came out of high school—such things as geometrical optics, simple chemistry ideas, and so on. I also didn't see that there was any reason to make the lectures

1

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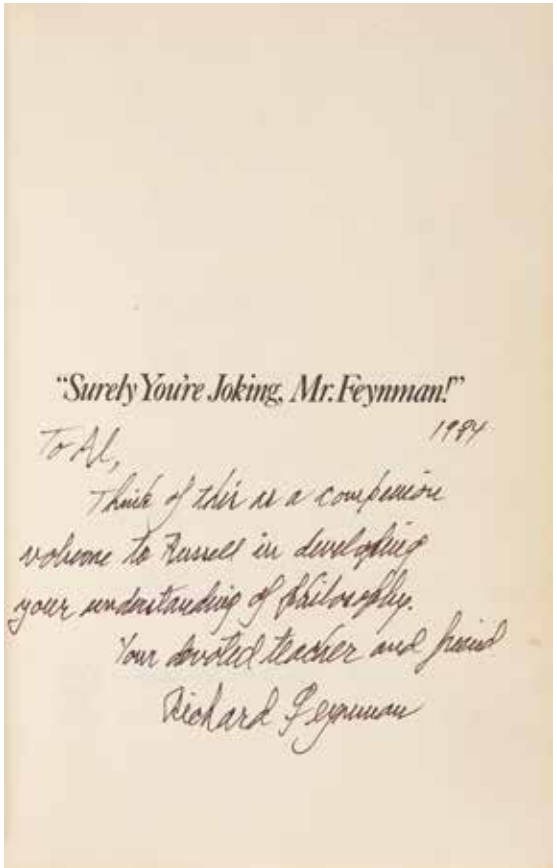
"Surely You're Joking, Mr. Feynman!"
1984
To Al,
Think of this as a companion
volume to Russell in developing
your understanding of philosophy.
Your devoted teacher and friend
Richard Feynman

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FEYNMAN, RICHARD PHILLIPS. 1918-1988.

The Feynman Lectures on Physics. Reading, MA: Addison-Wesley for California Institute of Technology, 1975-76.
3 volumes, 4to. Original red printed wrappers, custom red cloth clamshell box. *INSCRIBED BY THE AUTHOR* in top margin of Feynman's preface, next to a portrait of him playing a conga drum, "*May 5, 1982, To my friend, Al Seckel.*" Some light wear, especially to the lower outside corners, staining to wrappers.

A rare inscribed copy of *The Lectures*, to Feynman's friend, Al Seckel (see following lot). Feynman presented these lectures at Caltech between 1961 and 1963, first published in 1963-65. The work is co-authored by Robert Leighton and Matthew Sands, both formidable physicists in their own right, and is probably the most popular work on physics ever written, with millions of copies sold in multiple languages. Inscribed copies of Feynman's scientific works are especially rare, and this is only one of a handful of inscribed copies of *Lectures* known to exist.

$2,000 - 3,000

476

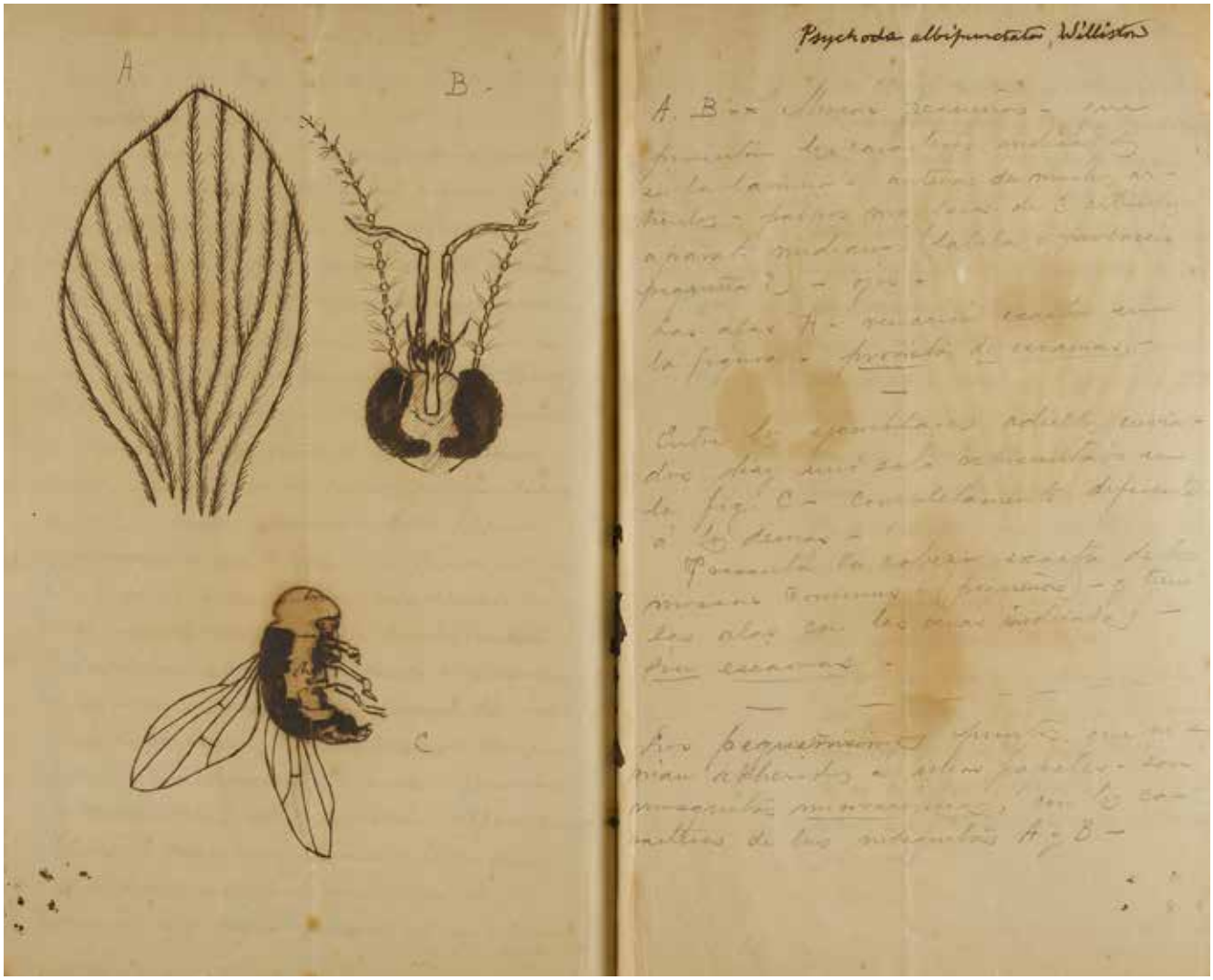
FEYNMAN, RICHARD PHILLIPS. 1918-1988.

"Surely you're Joking, Mr. Feynman!" Adventures of a curious character. [by] Richard P.Feynman, as told to Ralph Leighton; edited by Edward Hutchings. New York: W.W. Norton & Co., 1985.
8vo. Publisher's orange half cloth and boards, pictorial dust jacket, custom cloth box. Spine panel lightly sunned, as usual, light wear to corners of jacket, minor browning.
Provenance: Alfred Paul Seckel (1958-2015, ownership stamp "ex Libris Al Seckel," and inscription to him); by descent to his daughter Elizabeth Laura Seckel; sold to the present owner.

FIRST EDITION, DOUBLE-SIGNED PRESENTATION ADVANCE COPY, BY BOTH FEYNMAN AND LEIGHTON, one of about 16 to 20 advance copies, this copy signed and warmly inscribed by Feynman on the half-title: "*1984 To Al, Think of this as a companion volume to Russell in developing your understanding of philosophy. Your devoted teacher and friend, Richard Feynman.*" The inscription is dated 1984, as Feynman had received a box of advance copies in November of that year, each copy with the publisher's faint stamp "43546" on upper front free endpaper. Feynman gave a number of these copies away to friends and colleagues in November and December 1984 before the book was actually published in January 1985. Additional later inscription on verso of front free endpaper: "*To Al with best wishes. Happy reading Fond Memories Ral 1996*, by Ralph Leighton, son of Fenyman's colleague, Caltech physicist Robert Leighton, and the interviewer of Feynman, from whose tapes this work was edited for publication.

A fine double-inscribed advance presentation copy of Feynman's classic work signed by both the author (interviewee) and the interviewer. Feynman's book was edited by Edward Hutchings, from taped conversations with Ralph Leighton, his close friend and drumming partner. Feynman was notorious for refusing to sign his books, reportedly telling his editor: "*I am not going on TV and I'm not going to sign any books*." Feynman is considered a "rock star" among physicists, and was an enormously popular lecturer and author. He was the winner of the Nobel Prize for Physics in 1965,and a member of the Rogers Commission investigating the space shuttle Challenger disaster, correctly identifying the O-ring material as the reason for the explosion. Al Seckel (1958-2015) was the author of a number of books on illusions and perception, and the editor of two books on Bertrand Russell. An active figure in the Freethought movement and skeptic of the paranormal, he co-designed the "Darwin fish" logo in response to the proliferation of "Jesus fish" logos used on bumper stickers and t-shirts.

$12,000 - 18,000



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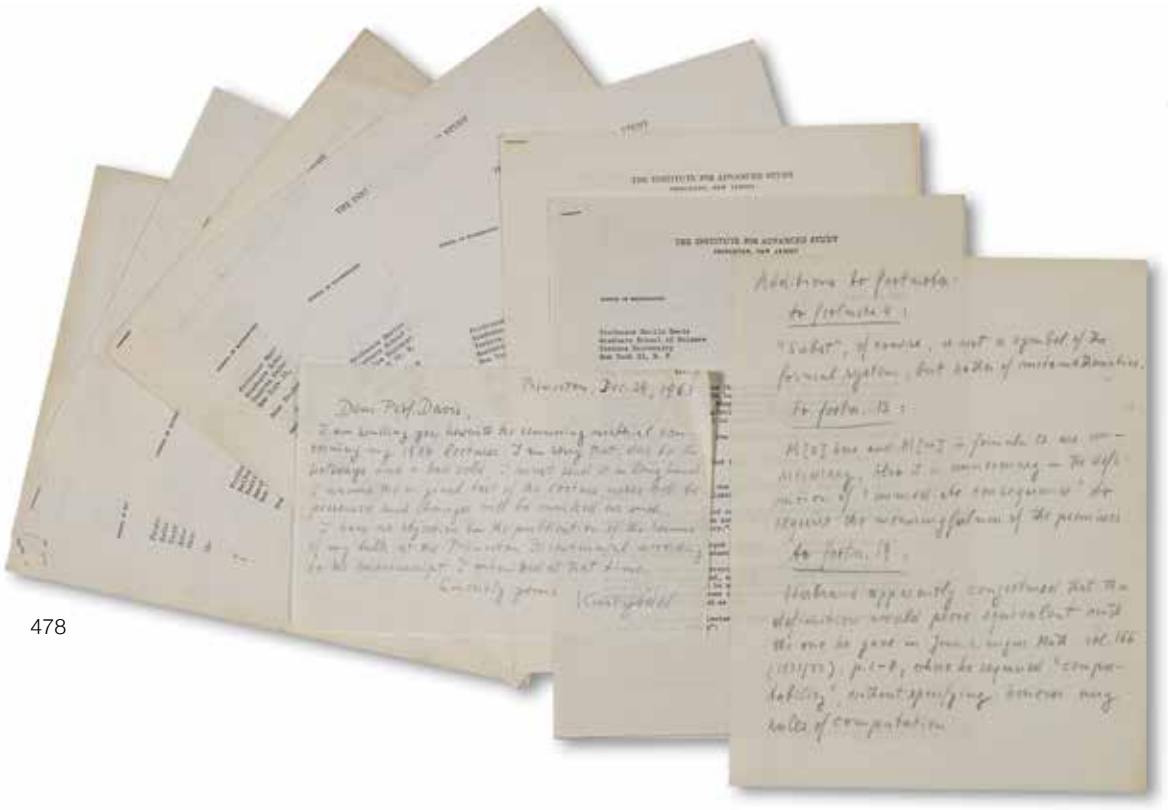
FINLAY Y BARRES, CARLOS JUAN. 1833-1915.

Manuscript Notebook in English, with portions in German, French and Spanish, recording cases of yellow fever in Cuba, 8vo, 400 pages (including approximately 100 blanks), [Havana], April 1900-June 9th 1906, with occasional hand-drawn illustrations, including tipped-in drawing of a fly, blind-ruled half calf and marbled boards, paper spine label, covers rubbed, text lightly browned, some offsetting from ink, some ink corrosion to a few drawings. *Provenance*; Carlos Finlay (some childhood notations on the blank end leaves by his grandson Enrique Finlay); Entry on p 203 for a case situation for a cousin(?) A.P. Finlay, an engineer for Havana brewery.

A fine and detailed casebook written up by Carlos Finlay, the noted Cuban physician and epidemologist, who provided the scientific evidence, through his researches in Cuba in the 1870s, that Yellow Fever, a scourge in the Tropics and elsewhere, was transferred by the mosquito. This notebook provides a methodical record of cases of yellow fever with names of patients, their symptoms, and the results (often death), of their illness. It covers his time as a physician in Havana, including a 4 pp listing of Yellow Fever cases August 5th 1899 to April 5th 1900, documenting the visits of the Yellow Fever Commission to hospitals in Cuba.

Carlos Juan Finlay was born in Cuba to a Scottish-born father and French-born mother. His education in Europe was interrupted twice by illnesses, including cholera and typhoid fever, before completion in Philadelphia, where he studied under John and Silas Mitchell, proponents of the germ theory of disease. He graduated in 1855 and returned to Havana in 1857 to set up an ophthalmology practice. It was during the 1870s that he formulated his hypothesis and proofs for the spread of yellow fever through insect bites. In 1881 he presented his theories at the International Sanitary Conference where it was well received, but it took until 1900 when the Walter Reed Commission reported its findings for his theory to be universally accepted. Foe a long time Reed received much of the credit for Finlay's research 20 years earlier. The US military governor in Cuba in 1900 described Finlay's work as "the greatest step forward made in medical science since Jenner's discovery of the vaccination." In many ways his successes did not come to the fore until the US took over the control of Cuba after the Spanish American War. He was nominated for the Nobel Prize in Medicine seven times, but never awarded. A Museum of Medical History in Havana is named in his honor, as is the UNESCO Carlos J. Finlay Prize for Microbiology, and formerly a Cuban national award for medical merit, the Order of Carlos J. Finlay.

$20,000 - 30,000



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GÖDEL, KURT. 1906-1978.

Archive of correspondence and notes sent to Dr. Martin Davis:
1. Autograph Manuscript, 1 p, 4to, [Princeton, New Jersey, 1963], in pencil, horizontal fold, entitled at top "Additions to footnotes," and providing 3 additional items. He adds to footnote 19: *"Hebrand apparently conjectured that this definition would prove equivilent with the one he gave in Jour. r. angew. Math. vol. 166 (1931/32), p 1-8, where he required 'compatibility,' without specifying however any rules of computation."*
2. Autograph Letter Signed ("Kurt Gödel"), 1 p, oblong 8vo, Princeton, New Jersey, December 29, 1963, some edgewear. Gödel mentions sending additional material concerning his 1934 lectures. He also consents to the publication of his resume which had been used for his talk at the Princeton Bicentennial.
3. Letter Signed ("Kurt Gödel"), 1 p, 4to, Princeton, New Jersey, August 21, 1963, on Institute for Advanced Study letterhead, fold creases. Gödel asks for clarification regarding the subject matter of the Davis-edited book, *the Undecidable.*
4. Letter Signed ("Kurt Gödel"), 1 p, 4to, Princeton, New Jersey, December 20, 1963, on Institute for Advanced Study letterhead, fold creases. Regarding corrections to Gödel's 1934 lecture notes.
5. Letter Signed ("Kurt Gödel"), 2 pp, 4to, Princeton, New Jersey, August 18, 1964, on Institute for Advanced Study letterhead, fold creases. Lot also includes a photocopy with an additional type foot note addendum. Regarding numerous corrections and the return of Gödel's 1934 lecture notes.
6. Letter Signed ("Kurt Gödel"), 2 pp plus additional typed leaf, 4to, Princeton, New Jersey, October 12, 1964, on Institute for Advanced Study letterhead, fold creases. Regarding numerous corrections including a reconsideration on one footnote: *"Professor van Heijenoort* [Jean Louis Maxime van Heijenoort, historian of mathematical logic and one of the editor's of Gödel's collected works] *called my attention to a third definition of 'general recursive,' given by Herbrand ... This, in conjunction with other passages, seems to prove that Herbrand was wavering between different definitions, which he hoped would prove equivalent. For this reason I would like footnote 19 to avoid reference to what he* meant *and confine myself to what he* said*. Also, considering Herbrand's wording, I think it is better to omit 'intuit. demonstrable' in the last sentence."*
7. Letter Signed ("Kurt Gödel"), 2 pp with Autograph Postscript, 4to, Princeton, New Jersey, February 15, 1965, on Institute for Advanced Study letterhead, fold creases, staple tears, notes and corrections throughout in Dr. Davis's hand. Gödel mentions additional corrections as well as his thoughts on Davis's introduction. In part: *"There is not only 'an effort to obtain undecidability results for formal mathematical systems in general.' Rather there is in section 6 a quite precise result, which is so general that it suffices for all applications occurring in practice. Moreover (for languages using varibles for integers) the most general result can be obtained very easily from mine simply be leaving out one condition ... As far as the second half of section (3) is concerned, it is not true that footnote 3 is a statement of Church's Thesis. The conjecture stated there only refers to the equivalence of 'finite (computation) procedure' and 'recursive procedure.' However, I was, at the time of these lectures, not at all convinced that my concept of recursion comprises all possible recursions; and in fact the equivalence between my definition and Kleene's in Math Ann 112 is not quite trivial."*
8. Letter Signed ("Kurt Gödel"), 1 p, with Autograph Postscript, 4to, Princeton, New Jersey, March 8, 1965, on Institute for Advanced Study letterhead, fold creases. Regarding corrections.
Provenance: American mathematician Dr. Martin Davis received his doctorate at Princeton University where his adviser was Alonzo Church. Davis is best known for his work on Hilbert's tenth problem as well as for pioneering work on the so-called "satisfiability problem." Davis edited the 1965 publication *The Undecidable: Basic Papers on Undecidable Propositions, Unsolvable Problems and Computable Functions*, which included 5 pieces by Gödel as well as material by Alan Turing, Alonzo Church, Emil Post, Stephen K. Kleene and J.B. Rosser.

Kurt Gödel, who was a friend and colleague of Albert Einstein, has been considered one of the most important logicians since Aristotle who, according to Dr. Davis, "utterly transformed the field of mathematical logic and our understanding of the foundations of mathematics, starting with his famous 'incomplete theorem.'" Davis recounts the context of the above material:
"As a young man committed to making mathematical logic my life's work, Gödel was a towering and inspirational figure. I was also

THE INSTITUTE FOR ADVANCED STUDY
PRINCETON, NEW JERSEY

Princeton, Feb. 22, 1967.

Dear Professor Davis,

From your letter of recommendation for Zuckerman I gather that you are well acquainted with his work. Looking over his three notes in the Notices of the AMS about the axiom of choice for finite sets, I find that almost all, and probably all, six theorems are easy consequences of Mostowski's work. Could you point out to me some really interesting result of his ?

Also I would like to know to what extent he is acquainted with, or has been working in, the field in which he expects to do research here (axioms of infinity, continuum hypothesis, etc.). These questions have very little to do with his previous work and his research plans seem to be rather vague.

Sincerely yours

Kurt Gödel

Kurt Gödel

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thrilled to be part of the circle at the Institute for Advanced Studies at Princeton, and to see Einstein and Gödel walking together.
Many years later, I was editing an anthology of fundamental research papers, The Undecidable *(1965), all concerned with the new perspectives that Gödel's revolutionary 1931 paper on formally undecidable propositions had illuminated. Several of the articles included were by Gödel himself.*
The book was entirely in English although three of Gödel's contributions had been originally published in German, and I translated two of these. I was pleased when during our correspondence he approved my translations. He also wrote me adding a significant amount of new material to another article (one that had originated in a series of lectures given in English at the Institute of Advanced Study in Princeton in 1934), bringing it up to date, emphasizing the importance of Alan Turing's work in extending the incompleteness theorem. Gödel sent some of this material to me in a handwritten letter, explaining that, because he was ill, he'd been unable to have it typewritten. After Gödel's death in 1978, I was studying a manuscript found with his effects for a project to publish his collected works. I was amazed to discover in it work by Gödel that was very close in method and form to a theorem in my doctoral dissertation of 1950 that had enabled a strengthened form of the incompleteness theorem."

In his book *The Universal Computer,* Dr. Davis summarized what Gödel had done with his paper on undecidability, the centerpiece of the Davis edited book *The Undecidable*: "Leibniz had certainly proposed the development of a precise artificial language in which much human thought would be reduced to calculation. Frege, in his *Bgriffsschrift,* had shown how the usual logical reasoning by mathematicians could indeed be captured. Whitehead and Russell had succeeded in developing actual mathematics in an artificial language of logic. Hilbert had proposed the metamathematical study of languages. But before Gödel no one had shown how these metamathematical concepts could be embedded in the languages themselves" (p 121).

$40,000 - 60,000

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GÖDEL, KURT.
2 Typed Letters Signed ("Kurt Gödel"), 3 pp, 4to, Princeton, February 22 & March 16, 1967, on Institute for Advanced Study letterhead, folded into thirds, some light creases, enclosure stapled to 2nd letter, excellent condition.
Provenance: Collection of Dr. Martin Davis.

Two letters written to fellow mathematician Dr. Martin Davis at NYU's Courant Institute of Mathematical Sciences regarding Davis's recommendation of a candidate for membership in the IAS. Attached to the second letter is a carbon of Gödel's rejection letter.

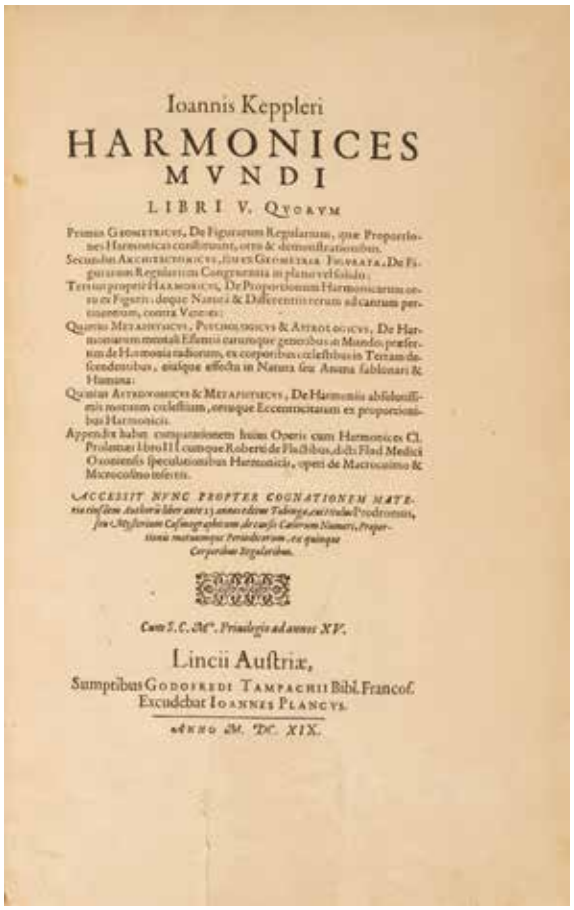
$2,000 - 3,000

480 W
HUMBOLDT, ALEXANDER VON. 1769-1859.
Bust, Berlin, 1850, cast in bronze, titled "*Alexander von Humboldt*" on front edge, marked "*1823 C.R. Fec 1850*" on back edge, with foundry mark "*H. NOACK BERLIN*" stamped at back of base. Height: 485 mm.

Alexander von Humboldt was an explorer, geologist and naturalist who, along with Goethe and Schiller, was one of the key figures in Weimar Classicism in the late 18th century. He traveled extensively, to South America, Mexico, the United States, and Russia. In his later years he lectured at the University of Berlin, which would later be renamed Humboldt University of Berlin after his older brother Wilhelm, who led the initiative to found the school in 1809. Statues of both brothers can be seen on the campus of the University today.

Although the identity of the artist, "*C.R.*" is not known, the dates suggest that this was probably sculpted for the foundry in 1850 based upon an earlier sculpture made in 1823, when Humboldt was living in Paris.

$2,000 - 3,000



Ioannis Keppleri

HARMONICES MVNDI

LIBRI V. QVORVM

Primus Geometricus, De Figurarum Regularium, quæ Proportiones Harmonicas constituunt, ortu & demonstrationibus.

Secundus Architectonicus, seu ex Geometria Figurata, De Figurarum Regularium Congruentia in planum vel solidum.

Tertius propriè Harmonicus, De Proportionum Harmonicarum ortu ex Figuris: deque Natura & Differentiis rerum ad cantum pertinentium, contra Veteres.

Quartus Metaphysicus, Psychologicus & Astrologicus, De Harmoniarum mentali Essentia earumque generibus in Mundo; præsertim de Harmonia radiorum, ex corporibus cœlestibus in Terram descendentibus, eúsque effectis in Natura seu Anima sublunari & Humana.

Quintus Astronomicus & Metaphysicus, De Harmonia absolutissimis motuum cœlestium, eorúmque Eccentricitatum ex proportionibus Harmonicis.

Appendix habet comparationem hujus Operis cum Harmonicis Cl. Ptolemæi libro III. cumque Roberti de Fluctibus, dicti Flud Medici Oxoniensis speculationibus Harmonicis, operi de Macrocosmo & Microcosmo inserto.

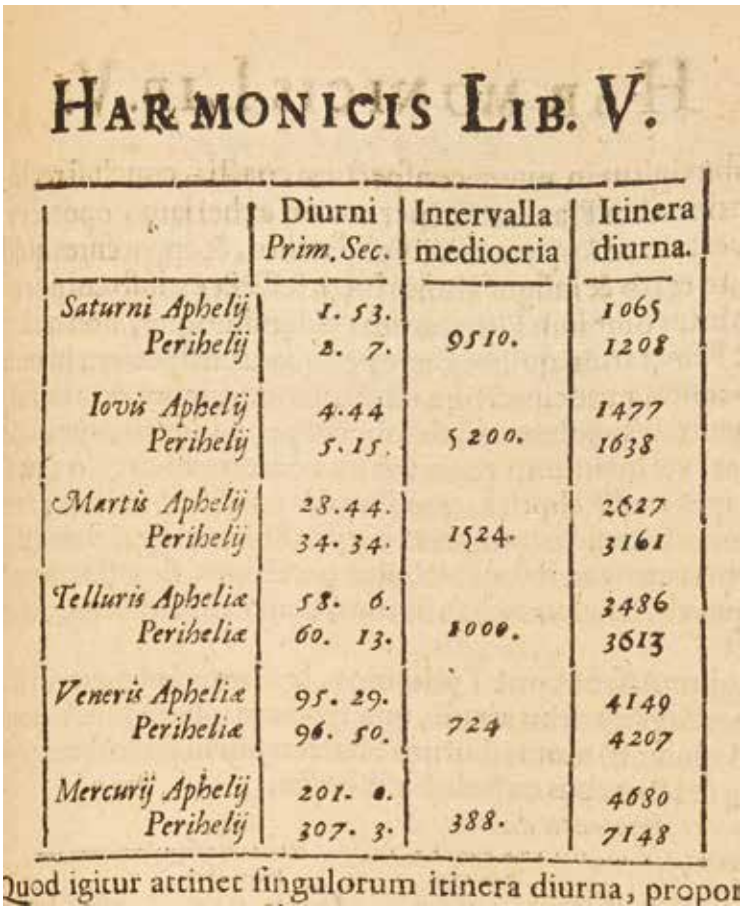
ACCESSIT NVNC PROPTER COGNATIONEM MATERIÆ ejusdem Authoris liber ante 13 annos editus Tubingæ, cui titulus Prodromus, seu Mysterium Cosmographicum de causis Cælorum Numeri, Proportionis motuumque Periodicorum, ex quinque Corporibus Regularibus.

Cum S. C. Mtis. Privilegio ad annos XV.

Lincii Austriæ,

Sumptibus Godofredi Tampachii Bibl. Francof.
Excudebat Ioannes Plancvs.

ANNO M. DC. XIX.



HARMONICIS LIB. V.

	Diurni Prim. Sec.	Intervalla mediocria	Itinera diurna.
Saturni Aphelij	1. 53.		1065
Perihelij	2. 7.	9510.	1208
Iovis Aphelij	4.44		1477
Perihelij	5.15.	5200.	1638
Martis Aphelij	28.44.		2627
Perihelij	34. 34.	1524.	3161
Telluris Apheliæ	58. 6.		3486
Perihelæ	60. 13.	1000.	3613
Veneris Apheliæ	95. 29.		4149
Perihelæ	96. 50.	724	4207
Mercurij Aphelij	201. 0.		4680
Perihelij	307. 3.	388.	7148

Quod igitur attinet singulorum itinera diurna, propor

"Before Kepler, all men were blind. Kepler had one eye, Newton had two."

- Voltaire

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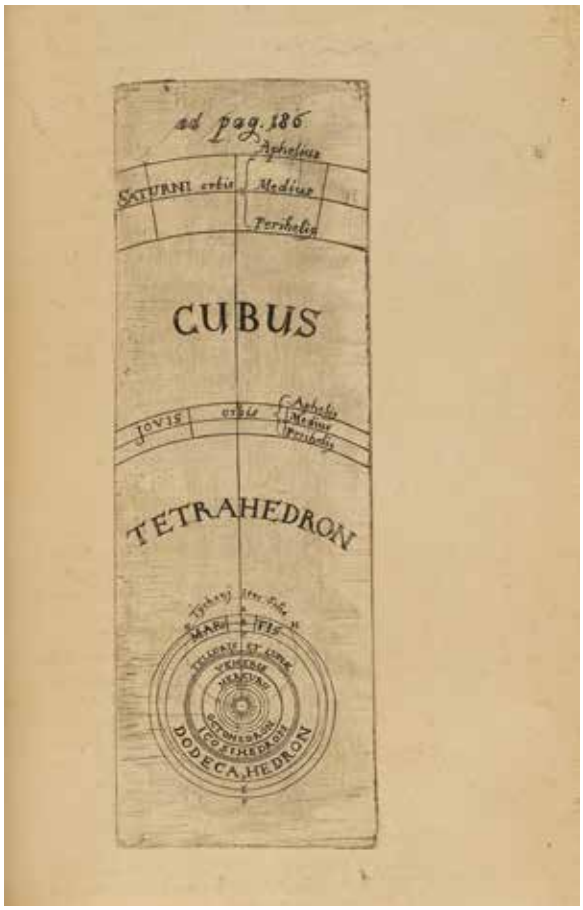
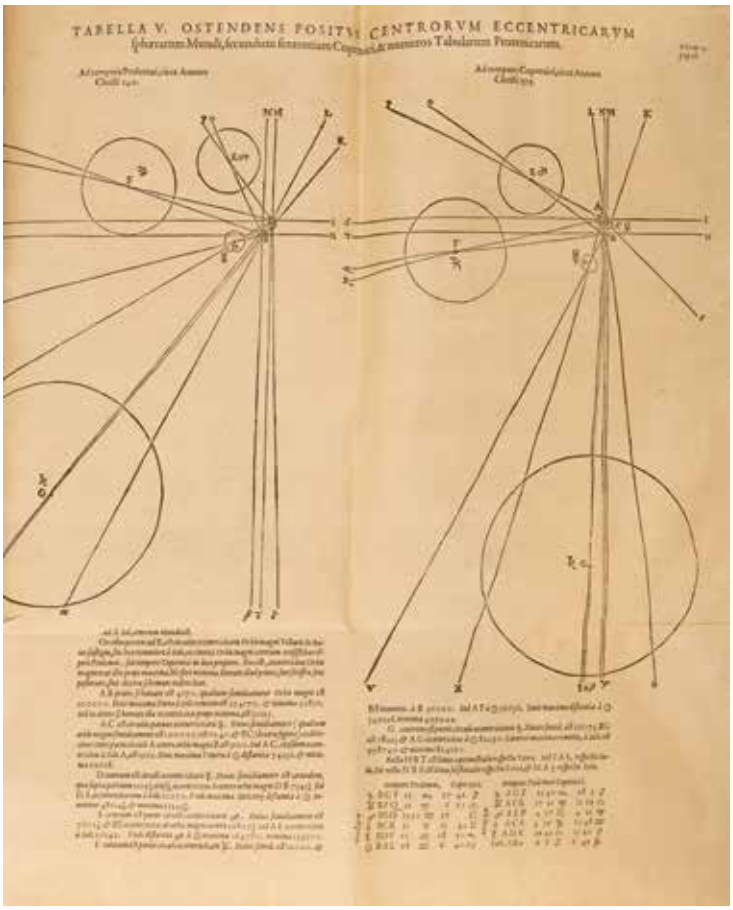
KEPLER, JOHANNES. 1571-1630.

Harmonices mundi libri V. Linz: Johann Planck for Gottfried Tampach, 1619. [BOUND WITH:] *Prodromus Dissertationum Cosmographicarum, continens Mysterium Cosmographicum de admirabili proportione orbium coelestium.* [AND:] *Pro suo opere Harmonices Mundi Apologia.* Frankfurt: Erasmus Kempfer for Gottfried Tampach, 1621-1622.
3 works in one volume, folio (*Harmonices* 325 x 205 mm; *Prodromus* 345 x 210 mm), all ENTIRELY UNTRIMMED with deckled edges; *Harmonices:* general title in second state (with typographic ornament and with the text beginning "Accessit nunc..."), with the dedication to King James of England *2r-*4r (later suppressed by Kepler and absent from some copies), 5 sectional titles, errata leaf at end; 6 engraved plates, numerous woodcut illustrations and diagrams in text, woodcut musical notation in Book III; stamp removed from title and final leaf, minor marginal repair to a couple of leaves, light even browning to the paper. *Prodromus Dissertationum and Pro suo opere Harmonices:* with separate dated title page: one engraved folding plate, 4 woodcut plates and woodcut diagram; closed marginal tear to F1, engraved folding plate with paper repairs to verso and mounted on a stub, light even browning to the paper, bound without final blank. The three works bound together, vellum-backed decorative boards.
Provenance: evidence of removed stamps from title and final leaf of first work; washed 17th-century ink presentation inscription on final verso of last work, woodcut label.

A RARE UNCUT COPY OF KEPLER'S MAGNUM OPUS, PRONOUNCING HIS THIRD LAW OF PLANETARY MOTION, $A^3 = P^2$, ONE OF THE FOUNDATIONAL ACHIEVEMENTS OF EARLY MODERN SCIENCE.

THE CULMINATION OF A LIFELONG EFFORT TO DISCERN THE PATTERN OF THE UNIVERSE, Kepler's *Harmonices Mundi*is a sweeping meditation on mathematics, music, and the stars. Fueled by an unshakeable Pythagorean conviction that the universe was constructed on harmonic principles, the work begins with purely mathematical considerations and advances upwards through musical theory to the Heavens -- ultimately reaching its crescendo in the first public pronouncement of Kepler's Third Law of Planetary Motion: the square of the period of revolution of a planet about the sun is proportional to the cube of the mean distance of the planet from the sun, $A^3 = P^2$.
A scientific masterwork, *Harmonices Mundi* represents a critical victory for scientific thought and method. Acknowledged as one of the most important and elegant equations in all of science, Kepler's Third Law was the first major modern scientific law deduced from empirical data. Many scholars consider the "Keplerian revolution" to be the true beginning of modern science.
Johannes Kepler is one of the primary "giants" on whose shoulders





Newton stood. Kepler's Third Law was in fact the mathematical springboard for Isaac Newton's discovery and articulation of the generalized laws of motion and gravity. Though Kepler had a "presentiment" of gravity — he believed that planetary motion was determined by a real energy emanating from the Sun — Kepler himself was unable to explain the actual force at work. This task was left to Newton, who addresses Kepler's laws at multiple places within the Principia. In the course of developing his own theory, Newton generalized Kepler's law to apply to any two bodies orbiting a common center of mass and he further showed that it was derivable from his own three laws of Motion and his law of universal gravitation. Kepler's grand synthesis of harmonic ratios in *Harmonices Mundi* concludes the research program he had begun in his first published book, *Mysterium Cosmographicum* (1596). "The first unabashedly Copernican treatise since *De Revolutionibus* itself," the *Mysterium* "established [Kepler] as the first and until Descartes the only, scientist to demand physical explanations for celestial phenomena" (DSB). In *Harmonices,* Kepler writes, *"Again, therefore, a part of my Mysterium Cosmographicum, put in suspense 22 years ago because it was not yet clear, is to be completed here, and brought in at this point... I first believed I was dreaming,"* before revealing his derivation of his harmonic law.

Containing the alpha and the omega of Kepler's life work, the present copy contains the untrimmed *Harmonices Mundi* bound with an untrimmed copy of the 1621 edition of the *Mysterium Cosmographicum* (2nd edition, revised) and the 1622 first printing of the *Pro Suo Opere Harmonices*, Kepler's defense of his work against Robert Fludd's critique. The dimensions of this copy of the Mysterium/Pro Suo in fact exceed anything recorded by OCLC. Complete, large copies of *Harmonices Mundi* have become increasingly rare, and no other uncut copies are known to have appeared at auction in the last 40 years. *A BEAUTIFUL EXAMPLE OF A MILESTONE OF SCIENTIFIC THOUGHT.*

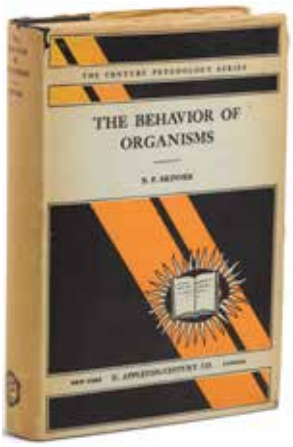
Kepler's Third Law was discovered in May 1618. 2018 marks the 400th anniversary of this world-shaping event.

Harmonices: Caspar 58; Dibner *Heralds of Science* 6; Grolier/ Horblit 58; Houzeau and Lancaster 11832; Norman 1207. *Mysterium Cosmographicum* and *Pro suo opere Harmonices*: Caspar 67-68; Houzeau and Lancaster 2841 and 11833. All three works: *Milestones of Science* 115. See *PMM* 112.

$100,000 - 150,000


THÉORIE
DES FONCTIONS ANALYTIQUES,

482



483

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482
LAGRANGE, JOSEPH-LOUIS. 1736-1813.
Theorie des fonctions analytiques. Paris: Imprimerie de la Republique, 1797.
4to (270 x 213 mm). 277 pp. Contemporary shellacked linen and marbled boards, paper spine label. Wear to binding, repairs to half-title and title page at lower inside corner, inked library markings on title.
Provenance: Ecole Polytechnique, Paris (ink stamp on title).

FIRST EDITION, FIRST ISSUE before the addition of the errata leaf. Italian-born Joseph-Louis Lagrange (originally Giuseppe Luigi Lagrangia) succeeded Leonhard Euler as director of mathematics at the Prussian Academy of Sciences, before moving to the Ecole Polytechnique in Paris in 1787. He made significant contributions to the advancement of number theory and celestial mechanics, and contributed to the conversion to the decimal system in Revolutionary France. *Theorie Des Fonctions Analytiques* deals with the general theory of functions, and their applications to geometry and mechanics.

$1,000 - 2,000

483
SKINNER, B.F. 1904-1990.
The Behavior of Organisms: An Experimental Analysis. New York & London: D.Appleton-Century Company, [1938].
8vo. Original black cloth stamped in gilt and blind, dust jacket. Somewhat toned, cloth remarkably fresh, jacket with tape reinforcement to verso edges, spine toned, tiny chips from head and tail of spine, an excellent copy overall.
Provenance: Seymour Radin (small stamp to f.f.e.p.).

FIRST EDITION, FIRST ISSUE OF SKINNER'S FIRST BOOK IN EXCEPTIONALLY RARE JACKET. Skinner, known for his work creating a technology of human behavior, herein sets the parameters for behavior anaylsis.

$1,000 - 2,000

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WARREN MASTODON: EXHIBITION BROADSIDE.
Great American Mastodon!! Now Exhibiting at the Hall. [United States: c.1846.]
Large broadside, 610 x 435 mm (visible in mat), announcing the discovery and exhibition of a large mastodon skeleton, offsetting of text, probably from another copy of the broadside, some spotting, matted.

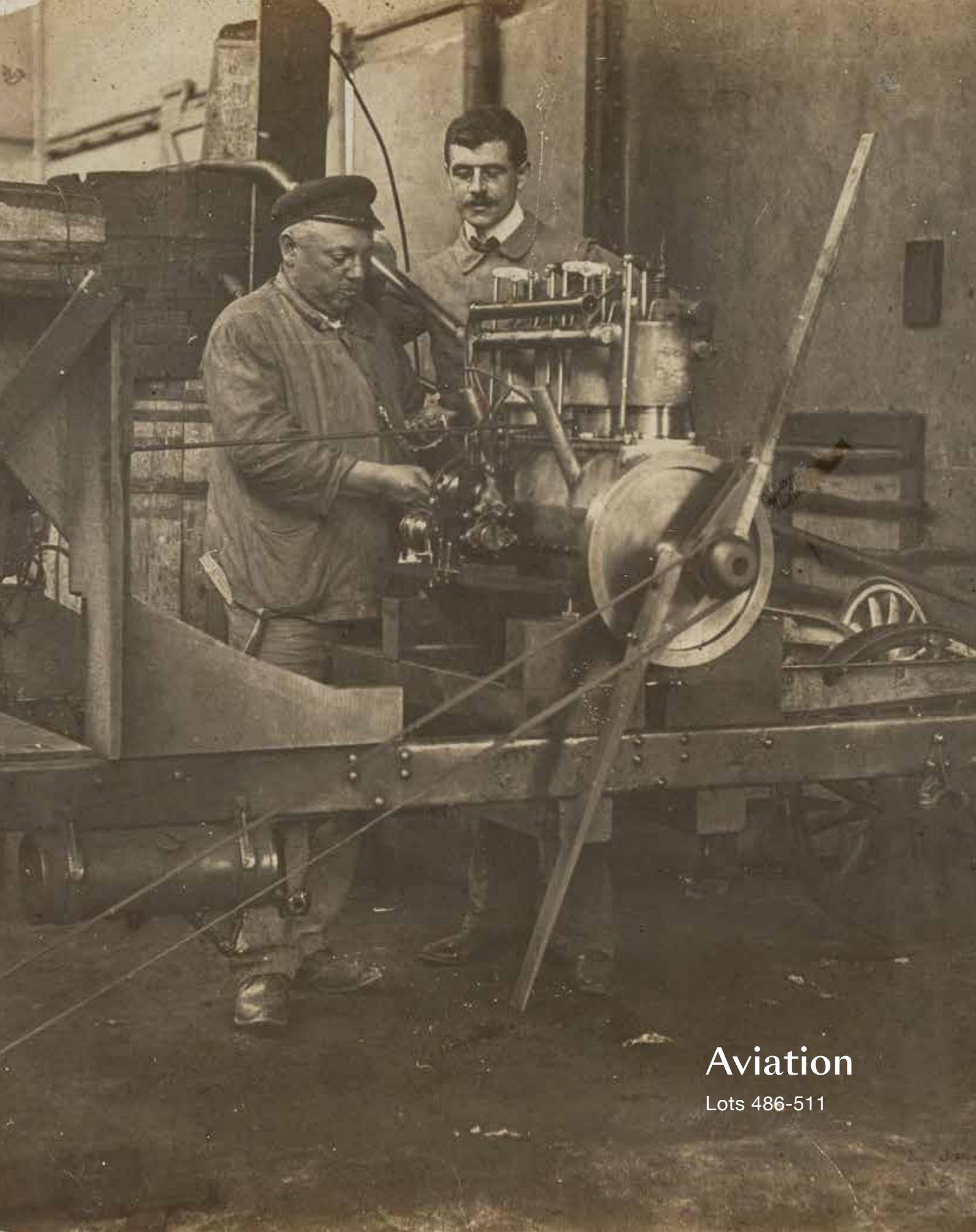
"NO ANIMAL LIVING APPROACHES THIS IN SIZE." Rare broadside advertising the exhibition of the nearly complete mastodon skeleton unearthed in 1845 near Newburgh, New York on the farm of Nathaniel Brewster by workers digging for peat fuel. One of the most famous finds in the annals of American paleontology, the skeleton was purchased from the Brewster family by the noted surgeon Dr. John Collins Warren, who wrote a monograph on the specimen in 1852 and kept it on display in a small Boston museum. The Warren Mastodon was later acquired by the American Museum of Natural History in New York, where it is remains on display. "The discovery of the mastodon skeleton, and Warren's serious treatment of it, mark the beginning of vertebrate paleontology in this country" (*Expedition* [AMNH gallery guide] 46).
Warren recalls in his memoir that he had learned of the skeleton after "it was brought into New England, shown in various towns, and ultimately in Worcester" (*Life...,* vol 2, pp 223); that the broadside does not state a locale other than "the Hall" suggests that the broadside was designed for this traveling exhibition.

$2,000 - 3,000

485
WATSON, JAMES D. B.1928.
[CRICK, FRANCIS. 1916-2004.] *The Double Helix.* New York: Scribner, 1998.
White cloth and boards, dust jacket. Signed by both Watson and Crick on title page. Slight soiling to dust jacket.

Watson and Crick came up with the double helical structure of the DNA molecule in 1953, building on the research of Rosalind Franklin and Maurice Wilkins. *The Double Helix* is Watson's personal narrative of the events leading up to their Nobel Prize winning discovery, originally published in 1968.

$600 - 800



Aviation

Lots 486-511

486

487

486

EARLY AVIATION: 18TH CENTURY AERONAUTICS SCRAPBOOK.

XVIIIth Century Aeronautics, compiled and edited by William G. Gerhard. 1934.

Folio (355 x 290 mm). 62 pp, title page hand-written in red grease pencil, with paper label typed "*Compiled and edited by Wm.G.Gerhard F.R.G.S., 1934*" and 5 clipped engravings of hot air balloons, each section headed by a note typed in red and black with the names of inventors, and an explanation of their flying machines. Pages hand-numbered in Roman numerals. Blue-grey cloth, gilt title on top cover. Wear to edges of covers, chipping and browning to page edges, some clippings coming loose.

William G. Gerhard was a noted collector of aviation ephemera, who compiled this album probably as a personal reference of the early pioneers of aviation. The album includes 2 contemporary hand-colored engravingd of Montgolfier balloons, an admission ticket to Jean-Pierre Blanchard's first balloon ascent in 1784, signed "*Blanchard*," and a contemporary engraving of a proposed assault on England from France in 1804, using ships and balloons.

$5,000 - 8,000

487

WISE, JOHN J. 1808-1879.

Balloon Ascensions! Lehigh, PA: Lehigh Bulletin, 1839.

Printed advertising broadside, 1,185 x 520 mm, linen mounted and matted. Promoting a balloon and parachute demonstration on April 27, 1839, in Allentown, PA, with a woodcut illustration of a balloon with a man and woman as passengers, and a man parachuting below it. Creases and fold marks, minor abrasions.

A RARE EARLY AERONAUTIC DEMONSTRATION BROADSIDE for an event billed as the "*13th Grand Ascension*" of John Wise, one of the earliest pioneers of ballooning in America. He designed his own balloons, incorporating an innovation that would allow the balloon itself to function as a parachute if deflated while in flight. In 1859, he carried the first airmail from Lafayette, IN bound for Crawford, IN, but was forced to land after 25 miles. In 1879, at the age of 71, he departed with a passenger from East St. Louis, IL, over Lake Michigan, never to be seen again. The body of the passenger was later found in the lake, but neither the balloon nor Wise were ever located.

$1,500 - 2,500

488

BALLOONING.

Collection of 9 items related to ballooning including:
1. GREEN, CHARLES. (1785-1870). Autograph Letter Signed, ("Chas Green"), 2 pp, 8vo, Holloway, London, September 12, 1852, discussing his first ascent in a balloon on July 19, 1821 to celebrate the coronation of George IV with coal gas.
2. [GREEN, CHARLES.] Lithograph portrait entitled *Mr. Charles Green, Aeronaut.* Lambeth: G.P. Harding, July 9, 1839. India paper mounted to a larger sheet, 308 x 238 mm.
3. [GREEN, CHARLES.] Broadside, 227 x 185 mm, London, before September 21, 1836, announcing the ballooning exhibition given by Charles Green at the Royal Gardens, Vauxhall.
4. JEFFRIES, JOHN. (1745-1819). Clipped Signature ("J. Jeffries"), 40 x 87 mm, matted with a stipple-engraved portrait of Jeffries. Jeffries, along with Jean-Pierre Blanchard, were the first to cross the English Channel in a balloon, doing so in 1785.
5. ZAMBECCARI, FRANCESCO. (1756-1812.) Autograph Letter Signed ("Francesco Zambeccari"), 1p, 4to, Island of Leon, April 5, 1775, matted with an engraved portrait. Italian ballooning pioneer whose first flew in a balloon in 1784. He died when his balloon caught fire in 1812.
6. SWEDISH BALLOONING. *Den Arostatiska Kulan, som upgeck fran Observatorie Garden i Stockholm den 17 September 1784.* Etching, 140 x 195 mm, matted.
* Lot also includes an engraved portrait of Jean Pierre Blanchard, a French engraving celebrating ballooning, and Thomas Rowlandson engraving depicting ballooning.

$1,200 - 1,800

488

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BALLOONING TROPHY.

[Boston], copper and pewter trophy cup, c.1911, with grape vine decorations in pewter at rim and base, curved pewter handles, height: 375 mm. Engraved "*Metro Club of New England / Everett C. Benton Trophy / Maintaining Longest Equilibrium*" with names of winners by year engraved below that, including Charles J. Glidden (1911), J.B. Benton (1912-1913), J.J. Van Valkenburgh (1914) and J. Walter Flagg (1915). Joint between base and top section slightly loose, traces of old polish, interior tarnished.

Everett C. Benton was a prominent Massachusetts politician who ran for Governor in 1912. The first winner of the cup, Charles J. Glidden, was a telephone pioneer who enthusiastically promoted the automobile, and later the aircraft, and established the Glidden Tour, a reliability competition for automobiles.

$1,200 - 1,800


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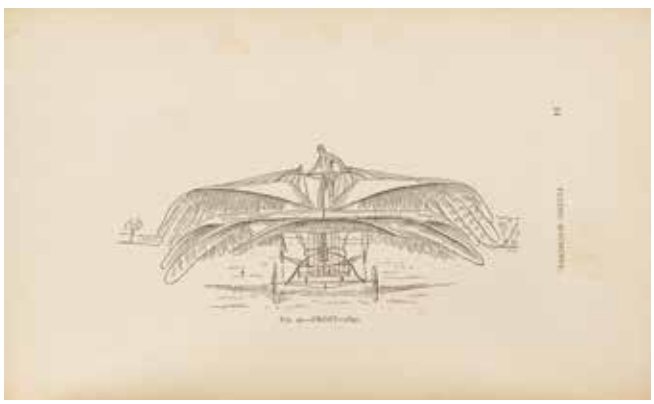
490

OCTAVE CHANUTE'S INFLUENTIAL EARLY WORK ON AVIATION.

CHANUTE, OCTAVE. 1832-1910. 5 publications:
1. *Aerial Navigation*. New York: The Railroad and Engineering Journal, 1891. Small 8vo. Being a "lecture delivered to the students of Sibley College, Cornell University." Rebacked in red cloth with quarter morocco, retaining original orange wrappers.
2. *Progress in Flying Machines*. New York: The Railroad and Engineering Journal, 1894. 8vo. A compilation of articles previously published in the journal by Chanute, with vivid line drawings and etchings of various experimental flyers. Publisher's gray cloth.
3. *Gliding Experiments—An Address by Octave Chanute, C.E. Mem. W.S.E.*". From *Journal of the Western Society of Engineers*, Vol 2. Chicago: Published by the Society, n.d. [1898]. 8vo. Quarter calf over marbled boards.
4. *Aerial Navigation*, from *The Crank* (Sibley College journal), Vol IV, No 8, May 1890. Ithaca, NY: Cornell University, 1890. 4to. Containing a transcript of an address by Chanute. Blue paper wrappers.
5. *Aviation*, from *The Sibley Journal of Mechanical Engineering*, Vol XI, No 7, April 1897. Ithaca, NY: Cornell University, 1897. 8vo. Containing an abstract of an address by Chanute. White paper wrappers.

Chanute was a civil engineer and an aviation pioneer whose early articles on aviation were influential on the work of the Wright Brothers. He was in contact with Wilbur as early as 1900 and visited their camp at Kitty Hawk, North Carolina in 1901, 02 and 03. Chanute and Wilbur Wright had a falling out in January 1910 over the Wrights' suit against Glenn Curtiss that was not fully resolved at the time of Chanute's death.

$800 - 1,200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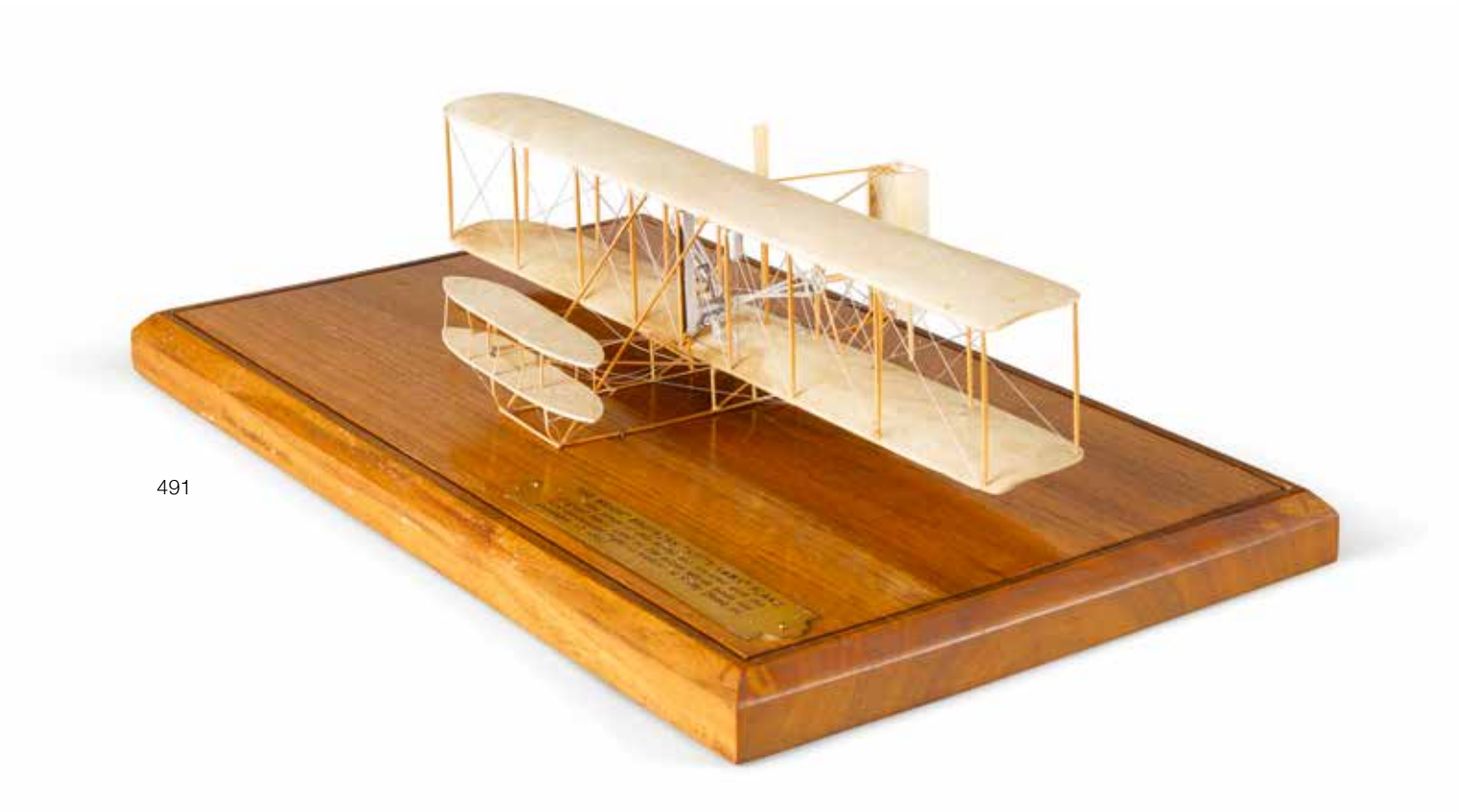


491

491

WRIGHT FLYER MODEL MADE FROM THE ORIGINAL FABRIC OF THE FIRST AIRPLANE.

1:42 scale model of the 1903 Wright Flyer flown at Kitty Hawk, in wood, covered with original fabric taken from the Wright airplane itself. 11-1/2 x 5-1/2 x 3-1/2 inches (292 x 140 x 89 mm), mounted to wooden base with Plexiglas cover.

Accompanied by letter of authenticity by Lester Gardner, stating: "*When Orville Wright, at my suggestion, assembled the Kitty Hawk machine for public exhibition for the first time... he found that the original fabric could not be used and substituted new fabric... When he died, his executors found that he had preserved some of the original coverings of the wings and entrusted them to me for distribution to notable aeronautical friends.*"

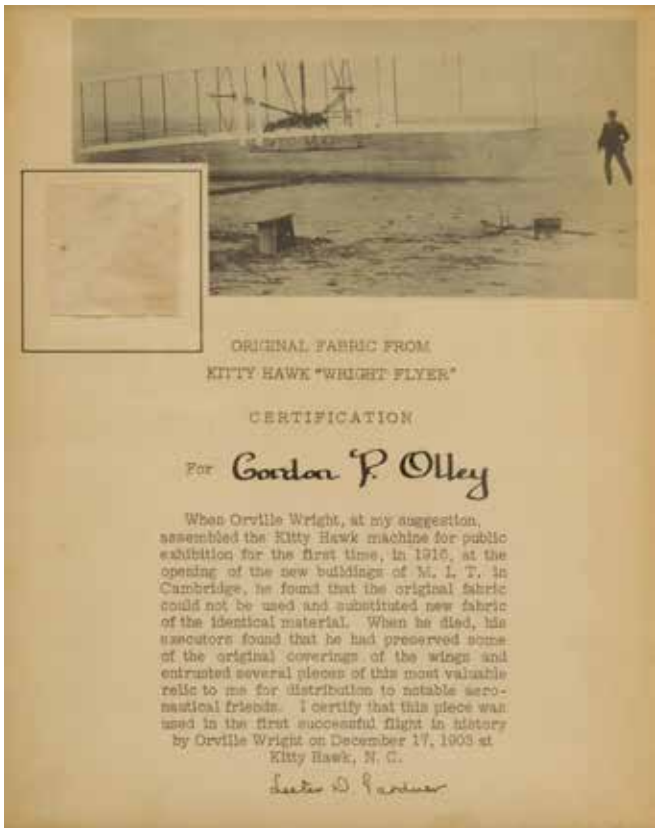
Provenance: The Otto Kallir Collection of Aviation History, Sotheby's June 14, 1993.

In 1916, Orville Wright partially re-covered the wings of the 1903 flyer prior to its display at Massachusetts Institute of Technology. Later, in late 1926 and early 1927, Orville completely re-covered the original 1903 Flyer in new muslin fabric, in preparation for sending it to be displayed in London. Intended to pressure the Smithsonian Institution into recognizing the accomplishment of the Wright Brothers, the London exhibit ultimately forced the Smithsonian to relent in order to obtain the original flyer for display.

Lester Gardner was the Editor in Chief of *Aviation and Aeronautical Engineering* from 1916 to 1921, a founder of the Institute of Aeronautical Sciences, and a friend of Orville Wright. He worked with Wright to arrange for the first public display of the original flyer at M.I.T. in 1916.

$20,000 - 30,000

492



493

492
LARGEST ORIGINAL FABRIC PIECE FROM THE WRIGHT 1903 KITTY HAWK FLYER OFFERED AT AUCTION.
Irregularly shaped, unbleached muslin swatch, approximately 12 x 10 inches. Together with a card with typed provenance note: "*This is a piece of the original fabric covering the wings of the Kitty Hawk with which Orville Wright made the first successful flight in history on December 17, 1903. I got it from the estate of Orville Wright.*" Signed in ink "*Lester D. Gardner*" at lower right.
Provenance: The Otto Kallir Collection of Aviation History, Sotheby's June 14, 1993.

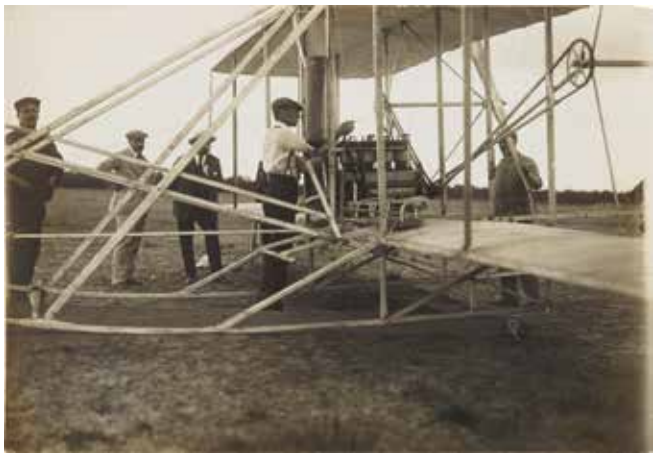
Lester Gardner was the Editor in Chief of *Aviation and Aeronautical Engineering* from 1916 to 1921, a founder of the Institute of Aeronautical Sciences, and a friend of Orville Wright. He worked with Wright to arrange for the first public display of the original flyer at Massachusetts Institute of Technology in 1916. The above fabric appears to be the largest piece ever offered at auction, many times the size of swatches generally offered.

$12,000 - 18,000

493
FABRIC SEGMENT FROM THE KITTY HAWK FLYER.
Square segment of fabric from the 1903 Wright Flyer, approximately 38 x 38 mm, affixed to an 8 x 10 inch card with image of the flyer taking off at Kitty Hawk, printed with a certificate of authenticity reading "*Original Fabric from Kitty Hawk 'Wright Flyer' Certification for Gordon P. Olley ... I certify that this piece was used in the first successful flight in history by Orville Wright on December 17, 1903 at Kitty Hawk, N.C.*" bearing the signature of Lester D. Gardner. Matted, framed and glazed.

Lester Gardner was the Editor-in-Chief of *Aviation and Aeronautical Engineering* from 1916 to 1921, a founder of the Institute of Aeronautical Sciences, and a friend of Orville Wright. He worked with Wright to arrange for the first public display of the original flyer at Massachusetts Institute of Technology in 1916.

$7,000 - 10,000



494

494
WILBUR WRIGHT IN FRANCE.
FIFTEEN PHOTOGRAPHS OF WRIGHT'S TRIP IN 1908. Gelatin silver prints of Wilbur Wright and the flyer, along with other subjects, various sizes ranging from 4-1/2 x 6-1/4 inches to 6 x 8 inches, and one 7 x 9 inches on larger paper. Two mounted on board, otherwise unmounted.

Subjects include portraits of Wilbur Wright, images of Wright in the flyer, walking back to the hangar after his first flight, examining a *voiturette* race car, getting an automobile ride with Léon Bollée at the wheel, and four images showing damage to the flyer after a crash on August 13, 1908.

$2,000 - 3,000

495

495
WRIGHT, WILBUR. 1867-1912.
L'aviation en 1908—M. Wilbur Wright dans un virage au Camp d'Auvours, pres Le Mans. Postcard Signed ("Wilbur Wright"), collotype print photograph of Wright Flyer at Le Mans, 3-1/2 x 5-1/2 inches, with autograph date above signature "*8 December 1908*." Tape residue at top edge, minor spotting.

$3,000 - 5,000

496

496
WRIGHT, WILBUR. 1867-1912.
L'aviation en 1908. Mr. Hart O. Berg, Mr. Wilbur Wright. Postcard Signed ("Wilbur Wright"), collotype print photograph of Wilbur Wright and Hart Berg at Le Mans, 3-1/2 x 5-1/2 inches, with autograph date at upper right above signature "*8 December 1908*."

$3,000 - 5,000

497

WRIGHT, WILBUR. 1867-1912.

La Conquete de L'air. L'aviateur américain Wright disposant son Aéroplane sur le rail d'ou il sera lancé pour prendre l'essor. Postcard Signed ("Wilbur Wright"), collotype print photograph of Wright preparing the flyer for take-off at Le Mans, 3-1/2 x 5-1/2 inches, with autograph date above signature at upper left "*8 December 1908*." Green ink stain at top right corner, light wear.

$3,000 - 5,000

497

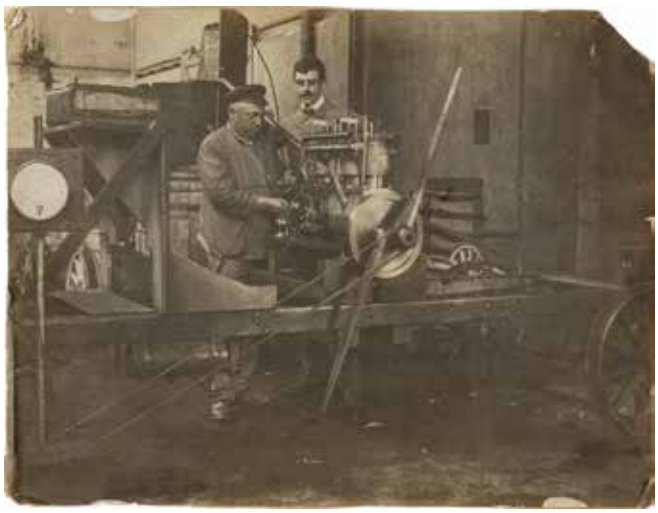
498

WILBUR WRIGHT AT LE MANS.

A collection of documents concerning Wilbur Wright and his 1908 flight at Le Mans (France), including:
1. Four collotype postcards signed ("Wilbur Wright"), 5-1/2 x 3-1/2 inches (140 x 89 mm).
2. 12 gelatin silver print photographs, most 9 x 7 inches, largest 15 1/2 x 12 inches, depicting the Léon Bollée factory, automobiles and one image of the Wright flyer engine being serviced at the factory.
3. Two unsigned collotype postcards.
4. Two bound booklets of 25 commemorative "La Conquete de l'Air" collotype postcards, undated, but after 1912 (one lacking covers).

SOUVENIRS OF WILBUR WRIGHT FROM A WORKER AT THE LÉON BOLLÉE FACTORY. Wilbur Wright chose the Hunaudières race track near Le Mans, southwest of Paris, as a location for his 1908 flight demonstration at the urging of French auto maker Léon Bollée. Because the flyer suffered extensive damage when inspected by French customs officers, Wright needed the factory to help him repair the plane, although he had to do most of the repair work himself. The postcard booklets included with this lot date from after Wilbur's death, as attested by the illustration in the inside back cover, which is a facsimile of the telegram received by Bollée from Orville Wright in 1912, informing him of Wilbur's death.

$5,000 - 8,000



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499

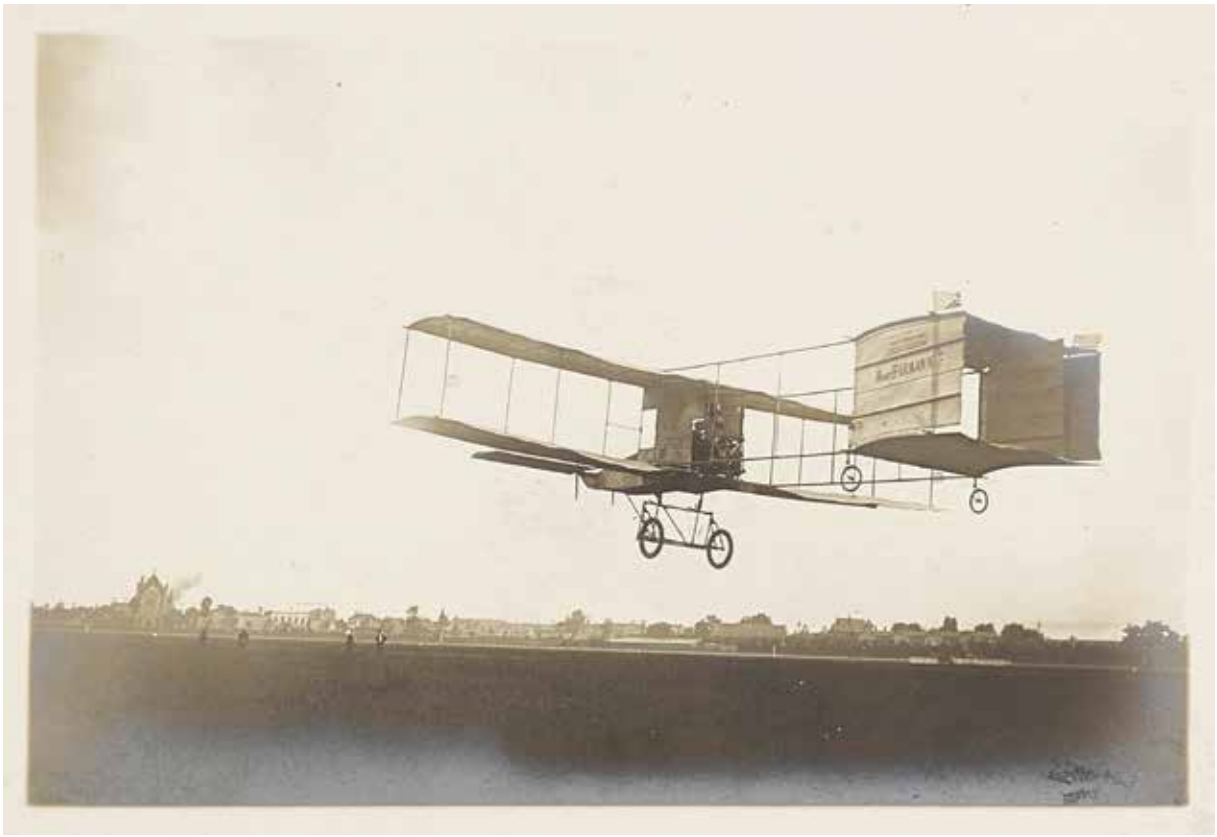
WRIGHT BROTHERS IN FLIGHT.

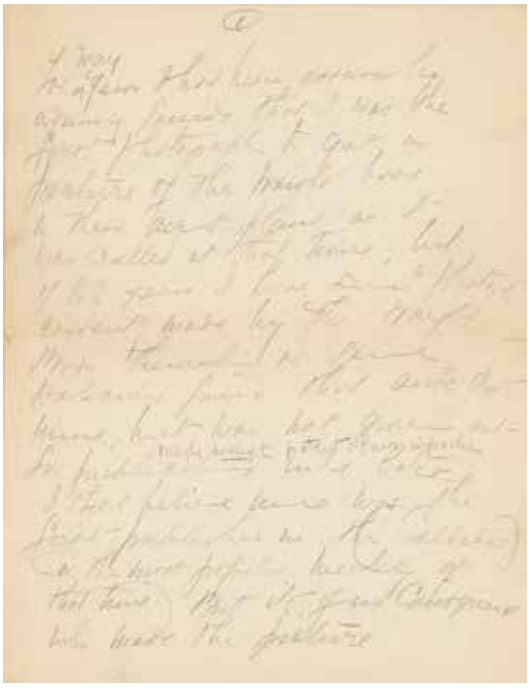
J. MUNIER. "*L'Exhibition Aerienne*." Photolithograph print, 11-3/8 x 16-1/4 inches (288 x 414 mm), no date, but c.1908. showing an aviation meet with multiple aircraft in the sky simultaneously while a crowd in the foreground looks on in amazement. The aircraft incorporated in this image, almost certainly drawn from contemporary photographs, include the Wright Flyer featured prominently in the foreground, as well as what appear to be Levavassuer's Gastambide-Mengin machine, and Goupy's triplane, as well as a rigid airship and a blimp.

The arrival of Wilbur Wright in Paris in 1908 created a great deal of excitement among the French public, and a boom in everything related to aviation. This somewhat exaggerated image seems to have been printed to sell to a crowd eager to gather everything related to aviation.

$800 - 1,200

499





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JAMES HARE ALBUM CONTAINING 55 PHOTOGRAPHS OF WRIGHT BROTHERS.

Photo album and letter of James Hare, who photographed the Wright Brothers' demonstration flights in 1908 and 1909, comprising:
1. Album, oblong folio, mounted with 55 gelatin silver prints, various sizes ranging from 4-1/4 x 3-1/4 inches to 6 x 4 inches. Captions include: "*Correspondents crossing sand dune to see if Wright Brothers are actually flying at Kill Devil Hill N.C.*"; "*First [published] picture of airplane actually flying [May 1908]*" with the word "published" and the date added later; "*Engine started, propellers working*" (at Fort Myer); "*Last picture of Lieut. Selfridge before the accident*" and "*Wilbur takes a canoe aloft at Governor's Island*." Most of the photographs are placed in sequential order depicting lift off, flight, and landing, with multiple shots of planes in mid-flight. The album also includes crowds gathering to watch the flight, such as Robert Taft's viewing party which included his son Charlie, and the Wright Brothers receiving medals. 9 images have been removed, leaving residue from corners.
2. Autograph Manuscript, unsigned, but ostensibly in the hand of Jimmy Hare, 8 pp, 4to, attesting to his experience photographing the Wright Brothers' flights: "*For many years I had been assured by admiring friends that I was the first photographer to get a picture of the Wright bros in their aeroplane ... but of late years I have seen a photograph ... taken by the Wright Bros ... I still believe mine was the first published in the Colliers....*" There are line-outs and notations in the text, indicating it was a draft.
Provenance: Christie's, 16 April 1991.

English-born photojournalist James H. (Jimmy) Hare became perhaps the most prolific photographer for *Collier's Weekly* after photographing the events of the Spanish American War. He photographed the Wright brothers flights at Kill Devil Hills in 1908, and again at Fort Myer that year. Hare's photographs were published in Collier's Weekly on May 30, 1908, marking the first appearance of the Wright Flyer in print. He also took two of the last photographs of Lieut. Selfridge (included in this album), the first man to die from an aviation accident, moments before his fatal flight. After documenting five wars and numerous historical events in the early 20th century, Hare retired in 1929.

$15,000 - 25,000

501

LARGE PHOTO OF A WRIGHT FLYER AT CAMP D'AUVOURS.

BRANGER, MAURICE-LOUIS, photographer. Sepia toned gelatin silver print, 16-3/4 x 19-7/8 inches, signed ("M. Branger"), mounted and framed, depicting the Wright flyer over the field at Camp d'Auvours, with the tower of the launching mechanism in view to the left, among a group of onlookers. Framed and glazed.

An unusually large image for the period, this shot shows detail of the tower that was developed by the Wrights to accelerate the plane down its track for takeoff, using a simple weight and pulleys to provide the motive force. Because the plane is moving toward the tower, and not away from it, we can see that the craft has made at least one complete turn, and returned to its starting point, and shows no sign of stopping. This may be the flight made on January 1, 1909, when Wilbur Wright set a duration and distance record in his 1907 Wright flyer, flying approximately 77 miles in 2 hours and 20 minutes. The man on the far right of the group sitting on a bench may be Léon Bollée.

$1,500 - 2,000

501

502

STUDIO PORTRAIT OF WILBUR WRIGHT, TAKEN IN FRANCE.

Portrait photograph, gelatin silver print on card mount, 10/3/4 x 7-3/4 inches (273 x 197 mm) overall, with photographer's name (*J. Carpent - Le Mans*) printed at lower right. Inscribed in pencil on reverse *"Wilbur Wright at Le Mans - 1909 - Property of Léon Bollée*." Mounted under glass with fabric tape edging.

$800 - 1,200

502

503

WRIGHT EXHIBITION AT FORT MYER, VA.

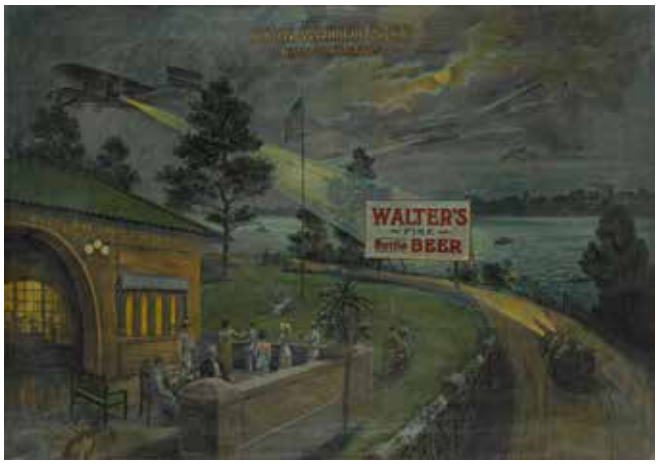
ASHTON, HENRY, photographer. Three photos of Wright Airplanes, gelatin silver prints, all individually matted:

1. Wright Flyer airborne at Fort Myer, Virginia, 1908, 4-1/8 x 3-5/8 inches.
2. Pulling Orville from the crash at Fort Myer, Virginia, September 17, 1908, 4-1/4 x 3-3/4 inches. The crash was a major setback for the Wright Brothers with Orville badly shaken and suffering a broken leg and several broken ribs, and the death of passenger Lt. Thomas Selfridge.
3. Archie Hoxsey in Wright Flyer, 1910, 4-3/4 x 3/3/4 inches. Hoxsey was an auto mechanic who became acquainted with the Wright Brothers around the beginning of 1910 and taught flying at their flight school in Montgomery, Alabama. He was the first to fly an airplane at night, took Theodore Roosevelt up for a flight, and set a flight altitude record of 11,474 feet in December 1910. A few days later, he died in a crash while attempting to set a new record.

Provenance: Swann Galleries, April 7, 1993 and April 22, 1994.

$800 - 1,200

503



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504
WRIGHT FLYER FEATURED IN ORIGINAL BEER ADVERTISEMENT ART.
Anonymous oil on canvas, 24 x 34 inches (610 x 864 mm), c.1909, depicting a dramatic nighttime scene of guests on the patio of a pub, while an automobile and a bi-plane pass by, shining their headlamps on a billboard that reads *Walter's Fine Bottle Beer*. At top center in gold lettering is the brewer's name: *John Walter & Co. - Eau Claire, Wis.*

THE EXCITEMENT OF EARLY AVIATION USED FOR MARKETING. Here an old-fashioned product is associated with exciting new technologies at the time: The airplane and the automobile.

John Walter & Co. was founded in Spencer, Wisconsin in 1874. After a fire destroyed the brewery it reopened in Eau Claire in 1889, and reached an output of 50,000 barrels just before Prohibition came into effect. The company survived prohibition and the death of its founder, but eventually succumbed to market changes in the 1980s. The name still exists, revived by a modern brewpub in Eau Claire.

$1,000 - 2,000

505

505
A 1909 BRONZE BUST OF ORVILLE WRIGHT.
CARVIN, LOUIS-ALBERT. 1875-1951. Portrait bust in patinated bronze, inscribed on base at front "Orville Wright," signed "Hotel GASSION - 13-2-1909 - L.CARVIN" on left side of base. Height: 9 inches (228 mm).

French sculptor Louis-Albert Carvin was a member of the *Société des Artistes Français*, known primarily for his sculptures of animals. He exhibited at the *Salon des Artistes Francais* from 1894 to as late as 1933, and sculpted the trophy presented to the Wright Brothers by the Aéro Club de la Sarthe on May 1, 1909. Entitled *La Muse de l'Aviation*, that trophy still resides at the Wright's family home, Hawthorne Hill, in Dayton Ohio.

$1,000 - 2,000

506

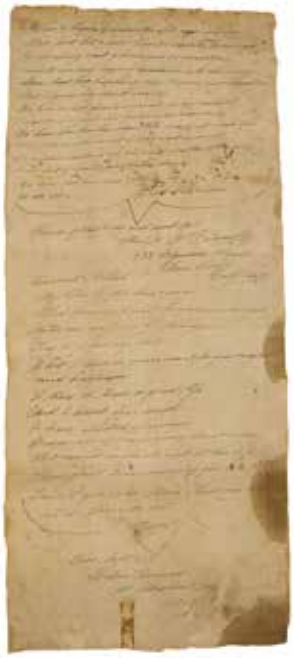
506
1910 COLUMBUS AVIATION MEET PHOTOGRAPHS.
COLLINS, JOHN F. 1888-1990. 11 sepia-toned silver gelatin print photographs, mounted to black paper album leaf, depicting aircraft in flight at a 1910 Columbus, Ohio aviation meet. 10 x 12 inches overall, the images in various sizes and shapes, the album page mounted to a later card, with penciled caption "*John F. Collins—Columbus, OH 1910.*"

A little-known meet held close to the birthplace of aviation. There is scant information available on the Columbus meet, although it was sometime after the Los Angeles Dominguez Hills Air Meet in January of the same year, which was the first of such meets held in the U.S. John F. Collins, born in Marietta, Ohio, had a remarkably long photographic career, being active from 1904 to 1974.

$800 - 1,200

507
CHICAGO AVIATION ARCHIVE.
Extensive archive of material related to the very beginnings aviation in and around Chicago—Clearing Field, Hawthorne Race Track, Grant Park and Cicero Field—including:
1. Approximately 90 photographs, predominantly gelatin silver prints with some collotypes and half-tone prints, various sizes, 2-3/4 x 2 inches to 4-3/4 x 3-1/2 inches, c.1910, with some duplicates, most with captions on verso. Subjects include Illinois aviators as well as those from outside the state, including Glenn Curtiss, A.L Brown, Edwin Ely, J.C. Mars, Jimmy Warde, H.H. Dailey, Whipple S. Hall, and others, as well as images of various participating aircraft.
2. Seven glass plate positives, image size approximately 2 x 3 inches, with images believed to be J.C. Mars and Glenn Curtiss with his Curtiss Pusher, and a Farman airplane in 3 of the slides; all shot at an undetermined location, although possibly Chicago's Hawthorne

507



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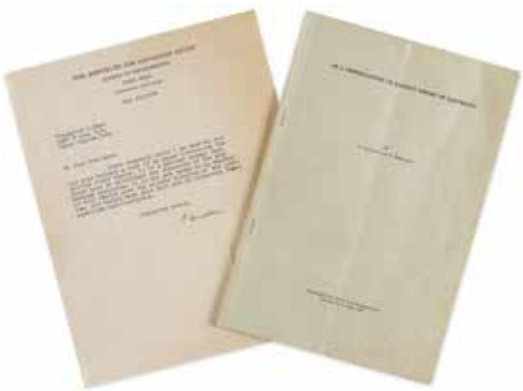

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Race Track during the Air Meet of October 1-8, 1910 or Cicero Flying Field c.1911.
3. Brochures, event lists, and published official rules of the Gordon Bennett meet.
4. Printed Membership Certificate for the Gordon Bennett Trophy, serial number 3340, unnamed, in dark orange and black ink, featuring an image of the trophy, inset portraits of former champions Glenn Curtis, Charles Weyman, and Claude Grahame-White, and the logo of the Aero Club of America on a background of a sky scene filled with a variety of flying machines. 9 1/2 x 13 inches.
5. Commemorate medal in bronze gilt and enamel, on green ribbon, with top bar reading "*International Aviation Meet Associaton*," together with 15 "Subscription Member" badges in bronze finished metal, pinback, with suspended red acetate ribbon.

An interesting view of Aviation in Chicago with images of some of the very earliest aviators as well as ephemera from the Gordon Bennett Aviation Cup meet. Photographs include numerous Curtiss aircraft, but also original aircraft built in Chicago and its surrounds such as by J.E. Mair who built a biplane in his backyard, H.H. Dailey who built a center-drop biplane, a biplane by James E. Case, a triplane by F.W. Kreck and Carl Bates who was building an aeroplane; also includes numerous images at Chicago's Hawthorne Field, images of J.C. Mars at the Mid-West Aviation meet, 1910 and in Omaha, Whipple Hall, who was the first man to cross the U.S.-Mexico border in an aeroplane, former bicycle champion turned aviator Charles W. Miller (also billed as one of the heaviest aviators at around 240lbs), etc. Should be seen.

$2,000 - 3,000

508

THE MURDER OF TWO AMERICAN PILOTS.

Flight Lieutenants Cecil H. Connolly and Frederick D. Waterhouse. *[Copy of their last Will and Testament, written out on a side of a plane.]* Dated 1919. A painted canvas section of aeroplane, 570 x 255 mm. The verso written in ink with the text of the last will and testament of two American Pilots Cecil Conolly and Fred Waterhouse, who crashed in the Baja de California, south of San Diego, after a storm, and who survived 17 days without food, only to be picked up and subsequently killed by two Mexican fishermen. The paint on the painted side badly worn, the verso slightly discolored with oil stains to left margin. Together with two identical photographs of the two draped coffins aboard the USS *Aaron Ward*.

The tale of the tragic death of two American Army flyers, attached to the 9th Aero Squadron, based in San Diego, who whilst on patrol hit a storm and were thrown dramatically off course. They eventually found land and crashed on an open beach at Refugio de Guadelupe, a deserted area on the eastern shore of the Baja de California, south of the Mexican border. With little or no food they survived 17 days waiting on the beach, until they were discovered by two Mexican fishermen, who took them in, fed them, but in some argument between the parties, the flyers were both killed, apparently on September 3rd 1919. The bodies were recovered in October 19th 1919 at Angeles Bay by the US Navy, according to the writer of the text, and brought aboard USS *Aaron Ward* to be returned to San Diego. A Mexican Judge in Tijuana in October 1921, two years later, sentenced the two men to 6 years imprisonment for homicide during a fight, and in 1928 the Connolly family sought financial recompense from the Mexican Government for covering up the two deaths. The text appears to have been transcribed by a naval officer, who was there when the bodies were recovered (see the hand writing on one of the photographs shot onboard the USS *Aaron Ward*), probably copying an original text found on the flyer's person.

$2,000 - 3,000

509

LINDBERGH, CHARLES. 1902-1974.

Program for the presentation of the Hubbard Medal of the National Geographic Society to Charles Lindbergh, [Washington, DC], November 14, 1927.
Printed sheet, 1 p, 278 x 148 mm. Folds, numerous creases, slightly soiled, a few small tears, one with tape repair visible on verso.

LINDBERGH RECEIVES THE HIGHEST HONOR OF THE NATIONAL GEOGRAPHIC SOCIETY, the Hubbard Medal, in November 1927. The award of the medal was announced in June of that year, but Lindbergh had not yet returned from France. The official presentation took place on November 14, and the medal was presented personally by President Calvin Coolidge. This program gives the sequence of events, starting with a musical performance by the United States Army Band, and ending with the screening of a motion picture. Lindburgh's party consisted of himself and his mother. Anne Morrow Lindbergh (who would also receive the Hubbard Medal in 1934) was not in attendance.

$500 - 700

510

510 W

HINDENBURG AIRSHIP.

Aluminum alloy section of struts from the zeppelin Hindenburg, 28.5 x 13 x 12 inches.
Provenance: Salvaged from Perth Amboy, NJ, scrapyard, 1937; thence, by descent.

CRASHED AND BURNED, LAKEHURST, NEW JERSEY, MAY 6, 1937: ONE OF THE LARGEST KNOWN STRUT SECTIONS FROM HINDENBURG LZ-129. The explosion of the Hindenburg on May 6, 1937 signaled the end of hydrogen-inflated dirigibles as commercial air vehicles. This girder section, although very large, is strikingly light. It is made of Duralumin, an age-hardenable aluminium alloy developed by Alfred Wilm. A fine example, one of the nicest, both in size and preservation, outside of the Navy Lakehurst Historical Society.

$20,000 - 30,000

511

511

HINDENBURG AIRSHIP.

Two fabric swatches from the tail fin, the larger featuring red and white paint, 110 x 335 mm, the smaller featuring black paint, 130 x 165 mm (irregularly shaped), 1937.

RED AND BLACK FABRIC SWATCHES SALVAGED FROM THE TAIL FIN OF THE AIRSHIP HINDENBURG. While silver swatches appear regularly in the red, white and black pieces for the tail fin are significantly more rare. With 10 pp of spectral analysis from Spectrace Instruments matching these pieces to a known piece of silver fabric from Willy Von Meister.

$10,000 - 15,000

Space History

Lots 512-592

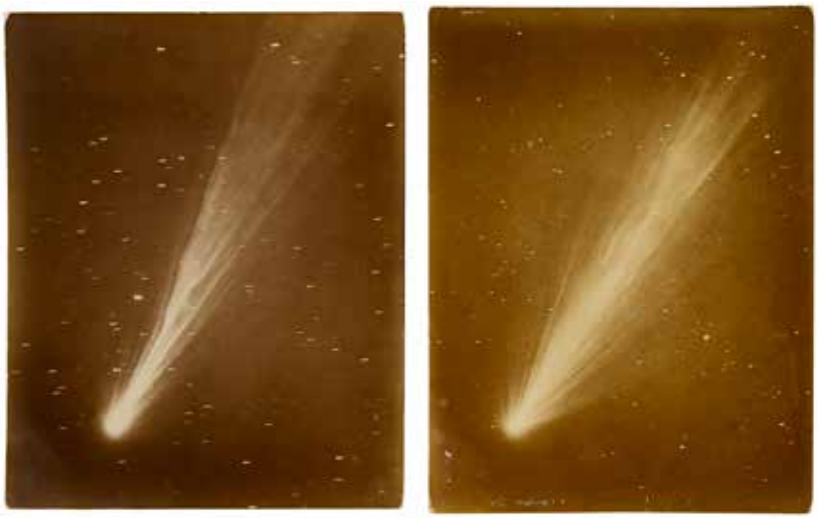
512

PHOTOGRAPHS OF MOREHOUSE COMET.

2 gelatin silver prints of images taken of the comet in 1908 at the Royal Observatory in Greenwich, each approximately 200 x 150 mm, inscribed in ink on verso "*Comet 1908 III (Morehouse)*" with dates and time annotations indicating November 19th and November 25th, and each marked "*Royal Obs. Greenwich*." Brown toned, slight wear to corners, paper browned.

Morehouse comet was discovered on September 1, 1908 by Daniel Walter Morehouse, an Astronomer at Drake University in Iowa. It was unusual for its bright, rapidly varying tail, which was found to contain high concentrations of a molecular isotope of Carbon Monoxide. A non-periodic comet, Morehouse is not expected to be visible from Earth again for millions of years.

$1,500 - 2,500



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513

PLASKETT, JOHN STANLEY. 1865-1941.

Annular Nebula, Lyra. Gelatin silver print, 199 x 148 mm, titled in ink on verso. Brown toned, slight flaking of emulsion to corners, browning to paper.

John Stanley Plaskett began his career as a machinist, landing a job at the University of Toronto Department of Physics, which inspired him to enroll in the school himself in 1895. He went on to become Director of the Dominion Astrophysical Observatory in Victoria, BC, and earned a number of prizes for his work, including a CBE, the Bruce Medal, and the Gold Medal of the Royal Astronomical Society.

$800 - 1,200

513

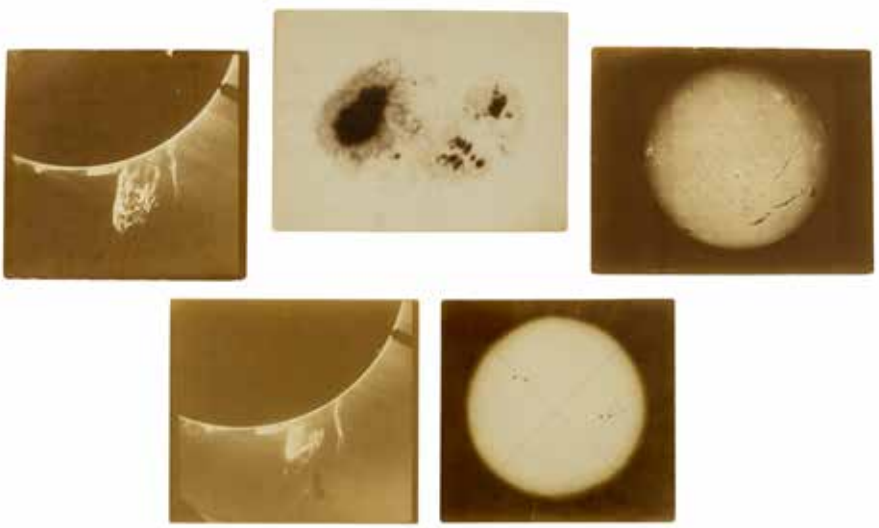
514

EVERSHED, JOHN. 1864-1956.

5 photographs of the sun, gelatin silver prints, approximately 200 x 150 mm to 160 x 150 mm, Greenwich, England and Kodaikanal, India, 1906 to 1917, all hand-captioned on verso, three images credited to John Evershed (dated 1916-1917), while the other two are credited to the Royal Observatory. All toned, with browning to paper, light wear to edges.

John Evershed was born in England but became director of the Kodaikanal and Madras observatories in India, where he made the first observation of the radial motion of gases in sunspots which came to be known as the Evershed effect. He retired in 1923 and returned to England where he continued his solar observations on his own. He was awarded the Gold Medal of the Royal Astronomical Society and was made a Companion of the Indian Empire upon his retirement.

$3,000 - 5,000



514

515

515
V-1 FLYING BOMB NOSECONE RANGE MEASUREMENT PROPELLOR.
Parabolic cone in plastic, with plastic 2-blade propeller attached at base, 50 mm diameter, 200 mm span of propeller, wires with metal and bakelite connector protruding from back, mounted on a 50 mm cardboard cone.

The small propellor mounted on the tip of the V-1 was part of the guidance system. It used airflow over the propellor blades to turn a countdown timer which would then measure the distance traveled. It would first arm the warhead when it traveled approximately 38 miles from the launch site, and then upon reaching zero on the counter it would detonate two exploding retaining bolts, which would release spoilers on the elevators. This, in turn, would cause a stall, and the V-1 would go into a steep dive over its target.

$4,000 - 6,000

516

516
WYSOCKI, CHARLES. 1928-2002.
Itself. Painting, oil on board, being original illustration art for *Scientific American*, 1962. Image size 350 x 285 mm. Matted and framed, with brass title plaque bearing Hoffman Electronics Corporation logo.

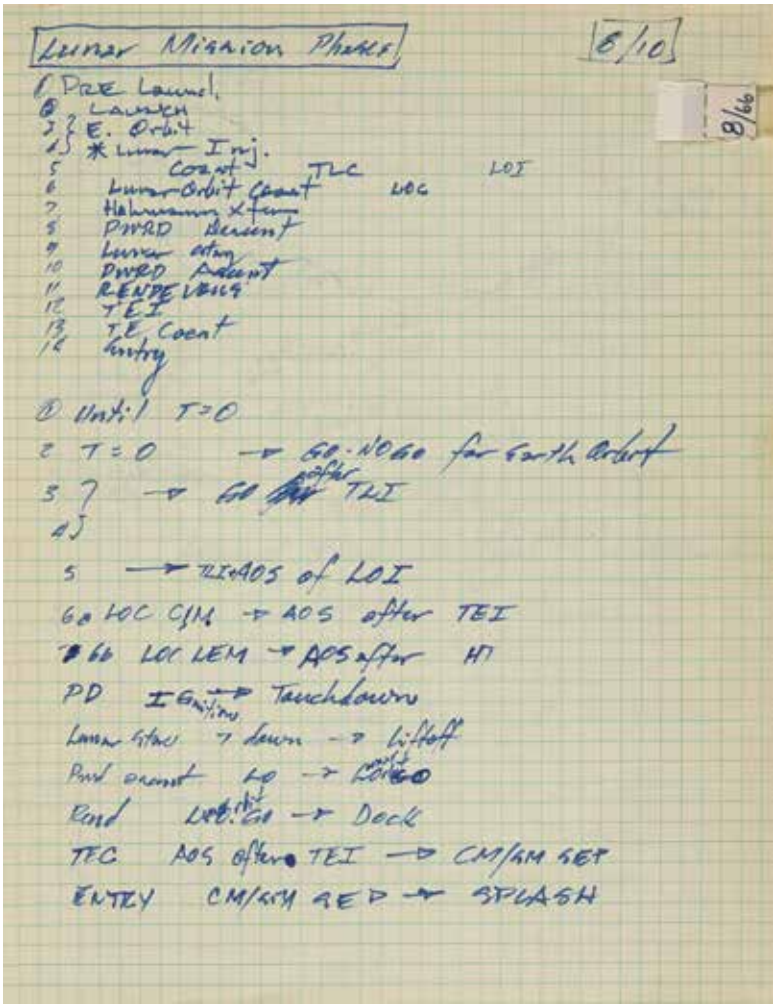
In 1962 the Hoffman Electronics Corporation hired a handful of the most prominent science fiction authors to write very short fiction pieces, which were then inserted as 2-page advertisements in *Scientific American*, paid for by Hoffman. A.E. Van Vogt's story "Itself" appeared in the magazine in January, 1962.

$1,500 - 2,500

517

517
TWO LUNAR CONCEPT DRAWINGS.
Opaque watercolors on board, each 20-1/8 x 30 inches (511 x 762 mm), one of a six-wheeled lunar rover concept, the other depicting an orbital space station with a docked rocket spacecraft and a spherical command module shown in cutaway. Lunar rover photo signed ("Lois H. Smith") while space station art is marked in lower right corner "*MS-6-54-64 - SEPT 28, 64*."

$800 - 1,200



518

PROPERTY FROM THE ESTATE OF GRANVILLE E. PAULES III

Granville E. Paules III (1937-2011) graduated from the University of Texas at Austin and served as an officer in the Navy in the west Pacific. He left active duty in 1964 to work at NASA Flight Control in Houston where he became a part of the Apollo Program, serving as a Primary Guidance Officer. He was in the "trench" during the Apollo 11 moon landing and received the Presidential Medal of Freedom for his efforts as a member of the flight operations team during the Apollo 13 crisis. He left NASA after Apollo 14 to work for the Department of Transportation, but returned in 1985 to serve as Operations Director of the Space Station Freedom Program.

In a 2006 interview for the Johnson Space Center Oral History Project, Paules explained his motivations: *"I made it my whole lifetime to be dedicated to getting to the Moon by the year 2000. That was what my goal was. I figured we could probably do it, and reading all of the Willy Ley and all of the science fiction guys, they figured you could make it by 2000. Here we were back in the early 60s. 'Yeah, we've got 40 years. We'll make it.' Made it by [19]'69. [Laughs] But it was a really compressed schedule."*

Bonhams is pleased to offer the following lots from Paules' years as part of the Apollo Program.

518

APOLLO-ERA: PLANNING FOR THE MOON.

GROUP OF ORIGINAL NOTEBOOKS FROM APOLLO MISSION CONTROL "GUIDO."

5 volumes, 4to. Manuscript, on lined paper. Green textured cloth and marbled boards. Hand titled on paper labels on covers, with inscriptions including "*504 Activities Planning*," "*G. E. Paules, NASA — MSC, FCD*," and one marked "*ARG ... and all that*," some with dates ranging from August 1966 to March 1970. All with covers worn, and internal wear from use.

An amazing view behind the scenes, these notebooks kept by NASA mission control GUIDO (Guidance Officer) Granville E. Paules III, who was present for Apollo missions through 14. He was Guidance Officer on the unmanned missions and later Lead Phase Guidance Officer, Lead Launch Guidance Officer and Yaw on Apollo 11. His notebooks document the many planning meetings with fellow staff as well as meetings with contractors and other involved parties to fully understand the systems and equipment utilized.

In a 2006 interview, Paules described some of the notebooks' contents for the NASA Johnson Space Center Oral History Project: *"I always created my own personal console position checklist for all the key events and the things that we had to do,in order chronologically. So that was something that was outside the flight plan. You had the flight plan to give you general guidance, and then you'd update it if something changed. The flight plan was pretty detailed on maneuvers, details about maneuvers, but not procedures. Procedures, you had your own console book."*

$8,000 - 12,000

519

520

519

NASA HAND-MADE CIRCULAR SLIDE RULE.

Used in the "Trench" at Mission Control during Apollo 7.
Plastic sheet, card stock, central metal brad hub, 280 mm diameter, hand-made at NASA Mission Control to calculate trajectories. Contained in sleeve made of heavy card stock and stapled around three edges.
WITH: *All Purpose Space Rule*. Houston: NASA Flight Control Division, 1967. Folding whiteprint chart tipped in at back, showing graphs of trajectory calculation. Bound with staples, on 5-hole punched paper.

In a 2006 interview for NASA Johnson Space Center Oral History Project, Granville E. Paules III explained the "Space Rule":
"We didn't have all the computer programs for calculating backup procedures if the computer failed, for getting the crew in the right attitude to reenter safely. They were in a circular orbit, so there shouldn't have been any problem.

When you're going around, and if they had to go to alternate sites around the world because of a problem, you need the computer to calculate the correct attitude of the spacecraft so it comes in right and it does all the right yaw maneuvers. You needed to align the platform, the inertial platform on board, correctly so that it would handle the spacecraft, and it wouldn't get in a position where it was what we call gimbal lock. This inertial platform can only go so many degrees in different axes, and so you align it to get the most reasonable midpoint of where any extreme would occur, rolling and rocking around, pitching.

You always had to align the spacecraft platform, depending on where you were going to come in, and we didn't have a computer program to do all that, so in terms of these procedures we all developed, I had a great big wheel. It was made out of cardboard with plastic and stuff on it that had all the key stars that they might see. I put them in the right star field orientation, and then if they were to see a certain star and they could identify it, we could tell them what angles they needed to put into the spacecraft backup system to reenter properly. That was all a handmade thing. It didn't depend on any computers."

$6,000 - 8,000

520 W

COLLECTION OF MANUALS CHARTS AND HANDBOOKS FROM THE APOLLO PROGRAM.

Extensive archive of manuals, handbooks and charts used during the Apollo program, including over 100 printed manuals and handbooks, and approximately 40 charts, mostly NASA official publications. Handbooks mostly 4to, in printed wrappers. Charts show lunar and earth trajectory maps of Apollo missions, including Apollo 11. Condition varies.

$4,000 - 6,000

521

522

521
APOLLO 8 EARTHRISE SIGNED.
Color photograph, 8 x 10 inches, of Earth over the horizon of the lunar surface, *SIGNED AND INSCRIBED* by all 3 members of the Apollo 8 crew: "*To Gran, Thanks for keeping us on course—Frank Borman, James Lovell, Bill Anders*." Additional caption at lower right over Lunar Surface reads "*Apollo 8, Dec '68, 21125100.89z*." Matted, framed and glazed.

$1,000 - 2,000

522
APOLLO 11 MISSION-USED COMPUTER DATA.
COMPUTER PRINTOUTS SHOWING PITCH AND YAW READINGS. A group of graph paper telemetry printouts showing pitch and yaw readings for the Apollo 11 launch. Most on continuous graph paper by Clevite Corporation, some marked in ink "*Apollo 11 Ascent*," one marked on the external surface "*Apollo 11—Pitch, Landphase, Mission U2t2*." 5 sheets are labeled "*506 Launch Velocity Dispersions*," stapled together. All rolled, some wear and foxing to paper edges.

Granville E. Paules, III served as Lead Launch Guidance Officer and would have used these printouts during mission.

$2,000 - 3,000

523

523
APOLLO 11 AT TRANQUILITY BASE, SIGNED.
Color photograph, 8 x 10 inches, with wide white margin at left, *SIGNED AND INSCRIBED* in blue pen in Armstrong's hand: "*To Gran — With thanks for all your contributions to this picture! Best of luck, Neil Armstrong, Tranquility Base*," and in black pen "*Buzz Aldrin.*" Additionally marked at the top left "*Apollo 11, Jul '69 16133200.78z.*"

$4,000 - 6,000

524

524
APOLLO MISSION CONTROL SIGNED PHOTOS.
A group of 4 photos signed by members of the NASA Mission Control staff:
1. Color photograph, 8 x 10 inches, of Saturn 1B launch vehicle carrying the AS-201 unmanned mission, signed by 5 members of the staff. Matted, framed and glazed. 2. Color photograph, 8 x 10 inches, of Saturn 1B launch carrying the AS-202 unmanned mission, signed by 6 members of the staff. Matted, framed and glazed.
3. Color photograph, 8 x 10 inches, of Saturn 1B launch carrying the AS-203 unmanned mission, signed by 4 members of the staff, dated "*Nov '67*." Matted, framed and glazed.
4. Color photograph, 8 x 10 inches, of Saturn 1B launch carrying Apollo 4 unmanned mission, signed by 6 members of the staff, dated "*Nov '67*." Matted, framed and glazed.

$1,000 - 2,000

525

525
APOLLO CREW SIGNED PHOTOS.
4 Apollo mission photographs signed by the crews, comprising:
1. Apollo 7 color photograph, 8 x 10 inches, of final Saturn stage in orbit with doors open for rendezvous maneuvers, *SIGNED* by Wally Schirra, Walt Cunningham, and Don Eisele. Matted, framed and glazed.
2. Apollo 8 color photograph, 8 x 10 inches, of the crew in spacesuits, posing by the Apollo Mission Simulator, *SIGNED* by James Lovell, W.A. Anders, and Frank Borman. Unframed.
3. Apollo 9 color photograph, 8 x 10 inches, of Lunar Module inverted in lunar orbit, *SIGNED* by James McDivitt, Rusty Schweickart, and Dave Scott. Matted, framed and glazed.
4. Apollo 10 color photograph, 8 x 10 inches, of Command Module with Lunar Surface in background, *SIGNED* by Tom Stafford, John Young and Gene Cernan. Matted, framed and glazed.
WITH: Two unsigned photographs of the Apollo 11 crew in spacesuits, one color and one black and white.

$1,500 - 2,500

525A

PROPERTY OF VARIOUS OWNERS

525A

ORIGINAL BOILERPLATE GEMINI CAPSULE

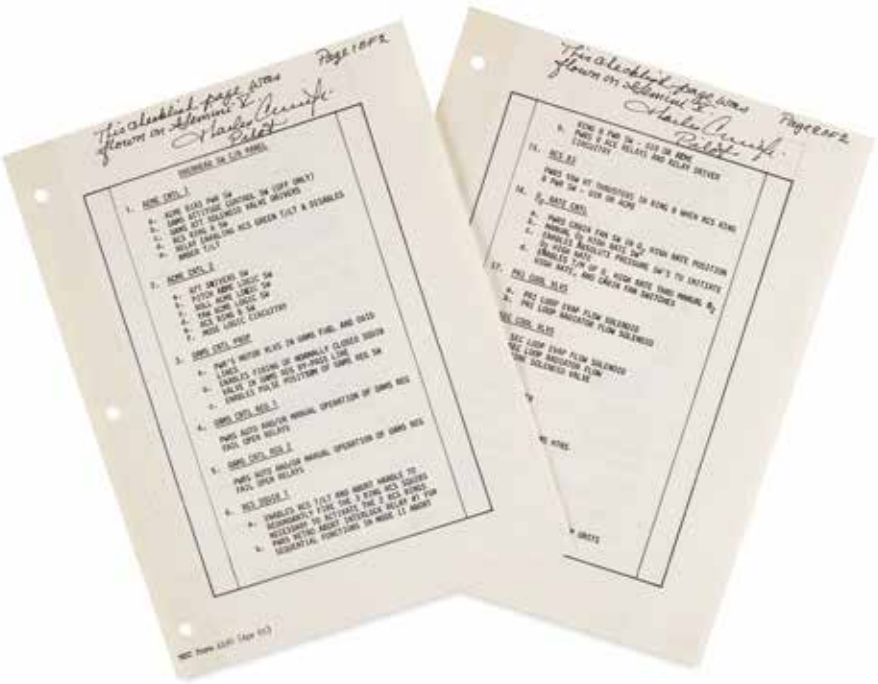
Boilerplate Gemini Capsule, 9.5 feet tall by 7.5 feet wide, approximately 3500 lbs. Serial number "MSC 325," painted gray with Gemini & NASA logos, US flag, stenciled "United States" and "NASA," interior unadorned, painted white. With original towing skid. Lacking access hatch and one panel, restored.

A boilerplate Gemini spacecraft, one of seven produced for testing weight and flotation prior to mission. Also known as a DemoSat or mass simulator, it is a nonfunctional craft or payload used to test various configurations and basic size, load, and handling characteristics of rocket launch vehicles as a cost-saving measure. This particular example was purchased in the San Francisco Bay Area and was likely used at the Mare Island Naval Shipyard in Vallejo. The capsule would be the only portion of the Gemini and Mercury spacecraft to return to Earth after accomplishing their missions, and as such required the most stringent and varied tests in order to ensure crew survivability. These frequently included water impact, flotation, parachute, environmental control and high-dynamic-pressure tests, amongst others. In the event, this vigorous testing proved to be of great worth: there were no disasters resulting in injury or loss of life in flight during the manned Gemini and Mercury missions. The "MSC" section of the serial number stands for "Manned Spacecraft Center," the original name for the Johnson Space Center.

Please note that this capsule is being sold in situ, and is currently located in the San Francisco Bay Area. Interested parties who wish to view the capsule are invited to contact the department to make arrangements. The successful buyer will be responsible for the timely disassembly if required, removal and shipping of this lot from its current location at buyer's expense no later than one month after the date of this auction.

$30,000 - 50,000

526



527

526

SCOTT CARPENTER AUTOGRAPH LETTER AND PAMPHLET SIGNED BY THE MERCURY SEVEN.

Autograph Letter Signed ("Scott Carpenter"), 1p, 4to, November 17, 1959, being a response to a class letter composed by grammar school students in St. Petersburg, Florida: "*Thank you for you fine letter which expressed my own feelings very well. I am enclosing some books which I thought you might enjoy....*"
WITH: a NASA pamphlet on Project Mercury, featuring photographs of the astronauts, SIGNED BY MERCURY SEVEN: SCOTT CARPENTER, GORDON COOPER, JOHN GLENN, GUS GRISSOM, WALLY SCHIRRA, ALAN SHEPARD and DEKE SLAYTON.
AND WITH: facsimile copies of the original class letter, and of Carpenter's letter.

$1,500 - 2,500

527

GEMINI 5 FLOWN CHECKLIST.

FLOWN checklist entitled "*Overhead SW C/B Panel*," 4 pages recto and verso, 8 x 10-1/2 inches on three-hole punched paper with laminated reinforcement along punched margin, SIGNED and INSCRIBED ("*This checklist page was flown on Gemini V / Charles Conrad — Pilot*") at the top of each leaf.

Gemini V was NASA's third manned flight in the Gemini program, tasked with extending the record for a U.S. manned spaceflight from 4 days to 8 days. Commanded by L. Gordon Cooper, with Charles "Pete" Conrad rounding out the two-man crew, the mission ran into fuel cell problems that limited the experiments they could perform, but broke the existing record duration for a spaceflight at the time.

$800 - 1,200

528

529

528 W

LUNAR GLOBE.

Globe in painted metal by Dennoyer-Geppert, Model No. 40702, 16 inches (406 mm) diameter, with clear plastic degree marker around half of the circumference, on circular metal base, with metallic manufacturer's label. Light wear, label on base partly peeling.

$2,000 - 3,000

529

ROCKWELL APOLLO CSM MODEL.

Model of the Command/Service Module (CSM) with escape tower and connecting lattice structure. Plastic and white painted metal model, 420 mm tall, made by the Walter J. Hyatt Company for North American Rockwell, prime NASA contractor for the CSM. With original fittem foam packaging and outer cardboard box with NASA and North American Aviation logos.

Decals represent the crew side hatch, windows, and the Command Module (CM) attitude control rocket engines, Service Module (SM) attitude control rocket engines, and additional structures on the SM. The large Service Propulsion System engine bell is visible through a clear viewing section at the base. The circular plastic base has a large decal that reads: *"Apollo Spacecraft – North American Rockwell."* The base, CM, SM and escape tower are all detachable.

$5,000 - 7,000

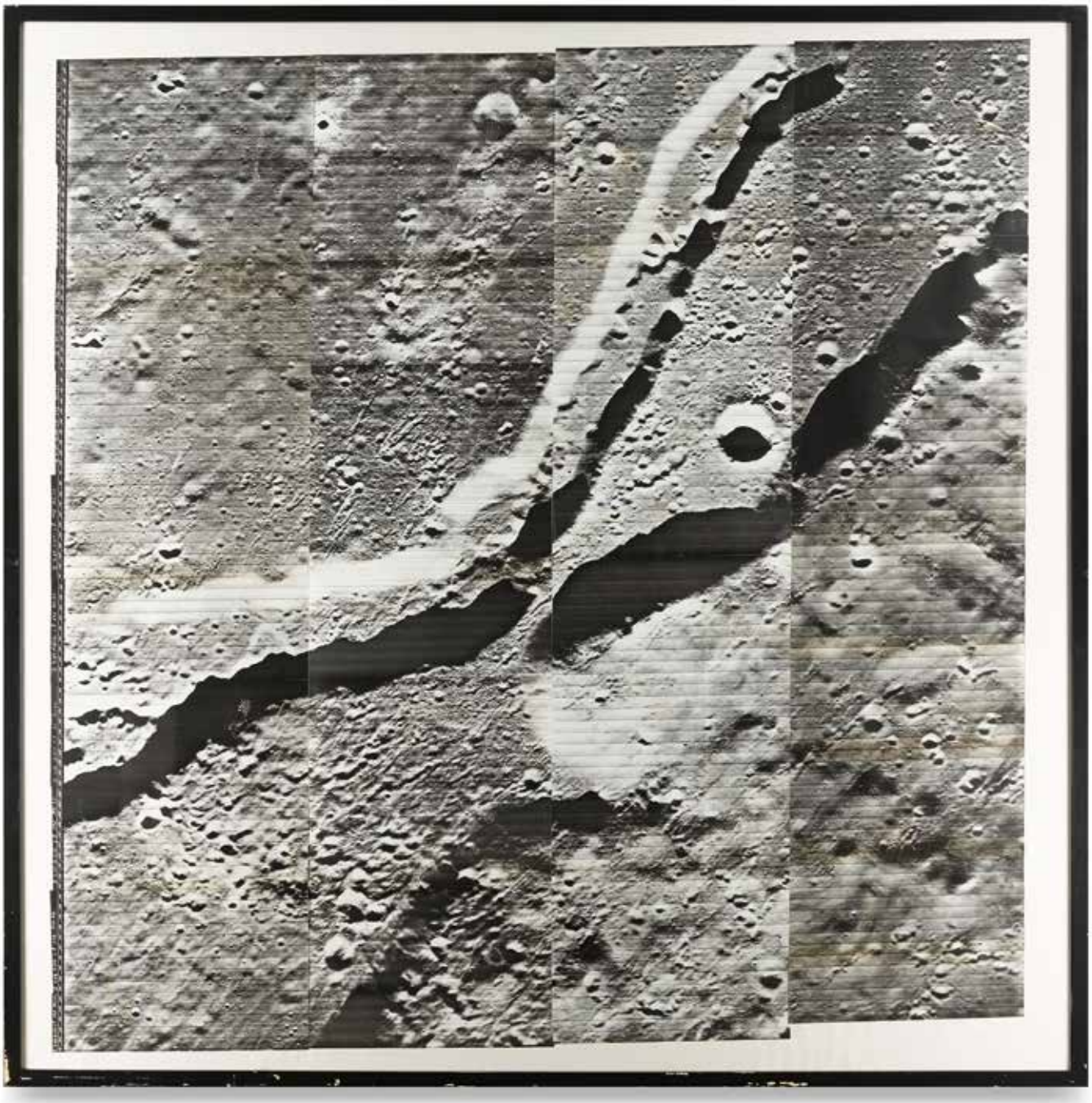
530

LEM COMPUTER TABLE USED DURING TRAINING.

Apollo Navigational Computer Information Table, Aluminum table, 158 x 360 mm, with black printed aluminum applied sheet to top, with four categories of information: *STAR LIST*, *SELECTOR LOGIC*, *INPUT* and *OUTPUT*. Fiberglass-filled back, with two articulated aluminum struts for mounting. Parts stamped in red ink on underside.

From the Apollo Lunar Module Mission Simulator, this table was attached below panel 6 of the LMP's control panels. The table serves as an all-purpose desk as well as a useful reference source during mission training. The desk is easily spotted in quite a number of contemporary Apollo training photographs including the famous image of Buzz Aldrin facing the camera, placing something in his shoulder pocket, with Neil Armstrong behind him. The table is clearly visible to the right. The desk was purchased by a Johnson Space Center engineer at the close of the Apollo program.

$15,000 - 20,000



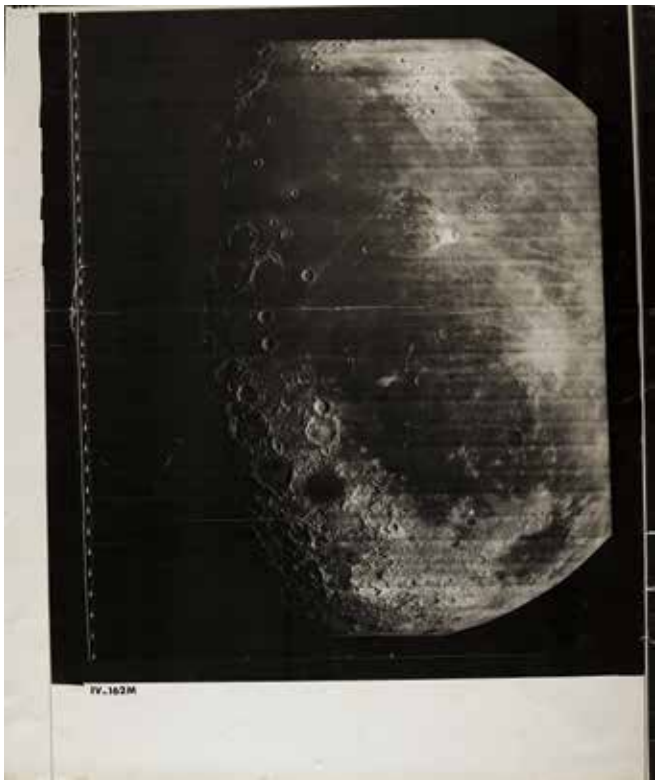
531 W

LUNAR ORBITER V: PHOTOGRAPHY.

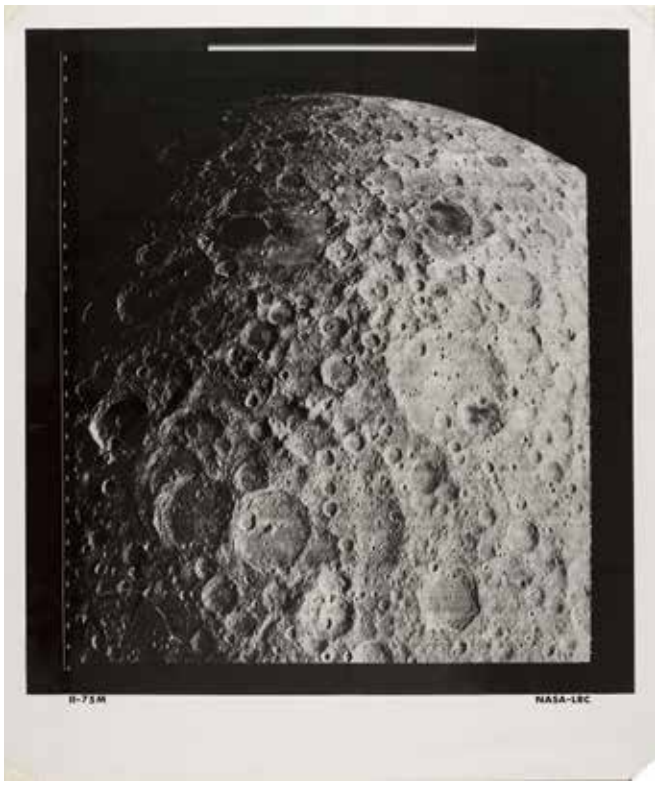
Oversize View of Schröter's Valley, August 18, 1967, comprising 4 telephoto panoramas, each comprising 10 silver gelatin prints joined, of Lunar Orbiter image V-202-205H, 1495 x 1550 mm overall, framed.

Launched on August 1, 1967, Lunar Orbiter V was the final LO mission, and had the objective of taking additional detailed photographs of potential Apollo landing sites. Known as the "APOLLO ZONE" this area was along the near side equator where a majority of Lunar Orbiter Program photographs were taken. Between August 6 and 18, Lunar Orbiter V took 174 photographs during 69 orbits. Illustrated in Cortright, *Exploring Space with a Camera,* p 124.

$10,000 - 12,000



532



533

532
LUNAR ORBITER-V PHOTOGRAPHS.
Lot of 3 NASA prints, various sizes, the largest 805 x 715 mm, including black and white photographic composited images, 1 numbered IV-162M and captioned *NASA-LRC*, another entitled "*Lunar Photomap, Copernicus, Orbiter-V-Site 37.1*," and another entitled "*Lunar Photomap, Marius, Orbiter-V-Site 51*." The last item with multiple tears, all with creases and small tears, rolled.

$2,500 - 3,500

533
LUNAR ORBITER V HIGH-RESOLUTION PHOTOGRAPHS.
Lot of 3 gelatin silver prints, 24 x 20 inches, including images numbered II-75M, II-93H1, and IV-161M, captioned *NASA-LRC*. Creases, tack holes to corners, rolled.

$2,500 - 3,500

534

LUNAR ORBITER V HIGH-RESOLUTION PHOTOGRAPHS.

Lot of 3 gelatin silver prints, 24 x 20 inches, including images numbered II-215M, III-162M, and III-162H3, captioned *NASA-LRC*. Slight creases, tack holes to corners, rolled.

$2,500 - 3,500

534

535

LUNAR ORBITER V PHOTOGRAPHS.

Lot of 3 gelatin silver prints, 24 x 20 inches, including images numbered IV-143M, IV-181M, both captioned *NASA-LRC*, and one captioned "*NASA - LRC Lunar Orbiter Project - Mission V, Spacecraft Frame No. 103, 1 of 1 Medium Resolution, Site A-21, GRE 08051190, KI No. 5119, Photographed: Date: 14 AUG 1967, TIME: 10:24:50.72, READOUT: AUG 23, 1967, SHUTTER .04 Second. Reassembled by: Army Map Service, Corps of Engineers, US Army, SEPT 11, 1967.*" Creases, tack holes to corners, rolled.

$2,500 - 3,500

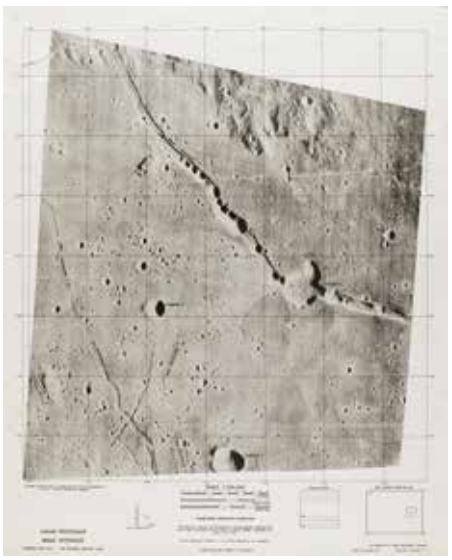
535

536

LUNAR ORBITER V PHOTOGRAPHS.

Lot of 3 NASA prints, various sizes, the largest 805 x 715 mm, including black and white photographic images, 1 numbered IV-195H1 and captioned "*NASA-LRC*," another entitled "*Lunar Photomap, Rima Hyginus, Orbiter-V-Site 23.1*," and another entitled "*Lunar Photomap, Prinz, Orbiter-V-Site 46*." Creases, the second print with a tear at bottom margin, rolled.

$2,500 - 3,500



536

537

537
APOLLO 7 FLOWN CUE CARD.
Instrument panel data card FLOWN on Apollo 7, 202 x 108 mm, irregularly shaped to overlay the panel, with 5 square pieces of Velcro on verso. INSCRIBED and SIGNED "*Flown and used during the flight of Apollo 7—Walt Cunningham*."

This cue card from Apollo 7's CSM instrument panel lists typed details of the Service Propulsion System (SPS) procedures, with hand-written notations in ink altering the time of the Mode III procedure from 9:30 to 9:49, and Mode IV from 9:26 to 9:46, with additional hand-written notes "*4 MIN*" before Mode III, and "*HA—NO ABORT*" in the margin beside Mode III procedures.

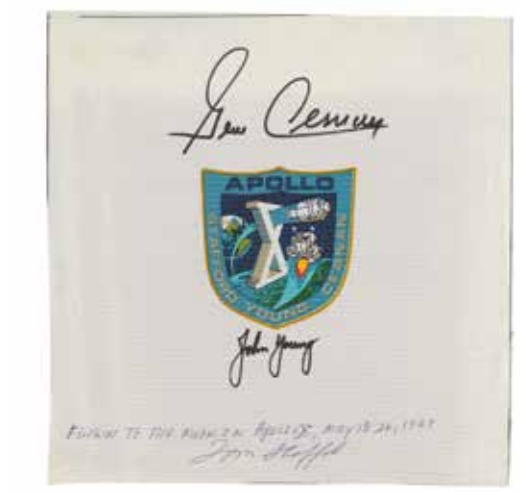
$1,500 - 2,500

538

538
A JIM MCDIVITT FLOWN APOLLO 9 BETA CLOTH PATCH.
FLOWN mission patch, with 78 mm diameter logo, on beta cloth swatch approximately 228 x 228 mm. SIGNED and INSCRIBED "*Jim McDivitt / Flown on Apollo 9*."

Apollo 10 was the first crewed flight of the Command/Service Module with the Lunar Module (LM) including the first docking and extracting of the LM.

$1,000 - 2,000



539

539
CREW-SIGNED FLOWN APOLLO 10 BETA CLOTH EMBLEM.
Apollo 10 shield-shaped emblem, 80 x 76 mm, printed on a segment of Beta cloth, approximately 230 x 228 mm.

INSCRIBED and SIGNED in ballpoint pen at the bottom edge by Tom Stafford "*Flown to the Moon on Apollo X, May 18-26, 1969*." Additionally SIGNED by Gene Cernan and John Young in black marker. Apollo 10 was the second mission to orbit the Moon.

$2,000 - 3,000

540

542

543

541

540 W

NASA LUNAR LANDING RESEARCH VEHICLE (LLRV) MODEL.
23 x 14 inch model in wood, metal and resin composite, in original NASA box measuring 29 x 21 x 15 inches. Box with NASA "meatball" label, numerous "*Fragile. Handle with Care*" and "*Delicate Instruments. Do Not Drop - Fragile*" labels, and original NASA mailing label addressed: "*US CIVIL SERVICE COMMISSION INCENTIVE AWARDS OFFICE*." Model in need of extensive repairs.
Provenance: From the estate of Col Emil "Jack" Kluever, the only pilot to fly LLRV No 2.

A very rare model of the Lunar Landing Research vehicle. The Moon landings of 1969 and after were the result of careful simulations run by NASA under the aegis of the Apollo Program. Accordingly, several Lunar Landing Research Vehicles (LLRV) manufactured by Bell Aerosystems Company were tested at Edwards Air Force Base in California by a number of Army and Air Force pilots. A former helicopter test pilot, Col. Emil "Jack" Kluever was the only pilot to fly LLRV No 2, which was flown six times during its flight test program at Edwards in early 1967.

$1,500 - 2,500

541 W

LUNAR RAKE MOCKUP USED FOR TRAINING.
Aluminum rake, Grumman, c.1969, 1,029 x 292 mm. Folding wire scoop and red painted band at lower end of shaft. Six rivet holes on shaft for attaching additional extension handle. Aluminum tab reading "*GRUMMAN AIRCRAFT ENG. CORP*" and serial number 144511 affixed to top of scoop.
Provenance: Bonhams, The Space History Sale, New York, April 21, 2015, Property of an Institution.

This Lunar Rake from NASA contractors Grumman Aircraft Engineering Corporation was used during astronaut training to simulate the collection of soil samples larger than 1 cm in diameter from the lunar regolith.

$3,000 - 5,000

542
LUNAR MODULE RCS NOZZLE MOCKUP.
Gold-painted fiberglass parabolic cone flattened at the point, with a threaded steel stud protruding from the tip. Some peeling of paint, wear.

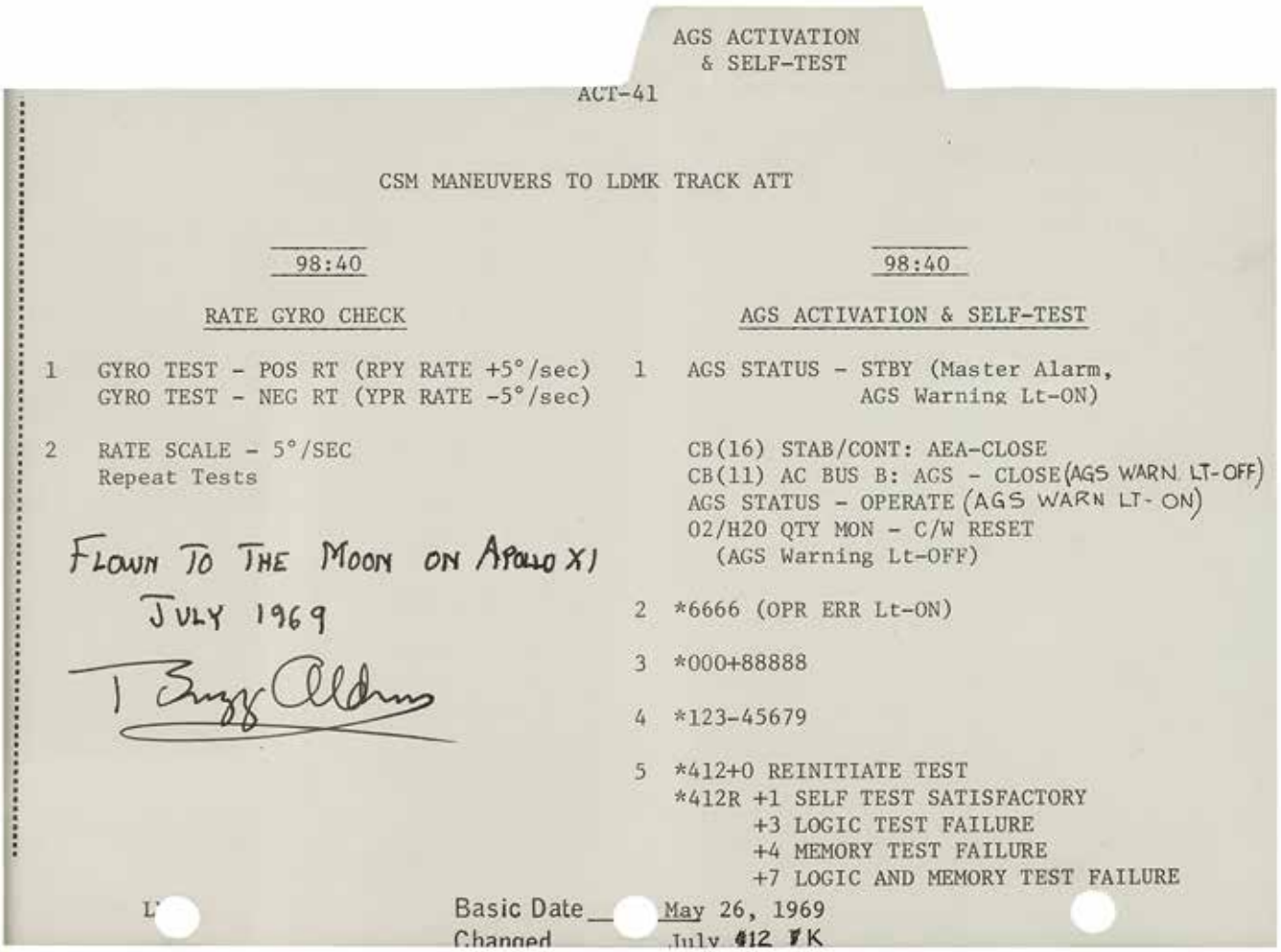
The Reaction Control Subsystem (RCS) consisted of 4 clusters of thrusters (16 all together), fuel feeding system and its control electronics and computers. The present piece is a planning mockup of one of the thruster nozzles. It was purchased at the close of the Apollo program by one of the Johnson Space Center engineers.

$1,000 - 1,500

543
FLOWN APOLLO 11 KAPTON FOIL.
FLOWN ON COLUMBIA, segment of Kapton gold foil, approximately 1 inch square (25 x 25 mm), mounted in clear acrylic with mirrored front panel bearing an outline drawing of the Command Module, with explanatory caption saying "*The affixed ... Kapton gold foil is an actual piece of the Apollo 11's Command Module ... part of a thermal protection subsystem that was recovered from the Command Module after splashdown.*"
Provenance: W.R. Whyskey, retired NASA employee (photocopy of signed statement).

Kapton polymer film was developed by DuPont in the 1960s, and has been used in printed circuits as well as insulation for satellites and spacecraft. It remains stable under an extremely wide range of temperature conditions, and was used on the Lunar Modules and Command Modules on the Apollo lunar missions.

$800 - 1,200



AGS ACTIVATION
& SELF-TEST

ACT-41

CSM MANEUVERS TO LDMK TRACK ATT

98:40

RATE GYRO CHECK

1 GYRO TEST - POS RT (RPY RATE +5°/sec)
GYRO TEST - NEG RT (YPR RATE -5°/sec)

2 RATE SCALE - 5°/SEC
Repeat Tests

FLOWN TO THE MOON ON APOLLO XI
JULY 1969
Buzz Aldrin

98:40

AGS ACTIVATION & SELF-TEST

1 AGS STATUS - STBY (Master Alarm,
AGS Warning Lt-ON)

CB(16) STAB/CONT: AEA-CLOSE
CB(11) AC BUS B: AGS - CLOSE (AGS WARN LT-OFF)
AGS STATUS - OPERATE (AGS WARN LT-ON)
02/H20 QTY MON - C/W RESET
(AGS Warning Lt-OFF)

2 *6666 (OPR ERR Lt-ON)

3 *000+88888

4 *123-45679

5 *412+0 REINITIATE TEST
*412R +1 SELF TEST SATISFACTORY
+3 LOGIC TEST FAILURE
+4 MEMORY TEST FAILURE
+7 LOGIC AND MEMORY TEST FAILURE

Basic Date May 26, 1969
Changed July 12 FK

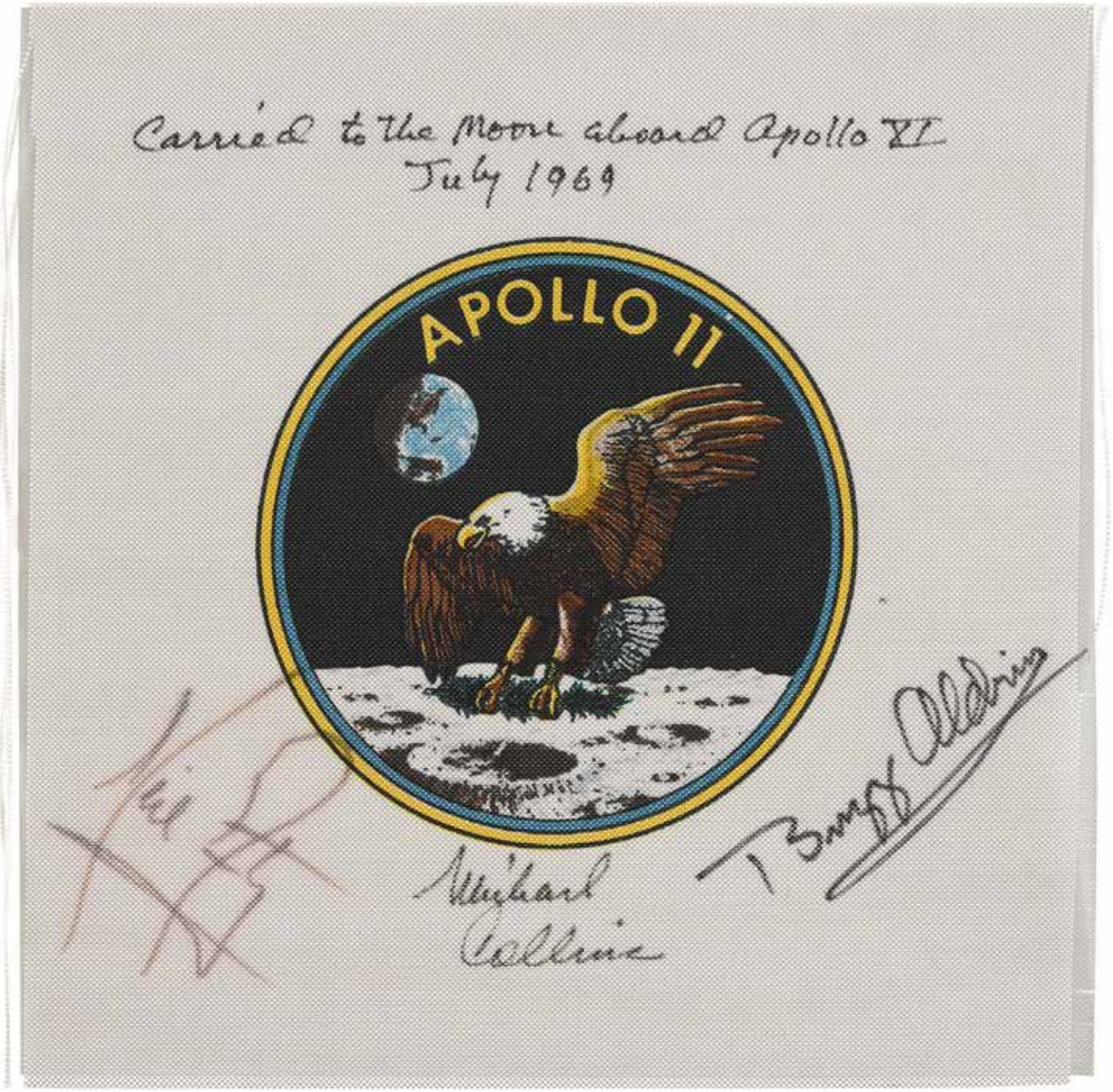
544

PREPARING FOR THE FIRST DESCENT TO THE LUNAR SURFACE.

BUZZ ALDRIN'S FLOWN APOLLO 11 LUNAR MODULE CHECKLIST. AGS Activation and Self-Test checklist on card stock, printed on recto and verso, 137 x 202 mm, with title on extending tab, listing "*CSM Maneuvers to LDMK Track ATT*, in two columns on recto that include "*Rate Gyro Check*" and "*AGS Activation and Self-Test*," steps 1 through 5, continuing on verso with steps 5, 6 and finally step 7 "*CDR and LMP Doff Helmet and Gloves*." *SIGNED AND INSCRIBED* in margin below first column: "*Flown to the Moon on Apollo XI, July 1969, Buzz Aldrin*." Framed, with 2-sided glazing.

The AGS was the Abort Guidance System, a backup navigation system to the PGNS or Primary Guidance and Navigation System. Although there was no occasion to use the AGS for navigation, it was cross-checked with the PGNS prior to landing the Lunar Module to ensure that the two systems were in agreement. This was mainly a step to give the astronauts confidence in their systems.

$15,000 - 25,000



545

MICHAEL COLLINS' FLOWN CREW-SIGNED APOLLO 11 EMBLEM.

A RARE FLOWN NEIL ARMSTRONG SIGNED MISSION ARTIFACT. FLOWN Apollo 11 printed mission emblem, 86 mm diameter, on a swatch of beta cloth, approximagely 154 x 154 mm overall.

SIGNED by the Apollo 11 crew: NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN. Additionally inscribed by Collins above the emblem with: "*Carried to the moon aboard Apollo XI, July 1969.*" A rare flown mission artifact signed by the first man to step on the moon — Neil Armstrong.

$40,000 - 60,000

546

546
ALDRIN, BUZZ. B.1930.
Photograph Signed ("Buzz Aldrin") and Inscribed, 16 x 20 inch color portrait of Aldrin on the surface of the moon, image taken by Neil Armstrong, inscribed with the date of Man's first lunar landing and first step onto the lunar surface, "*Tranquillity Base / Buzz Aldrin / Apollo XI.*"

A gorgeous large format image of Aldrin on the moon, the inscription memorializing the event captured on film.

$2,000 - 3,000

547

547
MASSIVE SIGNED PHOTO PORTRAIT OF MICHAEL COLLINS.
Poster sized color photograph, 36 x 54 inches, of Apollo 11 Command Module Pilot Michael Collins' official NASA portrait, wearing his spacesuit, his hand resting on his helmet.

SIGNED AND INSCRIBED: "*MICHAEL COLLINS. APOLLO XI CMP. JULY 16-24, 1969*."

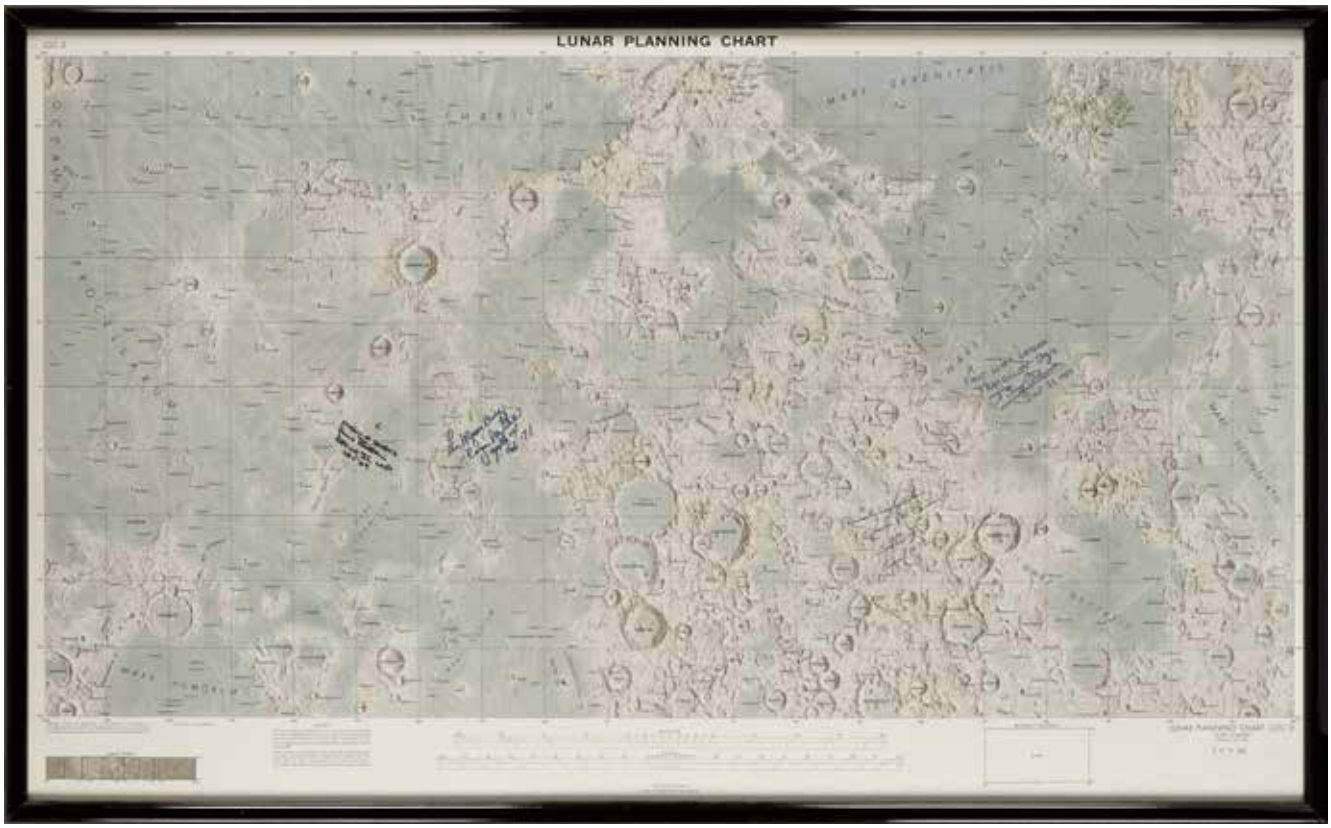
$800 - 1,200

548

548
APOLLO 11 SIGNED CREW PHOTO.
Black and white photographic print, 8 x 9-1/2 inches, of the crew of Apollo 11 posing with scale models of the Saturn 5 rocket and nose section with Command Module. SIGNED by all three crew members over white areas of spacecraft models. With an inscription on verso regarding the provenance of the photo hand written in French, notarized with the stamp of Jean-Louis Reveleau, Notary, of Bordeaux. Dry mounted on mat board.

This image was a publicity still shot with the crew members in civilian clothes prior to the flight.

$2,000 - 3,000



549

549

LARGE LUNAR NEAR SIDE CHART, SIGNED BY 20TH CENTURY SURFACE EXPLORERS.

LANDING DATE AND SITE NAME INSCRIPTIONS BY A MEMBER OF EVERY APOLLO LUNAR LANDING CREW.

Lunar Planning Chart (LOC - 2). Aeronautical Chart and Information Center, Edition 1, July 1969. Color lithographed moon map in Mercator projection. 29 x 49 inches. Scale 1:2,500,000 at the equator. Matted and framed.

BOLDLY INSCRIBED and SIGNED with:
"First Lunar Landing, Tranquillity Base, BUZZ ALDRIN, July 20, 1969"
"Ocean of Storms, ALAN BEAN Apollo XII LMP, Nov '69"
"Fra Mauro Base, EDGAR MITCHELL Apollo 14, Feb '71"
"Hadley Rille, DAVE SCOTT, Jul / Aug 1971/ Apollo 15"
"Descartes / Cayley Plains, CHARLES M. DUKE, JR., Apollo 16, April 1972"
and
"The Valley of Taurus Littrow, GENE CERNAN Apollo XVII, Dec '72."

A highly detailed lunar chart signed by a member of each Apollo lunar landing crew. In addition to their signatures and inscriptions, each astronaut has marked his landing site with either an "X" or a circle. All mare and large craters are labeled including unusual features such as rilles and ejecta rays. One of the largest lunar maps ever produced for NASA.

$15,000 - 20,000

550

550

APOLLO 11 GOODWILL DISC.

MESSAGES FROM PLANET EARTH. A circular silicon disc, 1 1/2 inches diameter but with one flattened edge, wafer-thin, one side coated in blueish-purple coating, etched lettering "From Planet Earth ... July 1969" visible to the naked eye, and an array of microscopic etching, the reverse gray-colored, manufactured by the Semi-Conductor Division of Sprague Electric Company of North Adams, Massachusetts.

Along with the American flag and the "We came in peace for all mankind" plaque, Neil Armstrong and Buzz Aldrin left a silicon disc on the lunar surface. That disc was manufactured by Sprague, an established NASA contractor with more than 50,000 components in Apollo spacecraft. Commissioned by NASA's Electronics Research Center, it carried messages from 73 world leaders, gathered in a frantic rush by NASA and the State Department in the weeks before the launch date.

The messages were photographed, reduced 200 times, and etched onto the surface of the disc just like integrated circuits. The example carried on Apollo 11 and now on the Moon's surface, like its sister in the Smithsonian, was encased in a protective aluminum holder, with eleven sides symbolizing Apollo 11.

It is unclear how many of the discs were produced, but the consignor, a descendant of one of the company's employees states that 76 were produced:one for each country who contributed a message, one carried aboard the Apollo 11 and two extra for the family. It's likely that only a handful exist now in private hands. A prototype disc without all the messages was sold in these rooms on April 26, 2012 (lot 1202). The present example is identical to that on the Moon and is from the final run that also included a message from the Pope.

The discs have been the subject of the book by Tahir Rahman, *We Came in Peace: The Untold Story of the Apollo 11 Silicon Disc* (2007).

$7,000 - 9,000

551

APOLLO 11 ASTRONAUTS SIGNED PROGRAM FOR HUBBARD MEDAL AWARD CEREMONY.

Program for the award ceremony of the National Geographic Society's Hubbard Medal, SIGNED BY ARMSTRONG, ALDRIN and COLLINS. Color bifold, 10 x 10 inches (254 x 254 mm).

The Hubbard Medal of the National Geographic Society is awarded every year for distinction in scientific exploration and research. Named for the founder of the Society, Gardiner G. Hubbard, the list of recipients includes some of America's most notable explorers, including Robert Peary, Roald Amundsen, Richard E. Byrd, Charles Lindbergh, and Astronauts including John Glenn, Frank Borman, Jim Lovell, William Anders, John Young, and Robert Crippen, in addition to the Apollo 11 crew. The ceremony for Armstrong, Aldrin and Collins was held at Constitution Hall, Washington, D.C., February 16, 1970.

$1,000 - 2,000

551

552

AN 18K GOLD COMMEMORATIVE "MAN ON THE MOON" GOBLET, ALBERT EDWARD JONES, BIRMINGHAM, 1969

An 18ct gold commemorative "Man On The Moon" goblet, by A E Jones, Birmingham 1969
The tapering circular bowl engraved with a depiction of Neil Armstrong within an oval reserve engraved "MAN ON THE MOON 03.56 HRS JULY 21ST 1969" with knopped tapering stem on a raised circular foot, the foot engraved "ONE SMALL STEP FOR MAN - ONE GIANT LEAP FOR MANKIND," fitted case height 13.4cm, weight 260g.

$7,000 - 9,000

552

553

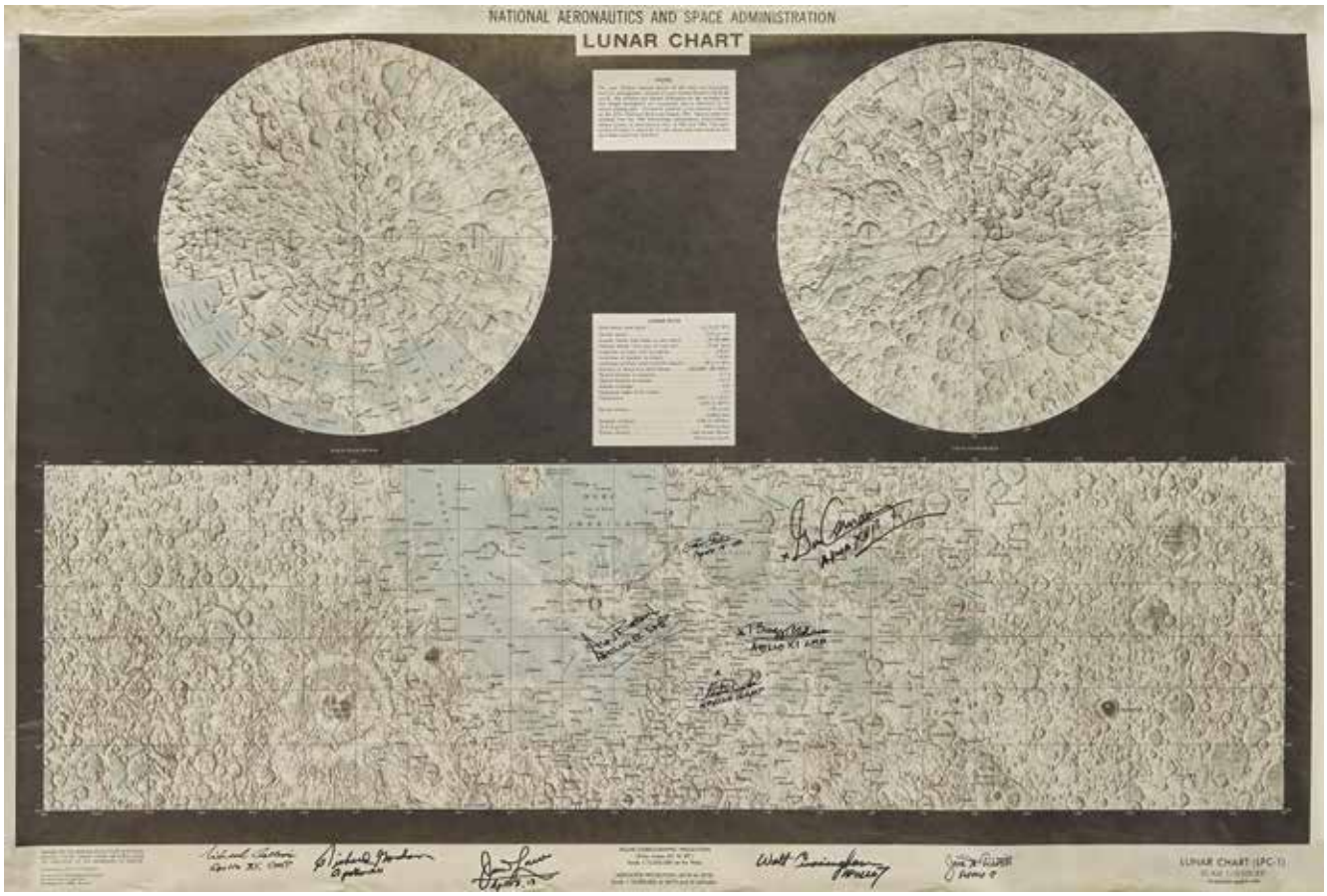
APOLLO 11 PUBLISHED CATALOG OF HASSELBLAD IMAGES.

Apollo 11. 70-mm Photographic Catalog. Greenbelt, MD: National Space Science Data Center, 1970.
4to. Green printed wrappers, bound with two staples. Sunned to edges of wrappers, corners slightly bumped.

A NEARLY COMPLETE CATALOG of the 70 mm Hasselblad images returned from the Apollo 11 mission, with six black and white images per page, each with NASA's reference number captioned below, from AS11—36—5291 to AS11—44—6696.

$1,000 - 2,000

553



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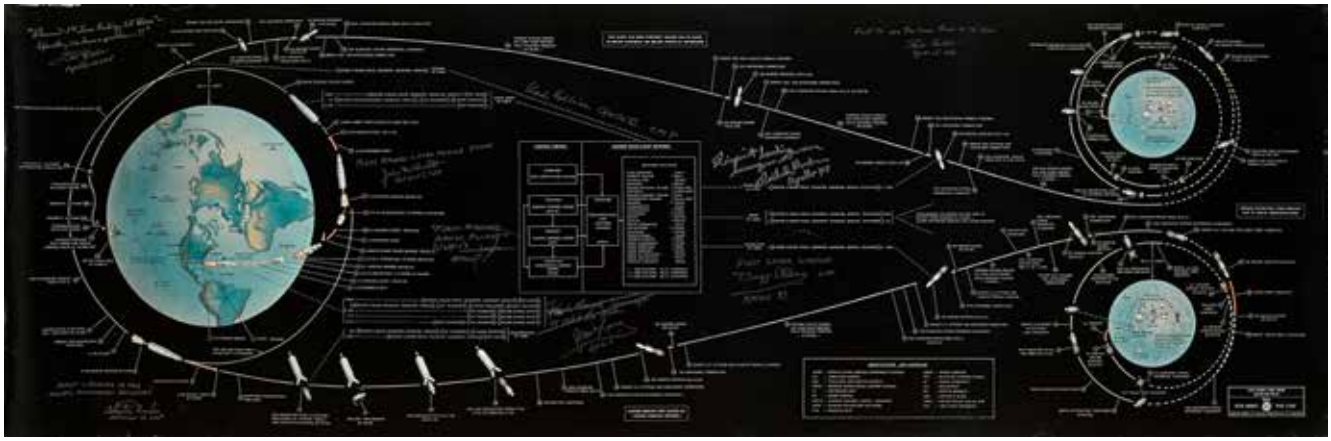


555

554

APOLLO 11 LUNAR MAP SIGNED BY 9 ASTRONAUTS.

Printed black and white map of Lunar Surface, 655 x 968 mm, *SIGNED* by Alan Bean, Dave Scott, Buzz Aldrin, Charlie Duke, Michael Collins, Robert Gordon, James Lovell, Jim McDivitt, and Gene Cernan. Wear and creasing to corners, rolled.

$8,000 - 12,000

555

APOLLO LUNAR LANDING MISSION PROFILE CHART SIGNED BY 9 ASTRONAUTS.

Apollo Manned Lunar Landing GOSS-Mission Profile. Published by NASA Office of Manned Space Flight, 540 x 1,450 mm, *SIGNED* by Apollo astronauts Fred Haise, Charlie Duke, Jim McDivitt, Walt Cunningham, Michael Collins, Jim Lovell, Richard Gordon, Buzz Aldrin, and Dave Scott. Wear to edges, rolled.

$8,000 - 12,000

557

556
ALAN BEAN ON LUNAR SURFACE.
Large black and white photograph, 16 by 20 inches. Mounted on board.

Showing Alan Bean photographing the plus-y footpad of the Lunar Module, with the TV camera in the background, Pete Conrad's footsteps visible in the foreground.
SIGNED and INSCRIBED: *"ALAN BEAN, APOLLO 12"* and *"RICHARD GORDON, APOLLO XII CMP."*

$800 - 1,200

557
APOLLO 13 EQUIPMENT STORAGE STRAP.
Flown A8 (Aft 8) Command Module equipment locker stowage strap. Made of heavy weave synthetics, 1 x 7-1/2 inches (26 x 235 mm) with metal end-plate connectors. One is a dual snap plate with a partly readable ID of *"V36-7... 24 - 3... 4 - 68...."* and a circular inspection stamp with "*ANM N67*." The opposite end has a peg type connector with a partly readable ID of *"V36-7800 ... – 5... 3... - 69... C"* and a circular inspection stamp with "*... NM 426*." The woven material is stamped *"V36 730024 51."* SIGNED by FRED HAISE and INSCRIBED: *"Apollo 13."*

The A8 locker was mounted on the aft bulkhead of the Command Module below the crew couches. This locker had four storage areas with outer doors labels which included: Return 70mm Camera, 70mm Film Mag, Lunar Surf Camera, 16mm Mag, Transfer Bag, Decontam Bag, Rock Samp Container, Headset, Exerciser, and Pilot Preference Kit. A photocopy of a Rockwell Space Division Temporary Parts Removal Tag is included, as well as a color photograph of an Apollo CSM storage locker and a location diagram of the CSM.

$3,000 - 5,000

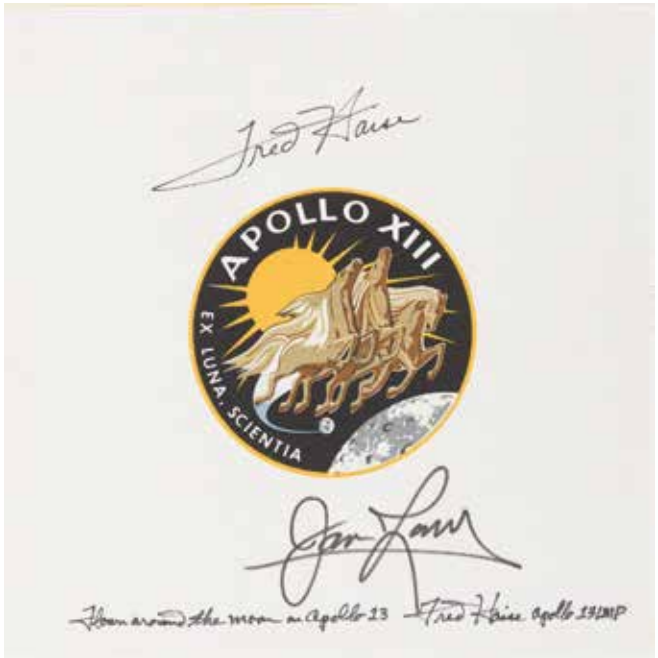
558
FRED HAISE'S FLOWN APOLLO 13 BETA CLOTH EMBLEM.
FLOWN Apollo 13 Beta emblem, 89mm diameter. Printed on a segment of Beta cloth, approximately 200 x 200 mm.

INSCRIBED and SIGNED below the emblem: *"Flown around the Moon on Apollo 13 — Fred Haise — Apollo 13 LMP,"* and additionally signed by both Haise and Jim Lovell. Includes letter of authenticity from Fred Haise.

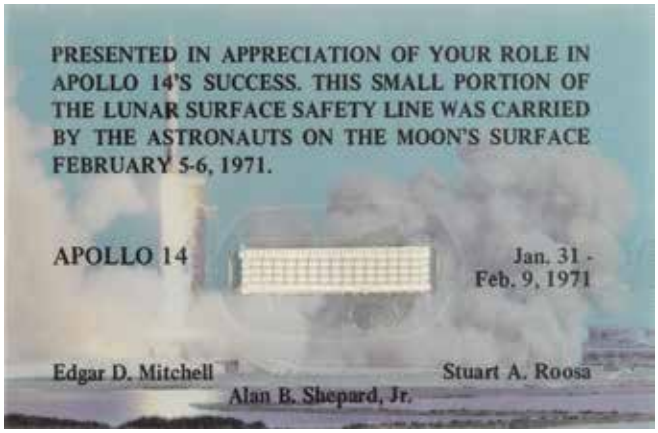
The Apollo 13 astronauts had artist Lumen Winter create an emblem from an idea the crew had of the mythical god Apollo driving a horse drawn chariot across the sky dragging the sun behind him. Winter's design features three horses traveling from the earth to the moon, symbolizing the Apollo crew of three astronauts.

$4,000 - 6,000

556



558

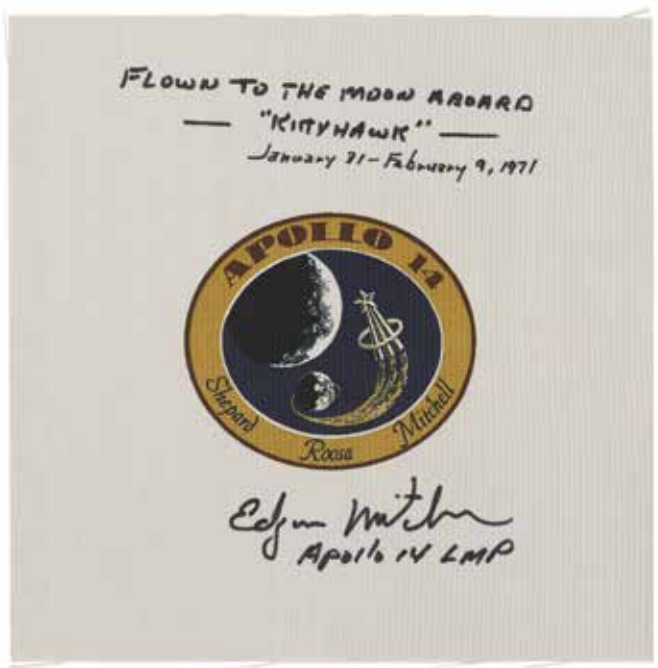


559

559
APOLLO 14 LUNAR SURFACE SAFETY LINE.
Segment of the Lunar Surface Safety Line used on the surface of the moon during the Apollo 14 Lunar landing, a 1 inch (26 x 7 mm) segment laminated to a presentation card, with NASA logo on the verso and the name of the recipient, William J. Dickinson, a NASA employee. Includes a presentation letter to Dickinson, with facsimile signatures of Apollo 14 astronauts Shepard, Roosa, and Mitchell, and a letter of authenticity from Dickinson detailing his NASA career.

The Lunar Surface Safety Lines were originally specified for the Apollo 12 mission to be used while astronauts were walking on the inside slope of the Surveyor crater. One 30 meter long safety line was carried on each of the Apollo missions from 12 through 15, but not used on Apollo 16 or 17. The Apollo 13 safety line never reached the Moon's surface, and the Apollo 12 and 15 lines were left behind. Apollo 14's safety line was the only one carried (but not deployed) on the Lunar surface and brought back. Pieces like this one were used as rewards to an unknown number of NASA employees.

$1,000 - 1,500



560

560
ED MITCHELL FLOWN APOLLO 14 BETA CLOTH EMBLEM.
FLOWN Apollo 14 emblem, 89 x 102 mm, on segment of Beta cloth approximately 228 x 226 mm.

SIGNED and INSCRIBED by Ed Mitchell: "*Flown to the Moon Aboard—'Kitty Hawk'—January 31—February 9, 1971 / Edgar Mitchell, Apollo 14 LMP.*" With Certificate of Authenticity signed by Mitchell, and printed with photograph of Mitchell holding this patch.

$1,000 - 2,000

561
AN AL WORDEN FLOWN APOLLO 15 FLAG.
American flag, printed fabric, 155 x 100 mm, FLOWN and SIGNED by Worden "*Flown to the Moon on Apollo 15, July 26 — August 7, 1971 / Al Worden, Apollo 15 CMP.*"

Apollo 15 was the fourth mission to land on the moon.

$2,000 - 3,000

561

562
APOLLO 15 MAPPING IMAGES.
Group of 38 black and white photographs, 10 x 10 inches, official NASA prints with number designations, with images of the Moon taken from Apollo 15's mapping camera.

$2,000 - 3,000

563
APOLLO 15 MAPPING IMAGES.
Group of 37 black and white photographs, 10 x 10 inches, official NASA prints with number designations, with images of the Moon taken from Apollo 15's metric mapping camera.

$2,000 - 3,000

564
FRED HAISE'S APOLLO 16 TRAINING MANUALS, SIGNED.
Two training manuals, one for Lunar Module (LM) simulator use, the other for the Command Service Module (CSM) simulator:
1. *LM Malfunction Procedures, Basic, Apollo 16 & 17, All Launch Dates.* NASA/MSC. December 2, 1971. Over 96 pp. 10 ½ by 8 inches, 14 tabbed sections. Card stock covers with three 1 ¼ inch loose-leaf binding rings.
INSCRIBED and SIGNED: "*My personal training copy – FRED HAISE, Apollo 16 BU CDR*" on the front cover.
Steps for LM systems trouble shooting are designed as flow-chart style diagrams with columns labeled: "*Symptom, Procedure, and Remarks.*" Lunar Module systems included are Guidance/Navigation, both primary and abort, Descent Propulsion, Ascent Propulsion, Communications, Environmental Control, Cameras (16mm and 70mm), and the Lunar Roving Vehicle.
2.*CSM Updates, Basic, Apollo 16 & 17, All Launch Dates.* NASA/MSC. November 15, 1971. Over 70 pp. 8 by 6 inches, 9 tabbed sections. Card stock covers with heavy weight sheets having two 1 ¼ inch loose-leaf binding rings.
INSCRIBED and SIGNED: "*My personal training copy – FRED HAISE, Apollo 16 BU CDR*" on the front cover.
Each tabbed section contains several task specific grid format data entry "pads" designed to be filled in with "real time" data sent from Mission Control or calculated on board. These values or numbers would enable the CSM to perform various maneuvers during flight. Included are P30 (Program) Maneuver, P37 Block Data, Earth Orbit Block Data, P27 Update, and P24 Landmark Tracking. Additional sections with Flight Plan Update sheets, Photo Logs for 70 mm, 16 mm and 35 mm cameras have large horizontal grids for manuscript data entries.

Haise served as back-up commander for Apollo 16.

$500 - 700

562

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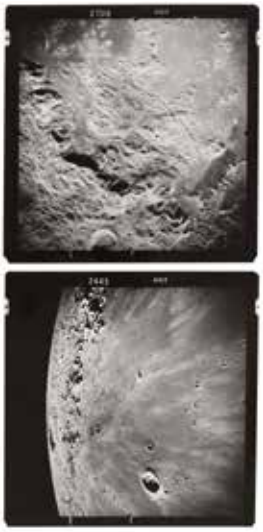

568

565
APOLLO 16 MAPPING IMAGES.
Group of 25 black and white photographs, 10 x 10 inches, official NASA prints with number designations, with images of the Moon taken from Apollo 16's metric mapping camera.

$2,000 - 3,000

566
APOLLO 16 70 MM FILM REEL.
70 mm film reel, containing color mags V, NN, PP, QQ and RR, on a single reel, with black metal spool with paper Apollo tag stamped "*Unclassified*."

A reel containing an extensive group, 756 images according to the official index, of color Hassleblad 70 mm photographs taken during the mission, all using Kodak Ektachrome MS film. Images taken in orbit, trans-lunar orbit and earth orbit and include numerous lunar images, but also images of Earth, including the US.

$3,000 - 5,000

567
CERNAN WITH THE FLAG AND LUNAR ROVER.
Color photograph, 16 x 20 inches, of Cernan next to the flag and lunar rover.

INSCRIBED and SIGNED by GENE CERNAN: "*Aim High! Impossible dreams do come true. Gene Cernan—Apollo XVII CDR—Last Man on the Moon.*"

$800 - 1,200

568
APOLLO 17 MAPPING IMAGES.
Group of 28 black and white photographs, 10 x 10 inches, official NASA prints with number designations, with images of the Moon taken from Apollo 17's metric mapping camera.

$2,000 - 3,000

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569
APOLLO 17 70 MM FILM REEL.
70 mm film reel, containing black and white mags B, C, NN, KK, OO, MM and PP, on a single reel, with silver-colored metal spool.

A reel containing an extensive group, approximately 1125 images according to the official index, of color Hassleblad 70 mm photographs taken during the mission, all using Kodak Ektachrome MS film. Images taken on lunar surface, in lunar orbit, earth orbit, and include images taken inside the Lunar Module, Earthrise and the SIM Bay EVA.

$3,000 - 5,000

570
GROUP OF NASA "RED NUMBER" PRINTS OF EARTH.
Group of 36 color photographs, 8 x 10 inches, official NASA "red" prints with number designations, with images of Earth taken from Gemini spacecraft and Apollo 6, 7 and 9.

$1,500 - 2,500

571
GROUP OF NASA "RED NUMBER" PRINTS OF MOON.
Group of 22 color photographs, 8 x 10 inches, official NASA "red" prints with number designations, with images of the Moon taken from Apollo 10 through Apollo 16.

$1,000 - 1,500

572
THE VIEW FROM SPACE: ASTRONAUT PHOTOGRAPHY BOOK SIGNED BY 11 ASTRONAUTS.
SCHICK, RON and JULIA VAN HAAFTEN. *The View From Space*. New York: Clarkson N. Potter, Inc., 1988. Folio, black cloth cover with pictorial dust jacket.

SIGNED by BUZZ ALDRIN on copyright page, and in the text by WALLY SCHIRRA, GORDON COOPER, JIM MCDIVITT, TOM STAFFORD, JAMES LOVELL, GENE CERNAN, RICHARD GORDON, WALT CUNNINGHAM, ALAN BEAN, AL WORDEN, and CHARLIE DUKE.

$800 - 1,200

573 W

SATURN V 1/100 SCALE MODEL.

Model of the Saturn V by the Marshall Space Flight Center (MSFC), plastic, composites, metal, and wood, 120 cm tall when assembled, approximately 1/100 scale. Many parts identified with decals, including each rocket stage identified with large red decals near the center point of each stage. A metal plaque on the mirrored wooden base reads: "*George C. Marshall Space Fight Center, Huntsville, Alabama, Graphics Engineering and Models Branch, SATURN V*."

MSFC was the lead NASA center for the development of the vehicle which took Man to the moon. The Apollo Saturn V rocket had a 100% success flight record. Nine Apollo crew traveled to the moon powered by the F-1's 1.5 million pound and J-2's 225,000 pound thrust engines. Six two-man LEM (later called LM) crews made landings there. In 1973, this vehicle's first and second stages put the Skylab space station into earth orbit. An icon of the technological achievement made by the United States during the Space Race.

$10,000 - 15,000

574

575

574
APOLLO-SOYUZ TEST PROJECT MODEL.
1:50 scale model of the American Apollo CSM and Russian Soyuz, wood and painted metal, 17 inches (432 mm) long assembled. The two vehicles are connected by a black Docking Module (DM) which provided a functional docking port for each spacecraft. The entire model is mounted above a 7-inch oval wood base, with plaque on the top reading "*Apollo-Soyuz Test Project, Scale 1/50, Space Division, Rockwell International*," with Rockwell logo.

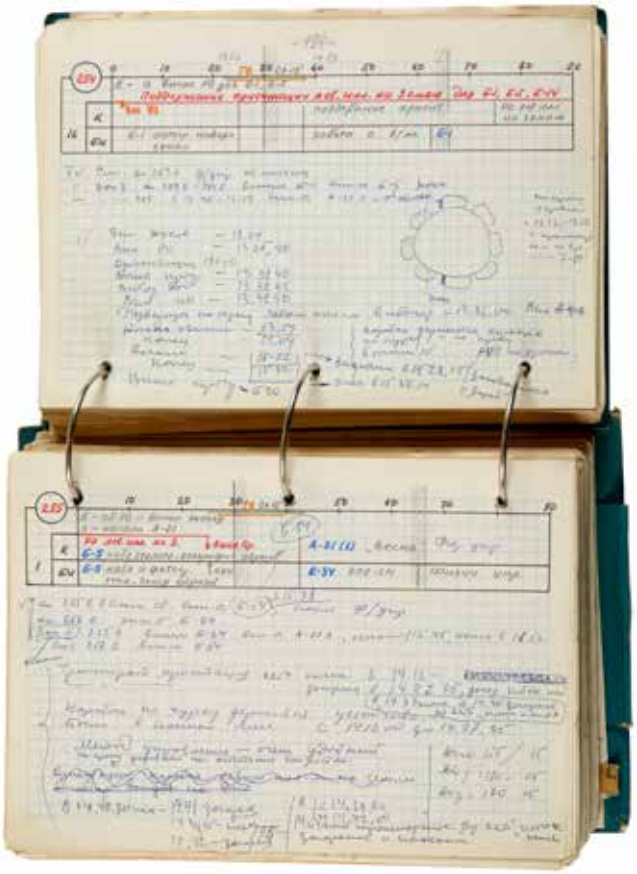
$2,000 - 3,000

575
APOLLO-SOYUZ CREW MEDAL.
brass medal designed by Konstantin Dmitrievich Hrenkov, 60 mm diameter, Mytishchi, Soviet Union, 1975, made in two halves that "dock" together to form a single piece, the obverse commemorating the "*First International Space Docking*" in English and Russian, with the two spacecraft on opposite halves of the medal; the reverse featuring U.S. and Soviet Russian flags, and the date "*1975*." Contained in white plastic case with felt-line base and clear acrylic insert.

One of only a few medals produced and identical to those actually flown and "docked" in space during this momentous occasion.

$5,000 - 7,000

576



577

576 W

SOVIET VENERA-4 VENUS PROBE MODEL.

Fiber-reinforced plastic and metal model on wood and metal base, with plaque on base in Russian, 470 mm high with base.

In June 1967 the Automatic Interplanetary Station, Venera-4, was launched to explore the planet Venus. It comprised an entry vehicle and an orbital spacecraft, and was the first successful probe to examine the environment of another planet. The data it sent back showed that the atmosphere of Venus consisted mostly of carbon dioxide, with nitrogen, oxygen, and water vapor.

$8,000 - 12,000

577

FLOWN ON SOYUZ 9: AN EXHAUSTIVE MANUSCRIPT ON LIFE IN SPACE

"БОРТОВОЙ ЖУРНАЛ КОСМИЧЕСКОГО КОРАБЛЯ «СОЮЗ-9» [On-Board Flight Journal for Spacecraft *Soyuz-9*, 1970].
9¼ x 7 inch log-book, over 400 pp (3-247, 249-502, 600-639) in black, blue, red, orange, purple, and green ink on graph paper, including 11 unnumbered pp with manuscript annotations, and 9 blanks. Bound with three rings into blue textured-cloth covers with the arms and cipher of the USSR to upper cover.
Provenance: Cosmonaut Andrian G. Nicolaev; Sotheby's *Russian Space History*, 1996, lot 161.

AN EXHAUSTIVE, HIGHLY DETAILED MANUSCRIPT ON LIFE IN SPACE.

Written while weightless in orbit on the record setting voyage of the *Soyuz-9*, the log begins with 200 pages giving an orbit by orbit account of activities. Each orbital account begins with a chart divided into 10 minute segments, with shading indicating night and day-time, and provides details on the activities planned. Some of the detailed notes include: A description of the moon (orbit 48); notes on experiments being conducted, including a drawing of a battery showing the results of a mercury experiment (orbit 65); A description of how a floating particle of debris flew into the eye of Nikolaev and "caused a sharp pain" until Sevastyanov wiped it away (orbit 159); The cosmonauts being congratulated on setting a new world record for space flight distance and duration (orbit 252); details on the descent, with a dotted line indicating "separation," "atmospheric entry," "parachute," and "landing" (orbit 287). Following the orbital log are tables completed in space, as well as printed operational instructions. This section is followed by several un-numbered pages which record radio transmissions received while in space, including one from NEIL ARMSTRONG: "*June 2, 1970, 17:30. 'Best wishes to the crew of Soyuz 9. Success to your mission and good landing.' American Cosmonaut Neil Armstrong*." There are also several pages of miscellaneous notes which give a picture of conditions in the spacecraft, including *"Soft urine receptacles are not convenient,"* "*Forks and can openers should be tied by separate strings so they don't get tangled*," "*Canned meat tastes good and we eat it with gusto*," "*Cottage cheese paste should be more liquid*." Also included are equipment inventories, control manuals, details on emergency procedures and explanations of medical equipment and the waste system, as well as observations on celestial navigation, optical effects, and a very detailed record of all food and drink consumed while on board. A series of unnumbered pages containing psychological questions, including inquiries on dreams is followed by reports on photographic experiments.

A handwritten provenance letter in Russian by Nicolaev reads [trans]: *"LOG BOOK KK SOYUZ #9. THIS IS THE ORIGINAL LOG BOOK OF THE SHUTTLE SOYUZ 9, PILOTED BY CHIEF OF AIR SHUTTLE COSMONAUT OF THE USSR A.G. NICOLAEV, AND COSMONAUT RESEARCHER, V.E. SEVASTIANOV ... JUNE 1 THROUGH JUNE 19, 1970."*

$2,000 - 3,000

578

579

578

SOVIET COSMONAUT "PENGUIN" JUMPSUIT.

Soviet Penguin zero-gravity exercise jumpsuit attributed to cosmonaut Aleksandr Aleksandrovich Volkov. Medium blue patterned fabric with blue elasticized neck, waist, and cuffs. Embroidered patches include the State Emblem of the Soviet Union on the left breast above the pocket, Salyut program insignia on right pocket, and Soviet Russian flag with letters *CCCP* on left shoulder.
WITH: communication headset, as used in the Sokol-K space suits, of gray leather and white synthetic fabric mesh with suede lining, mounted with two extending microphones, with braided metal covered cable terminated in aluminum connector.

The Penguin jumpsuits were fitted with elastic tensioners and straps to supply resistance in order to combat muscle atrophy and loss of bone in zero gravity conditions during long missions in orbit.

Cosmonaut Aleksandr Volkov served three missions, to the Salyut 7 on a 64-day trip, and twice to the Mir Space station for a combined 326 days. Certainly a good candidate for the Penguin suit!

$4,000 - 6,000

579 W

LUNA 9 SOVIET LUNAR LANDER MODEL.

Manufacturer's model of the Luna 9 spacecraft, metal and plastic, 635 mm high overall, on 254 x 254 mm base, Moscow, Lavochkin Research and Production Association Design Bureau, 1980's.

In 1959, the Russians became the first country to put an object on another planetary body with Luna 2. In February, 1966, they went a step further and achieved the first soft landing on the moon, with Luna 9. Cushioned by a landing bag, it touched down and deployed four stabilizing "petals," antennae, and a rotating mirror and camera assembly. It sent back panoramic views of the lunar surface — the first time humans had seen the surface of the moon close-up.
A plaque on the base of the model reads (in English) "*Luna-9 Automatic Lunar Station Project Presentation Model, January 31. 1966-February 6. 1966. Lavochkin Research and Production Association.*"

$10,000 - 15,000

580

580
NOTES ON IN-FLIGHT SPACESUIT REPAIR.
GERASIMENKO, O.I., B. 1939. Manuscript notes with diagrams and hand-drawn illustrations, describing repair procedures for a spacesuit, to be done while in space, 7 pp, most 8-1/2 x 11-3/4 inches (216 x 298 mm), one approximately 23-1/2 x 12 inches (597 x 305 mm), torn at one end. Four pages are signed ("O.I. Герасименко") and dated October 29, 1983.

The author of these highly detailed documents was O.I. Gerasimenko, an engineer specializing in the durability of spacecraft. The repairs were done after a planned spacewalk aboard Salyut-7 had to be scrapped in October 1983, due to a detected leak in the spacesuit. A procedure was devised to test for the location of the leak, and once it was found n the left foot, these procedures were transmitted to the Cosmonauts (Vladimir Lyakhov and Alexander Alexandrov), who were able to carry it out on October 29th. This allowed them to install two additional solar batteries on the exterior of Salyut-7, needed to meet their power consumption needs on board the space station. The mission had other technical problems, including a fuel leak, which had to be repaired by the next crew to reach the space station, in February 1984.

$3,000 - 4,000

581

581 W
PROTON-M ROCKET MODEL.
Fiber-reinforced plastic and metal model, 160 cm in height, on wood and metal stand, in Roscosmos livery with Russian Federation flag, with Briz-M upper stage. Probably made by Khrunichev, after 1992.

A highly detailed model of impressive size, used for exhibition either by the Russian space corporation Roscosmos, or the rocket's manufacturer, Khrunichev. The Proton-M heavy-lift launch vehicle was first launched in 2001, and has since seen over 100 launches, putting satellites into orbit. The Briz-M upper stage is the most commonly used, using its propulsion system to achieve orbital injection and place the satellite payloads.

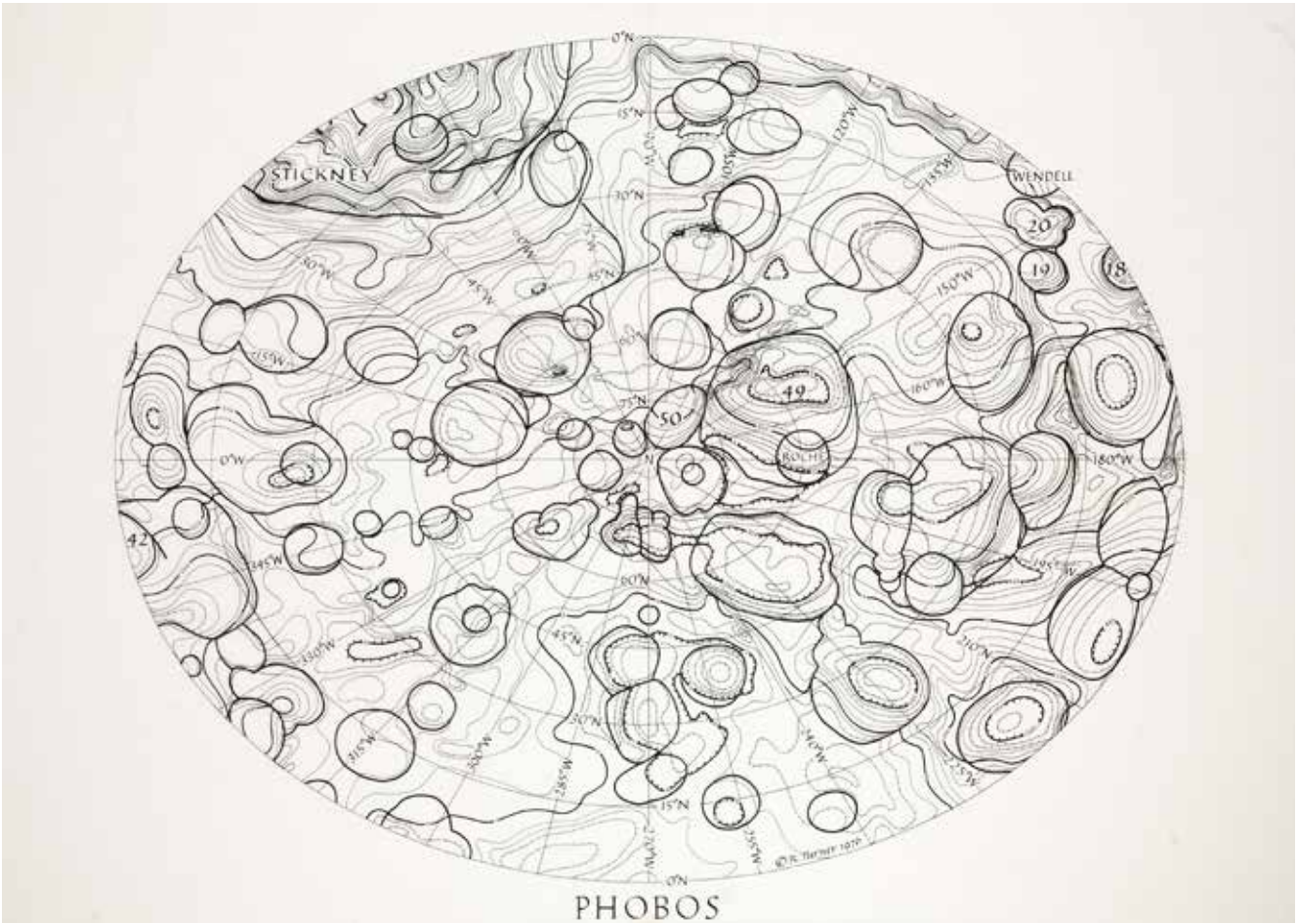
$5,000 - 7,000

582

582 W
R-7 SEMYORKA SPACE ROCKET MODEL.
Hand-painted, highly detailed aluminum and plastic model in two parts, with Soviet flag and Soyuz decals, plaque on base reading: "*R-7 "SEMYORKA" SPACE ROCKET MODEL TsSKB-PROGRESS, SAMARA, OCTOBER, 2001*, 159 cm tall including stand.

The most recognizable and frequently used of the Russian rockets, made by Samara, the factory that produces the Soyuz rockets today. R-7 was originally developed as an intercontinental ballistic missile but was used in the Russian space program starting with Sputnik, and continuing to the Soyuz launches, as depicted in this model.

$5,000 - 7,000



583

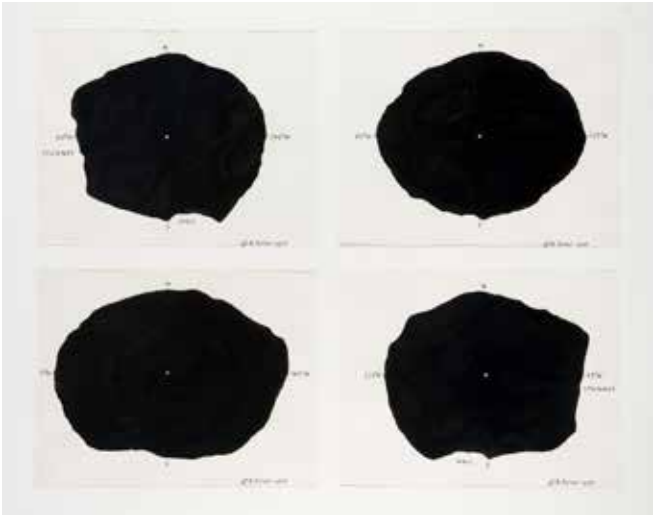
583 W

TURNER, RALPH. BORN 1935.

4 large calligraphic sketches of Phobos's northern and southern hemispheres, Sheridan, OR, 1976, 2 being contour diagrams, and 2 being shaded contour diagrams, ink and white gouache, each on 2 joined sheets of acetate, overall 1000 x 1500 mm to 1060 x 1440 mm, signed "R. Turner, 1976," framed.

Phobos is the larger and closer of the two natural satellites of Mars, and was discovered in 1877. Turner has a degree in calligraphy from Reed College in Oregon and worked with Gerard Kuiper at the University of Arizona Lunar and Planetary Laboratory.

$20,000 - 30,000



584

584 W

TURNER, RALPH. BORN 1935.

4 cross-section silhouettes of Phobos, signed and dated lower right ("R. Turner, 1976"), Sheridan, OR, 1976, ink on paper, each approximately 400 x 500 mm, framed together.

Silhouettes taken directly from Turner's Phobos model.

$3,000 - 5,000

585

585 W ¤

LANDSAT III SATELLITE MODEL.

1:4 scale model satellite by General Electric, c.1977. Metal & wood, with mirrored panels on sensory ring, and various antennae. 16 x 15 inches on 16½ x 16½ x 1½ inch wooden base. Base with blue plaque which reads: "*LANDSAT 3. GENERAL ELECTRIC. SCALE 1/4*." WITH: *NASA Landsat 3 Reference Manual*, Valley Forge Space Center, General Electric Space Division, c.1978.

A large scale model of the lower portion of the Landsat 3 satellite. The Landsat program was implemented to use Earth Resources Survey Satellites as a research tool to show that remote sensing from space is a practical approach to efficient management of Earth's resources.

$2,000 - 3,000

586

586 W ¤

GEODETIC SATELLITE MODEL.

Large scale model of a Geodetic Satellite. 37½ inch tall plexiglass pole topped with 16½ inch tall conical satellite with ten 21 inch long folding blue panels.

Employed by the United States Navy, the GeoSat was an Earth observation satellite launched in 1985. The goal of the GeoSat mission was to provide information on the marine gravity field.

$1,000 - 1,500

587 W ¤

HUGE SPACE SHUTTLE COLUMBIA MOBILE COMMAND CENTER TRAILER MODEL.

Over 6 feet long, nearly 2 feet tall, and 15 inch wide detailed hand-built engineer's model on wood base with removable metal back and cover, plexiglass walls giving an unobstructed view of the interior which includes various computer systems, electrical panels, storage cabinets, fans, power boxes, printer, etc, smaller details such as clocks, a first aid kit, fire extinguishers, an escape hatchet, rope and a rifle, and a model of a man sitting at the controls. The various control panels fitted with highly detailed decals, the whole supported with 8 rubber tires at rear reading "*Firestone Transteel Radial. Protector Ply XR4*," additional spare tire mounted to underside, General Electric, c.1980.

HUGE DETAILED ENGINEER'S MODEL, THE ONLY ONE BUILT, of a mobile command center trailer used during the space Shuttle *Columbia* landing at Robins Air Force Base, on August 20, 1989. Ferried atop a special NASA Boeing 747 jumbo jet, the *Columbia* was forced to divert its planned landing at the Kennedy Space Center to Robins Air Force Base due to poor weather conditions.

587

$3,000 - 4,000

588 W ¤

HUGE SPACE SHUTTLE COLUMBIA MOBILE GROUND CONTROL BUS MODEL.

5 feet long, 1 foot 4 inches tall, and 1½ foot wide detailed hand-built engineer's model in metal and composite materials, large plexiglass viewing window on roof and at rear giving unobstructed view of the interior which includes various computer systems, electrical panels, power boxes, as well as a model of a man sitting at the controls. The various control panels fitted with highly detailed decals, the whole supported with 6 rubber tires reading "*Firestone Transteel Radial. Protector Ply XR4*," decal below passenger and driver side windows read: "*US AIR FORCE. 81C 940. FOR OFFICIAL USE ONLY*," decals on rear viewing window read: "*US AIR FORCE 81C 940*, and "*AFMPC RAFB*," front license plate reads *AFMPC RAFD*." General Electric, c.1989.

HUGE DETAILED ENGINEER'S MODEL, THE ONLY ONE BUILT, of a mobile command center bus used during the space Shuttle *Columbia* landing at Robins Air Force Base, on August 20, 1989. Ferried atop a special NASA Boeing 747 jumbo jet, the *Columbia* was forced to divert its planned landing at the Kennedy Space Center to Robins Air Force Base due to poor weather conditions.

588

$2,000 - 3,000

589 W ¤

HUGE SPACE SHUTTLE COLUMBIA MOBILE GROUND CONTROL ARMY JEEP AND TRAILER.

4 feet 2 inches long, 1 foot 2 inches wide, and 2 feet tall detailed hand-built engineer's model of an Army Jeep, with 2 feet 1 inch long, 1 foot 2 inch wide and 1 foot 2 inch tall trailer, both in metal and composite materials, plexiglass viewing windows on roof, back and sides giving unobstructed view of the interior which includes various computer systems and electrical panels. The various control panels fitted with highly detailed decals, the whole supported with 12 rubber tires, plus 1 spare, reading "*Firestone Transteel Radial. Protector Ply XR4*," stencils on either side of hood and at bumper read "*US ARMY. NLO92Q*," a few decals to exterior, including two inclinometers, trailer stenciled on either side with "*WARNING NOISE AREA. MAY CAUSE HEARING LOSS. USE PROPER EAR PROTECTION*," back of trailer stenciled with "*OPEN TO RUN*." General Electric, c.1989.

HUGE DETAILED ENGINEER'S MODEL, THE ONLY ONE BUILT, of a mobile command center Army Jeep and trailer used during the space Shuttle *Columbia* landing at Robins Air Force Base, on August 20, 1989. Ferried atop a special NASA Boeing 747 jumbo jet, the *Columbia* was forced to divert its planned landing at the Kennedy Space Center to Robins Air Force Base due to poor weather conditions.

589

$2,000 - 3,000

590

590

JOHN GLENN: BOTTLE SIGNED BY THE CREW OF STS-95.

Bottle in white opaque glass, originally containing Archer Peach Schnapps, *SIGNED* by the crew of STS-95, plus several of their spouses, including John Glenn, Curt Brown, Steve Lindsey, Steve Robinson, Chiaki Mukai, Pedro Duque, Scott Parazynski (who inscribed it "*You're my Hero!*"), as well as Annie Glenn, Diane Lindsey, and others. Above "Archer" on the schnapps labeling, the word "Annie's" has been written in.
Provenance: Estate of John Glenn, with copy of verification letter from Greater Washington Estate Services.

Shuttle mission STS-95 launched in October 1998, taking John Glenn, the first American to orbit the earth, back to space for his second orbital flight at the age of 77. He participated in studies that hoped to gain insight into the aging process, and similar effects on human physiology brought about by zero-gravity space flight. Glenn remains the oldest person to go into space.

$1,000 - 2,000

591

591

X-33 SUBORBITAL SPACEPLANE MODEL.

Lockheed Martin contractor's model in painted die-cast metal, with VentureStar decal and decals of contributing contractors, Sverdrup, Allied Signal, Boeing and Rohr, as well as NASA logo and "Skunk Works" decals on vertical stabilizers, detachable stand with Lockheed Martin logo, 209 mm long, wingspan 212 mm, height 125 mm with base.

The Lockheed Martin X-33 suborbital spaceplane was a technological test vehicle for NASA "single-stage-to-orbit" technologies. Designed as an unmanned plane that would launch vertically and land horizontally, Lockheed Martin had plans to make the technology commercially viable in the private sector, replacing the space shuttle program with a program called VentureStar that would launch commercial satellites. With a decline in demand for commercial satellites, the project was cancelled in 2001. The X-33 was never built or flown, but the research conducted in the planning process led to new technological developments that may be applied to future suborbital vehicles.

$1,000 - 2,000

592

592

PANG, ALEX. ILLUSTRATOR.

GILPIN, DANIEL. *Space Vehicles, Machines Close Up.* London: Wayland, 2009.
5 original artworks, together with book, illustrating detailed cutaways of spacecraft, rockets, space stations, etc. Illustrations on heavy stock, 510 x 700 mm each. Some pencil markings, smudges, book cover worn, book with
library de-accession stamps.

Alex Pang learned his craft at Taunton College of Arts and Technology, and has been creating illustration art using digital technology for many years. He has done work for Fuji, British Petroleum, Matchbox, a number of publishers, and the feature film *Captain Scarlet and the Mysterons*.

$1,000 - 1,500

Technology

Lots 593-658

593

594

595

596

593 W

POULSEN, VALDEMAR. 1869-1942.

Poulsen Arc Transmitter, United States, c.1917, 505 x 305 x 380 mm, front panel with microphone, Weston radio frequency Thermo-Ammeter, two female lightbulb connectors, two on/off switches, one selector switch, back with William J. Murdock oscillator transformer coils, steel pipe containing carbon cathode at one end and copper anode at the other, glass reservoir, mica condenser contained in wooden box.

Danish engineer Valdemar Poulsen invented the arc transmitter in 1903. It used an electric arc to convert direct current electricity to radio frequency alternate current. It was used as a radio transmitter until it was replaced by vacuum tube transmitters in the 1920s. The present example uses U.S.-made parts and was likely produced around 1917, the date on the condenser label.

$1,000 - 2,000

594 W

ENGLISH POWER AMPLIFIER: STERLING TELEPHONE & ELECTRIC COMPANY.

Audio Amplifier, metal amplifier with 2 valves in fine wood lidded case, London, before 1926, accompanied by Magnavox R3 horn speaker, 1920s.

The Sterling Telephone & Electric Company was one of the earlier English telephone and electrical equipment manufacturers dating back to the 19th century. The Magnavox R3 was the first speaker to employ a voice coil in the reproduction of sound.

$1,500 - 2,000

595 W

MAGNETIC RECORDING: WESTERN ELECTRIC.

Mirrophone, Magnetic Tape Recorder, c.1942, wood and metal case, 395 x 330 x 488 mm, front panel with speaker, cathode ray indicator, motorized time indicator, volume dial, selector switch, 1/4-inch microphone jack, side with external 1/4-inch external speaker jack and internal speaker switch, removable back panel with power cord.

Bell Labs had been researching magnetic recording for some time before the development of Mirrophone which used Vicalloy tape—essentially magnetized metal ribbon—to record a 1-minute loop. It was far superior to the wire recording that had been developed by Danish physicist Valdemar Poulsen in 1898. The Germans had also been developing magnetic recording in a slightly different direction at the time, but their work was mostly unknown to the Americans due to WWII.

$1,000 - 2,000

596

ANSWERING MACHINE.

Telemaster Answering Machine, c.1950, metal, front panel with volume dial, on/off switch, timer, and selector dial, front-mounted speaker, lid raises to reveal wire recorder and miniature record player, back panel with power cord, 1/4-inch jack (for microphone?), and a tube socket.

This early answering machine, very similar to the Electronic Secretary, which was the first commercially successful answering machine, recorded incoming messages on a magnetic wire recorder and played the outgoing message from a miniature record.

$500 - 700

597

597

SWISS MODEL 45 NEMA CIPHER MACHINE.

Type T-D (Tasten-Druecker-Maschine) enciphering machine, serial number TD 521, Switzerland, manufactured by Zellweger AG, c.1950. The machine with ten wheels, four of which are coding wheels, one a reflector (right side red wheel, similar to the enigma construction), and the other 5 all driving wheels, mounted under hinged cover is letter counter, lamp panel and standard keyboard layout, 4v electrical input to the side and mains lead inside, the inside lid of the cover with external lamp panel, lamp cable, 14 spare bulbs, 2 extra wheel cases, each containing a pair of wheels, and a contact cleaning brush. The carrying case lid with stencilled numbers 521 and TD521, and special printed red and white period label indicating its use in time of war, leather carrying handle, lock and key present. The carrying case 14 1/2 x 12 3/4 x 5 1/2 in (36.5 x 32.5 x 14 cm). WITH: Original NEMA instruction booklet, in German and French, marked SECRET, and stamped 785, with declassification stamp at center of front cover dated February 13, 1998.

A FINE AND RARE SWISS NEMA MACHINE, an example of the new breed of ciphering machines which developed from the German Enigma wartime series, in this case developed by the Swiss. Following the realization that their Enigma K series was compromised by the codebreakers of most of Europe, a team of professors from Bern and other universities, from 1941, began to develop this new machine, a prototype of which was made in 1944, and a design for manufacture which was passed in spring of 1945. The name NEMA derives from NEu MAschine, made by Zellweger AG in Uster. 640 machines (numbered 100-740) were built, the first was in active service by 1947, and many of the higher numbered machines (such as this one) have the special label pasted onto lid and were put in storage to be used in time of war. NEMA was declassified in July 1992, and examples now come to the market on occasion. The NEMA machines were distributed as follows: those numbered under 100 were for training use and are mostly worn out; those allocated to the diplomatic service of which apparently none of which have been released; and those, as this example, put aside in bunkers around Switzerland in preparation for the next world war. These Kriegsmobilmachungs-Maschine or K-Mob-Maschine all have the white label printed in red on the case which reads: *"Nur bei Kriegsmobilmachung abgeben ! / Ne délivrer qu'en cas de mobilisation de guerre ! / Da consegn. solo in caso di mobilitazione di guerra !"* They were generally unused except for occasional testing, and appear to be released only very occasionally.

$8,000 - 12,000

598

598 W

SURVEILLANCE TECHNOLOGY: COMMUNICATIONS ELECTRONICS.

Two Radio Receivers, Bethesda, MD, c.1960, being models 901-1 and 501, excellent condition.

Communications Electronics, Incorporated formed in 1960 to produce electronics directed at the *"surveillance, telemetry, direction finding, counter measures and general communications fields"* according to their 1966 catalogue preface. The 901-1 VHF receiver was their first product, made to the highest specifications and in limited numbers. The 501 was developed shortly thereafter. Both were updated with different model numbers by the time of their 1966 catalogue, which is available online.

$1,000 - 2,000

599

599 W

SURVEILLANCE TECHNOLOGY: COMMUNICATION ELECTRONICS.

Full rack of Communication Electronics surveillance equipment, Rockville, Maryland, 1960s, including:
1. HF Receiver Type 373A-2.
2. R-1401A/G Receiver.
3. Demodulator Type DM-22A.
4. Unlabeled half-rack module.
5. Receiver Type 775-3.
6. 905 Receiver.
7. FC-100 Frequency Converter.
8. VOR-6 Voice Operated Relay.
9. Power module.
10. Receiver Type 415-42.
11. Frequency Extender Type FE-1-2A.
12 & 13. IF-Tape Converter Type FT-201A.

A full complement of "special purpose" receiving equipment. The 1966 catalogue describes the offerings as being *"directed at surveillance, telemetry, direction finding, countermeasures and general communications fields."*

$3,000 - 5,000

600

600 W

MACH-TRONICS.

MVR-11 Video Tape Recorder, metal and plastic with removable lid, 623 x 270 x 336 mm, video and audio-in knobs, audio bias and phase dials, on/off toggle switch on drop-open panel, fast forward, rewind, play, and record buttons in white plastic, stop button in red plastic, 3-digit counter, sides with metal carrying handles, original detachable power cord. With the original MVR-11 Operation and Service Manual and MVR-11 Service Manual Supplement, and original letter dated June 7, 1963 from the Machtronics Manager of service engineering. Housed in an original MVR-10 box and an original Machtronics shipping crate.

Ex-Ampex Engineering Manager Kurt Machein formed the Mountain View, CA company Mach-Tronics with some fellow Ampex engineers. Their first product was the MVR-10, the first helical-scan recorder that used 1-inch tape running at 7 1/2 inches per second. 96 minutes could be recorded on a 10 1/2 inch real. It was priced at $10,300 with an 8-inch monitor, $9,800 without. At under 100 pounds, the unit was considered portable. The MV-11 followed the next year and whereas the MVR-10 was advertised as a closed circuit video tape recorder, the MVR-11 was billed a "Television Tape Recorder." The industry quickly adopted the new format and Mach-Tronics had nearly-immediate competition.

$2,000 - 3,000

601 W

MVR VIDEODISC RECORDER.

VDR-210CF TV Disc Recorder, Palo Alto, 1965, metal base with plexiglas cover protecting nickel cobalt-coated aluminum magnetic disc, front panel with buttons for record, play, freeze, reset, switch for "EE" and play, dial labeled "video," switch for input and servo, meter, on/off switch, remote connector; back panel with connectors for video in, video out (2), external sync, ac, field/frame switch.

"FREEZE ACTION"—THE INSTANT REPLAY IS INTRODUCED.
MVR, formerly Machtronics, was first to market with their VDR-210CF Videodisc recorder. CBS first used it in 1965 for sports replays. The device was able to record 20 seconds of black and white video as 600 single frames on a shiny magnetic disc. Ampex, where MVR founder Kurt Machein had worked as a lead engineer, were quick to follow with their own Videodisc recorder which they sold to ABC for their "Wide World of Sports."

$3,000 - 5,000

601

602 W

MVR VIDEO DISC RECORDER.

DMI 100S-2A TV Disc Recorder, Palo Alto, 1966, metal base with plexiglass cover protecting aluminum magnetic disc, front panel with buttons for record, play, freeze, reset, switch for "EE" and play, video adjustment dial, servo out indicator light, update/single cycle/auto switch, remote connector, in/out switch, meter, on/off switch; back panel with connectors for video in, video out (2), ac.
Provenance: CBS (label on front panel).

The 100S-2A was MVR's (the company created by ex-Ampex employee Kurt Machein) follow-up to their 210-CF. Unfortunately, it still recorded black and white video, whereas Ampex where able to develop the technology to record color a short time later. It's uncertain why this unit is branded Data Memory Inc. as it is clearly manufactured by MVR, but we can conjecture that the company was targeting the computer data storage market. This unit, according to a label on the front panel, was used by CBS.

$3,000 - 5,000

602

603 W

MOBILE PHONE: INTEGRATED SYSTEMS TECHNOLOGY.

Tel-Com 150A, Garland, TX, c.1973, briefcase base station, handset with rotary dial.

Integrated Systems Technology was a Texas-based company that sold their Tel-Com 150A mainly to wealthy oil men and celebrities at a price of $3,500 per unit.

$1,000 - 1,500

603

604

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EXCELL POCKETPHONE.

PC105T Mobile Telephone, 1986, plastic case with LCD screen and capacitive keypad, 183 x 72 x 23 mm, with attenna, plug-in charger, docking charger, car dock, branded address book, phone case, all in custom case.

The Excell PC105T, made by the British company Technophone, was the first mobile phone that was small enough to fit into a shirt pocket. The phone cost about 2500 pounds when it was launched in 1986 and was immediately popular.

$800 - 1,200

605 W

SATELLITE PHONE: MAGNAVOX.

Magnavox MX2020 Portable Satellite Phone, Deer Park, NY, 1990, metal, fabric and plastic, with collapsible fabric dish antenna, folding legs, in case.

$1,500 - 2,500

606 W

MTI SATELLITE PHONE.

Mobile Telesystems, Inc. TCS-9200, Rev.B, Gaithersburg, MD, c.1991, with handset, base, power supply, collapsible fabric transmission dish, manual, in metal case.

$2,000 - 2,500

607 W

MAGNAVOX SATELLITE PHONE.

MX-3030 INMARSAT-M/LM Magnaphone M, Deerpark, NY, 1993, base station/briefcase, handset, and fitted anvil case.

Satellite phone technology quickly progressed throughout the 1990s. The Magnaphone traded the large satellite dish antenna of the MX-2020 for simply an open lid of the briefcase.

$1,000 - 2,000

608

609

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608 W

GLOCOM SATELLITE PHONE.

Global Phone 2000t, Rockville, MD, 1993, briefcase/base station, handset. Like the Magnavox MX-3030 Magnaphone M, the Global Phone 2000t also uses its lid as an antenna—extremely compact for its day.

$1,000 - 1,500

609 W

CALIFORNIA MICROWAVE SATELLITE PHONE.

VTC-202 LYNXX INMARSAT-B, Redwood City, CA 1990s, with base unit, handset, folding square antenna dish, housed in original case with Mobile Satellite Products Corporation labels.

$1,500 - 2,000

610

IBM SIMON.

Personal Communicator, 1994, touchscreen personal digital assistant, in original box with 2 batteries, leather protective sleeve, manual, stylus and charger.

THE FIRST SMARTPHONE. IBM designed and engineered the Simon Personal Communicator in the early 1990s first showing a prototype, code named "Angler," in 1992. BellSouth Cellular Corp first distributed the smartphone in August 1994 and it sold 50,000 units in the 6 months it was on the market. The Simon was able to make and receive telephone calls, faxes, emails and pages and included a number of applications such as an address book, calendar, appointment scheduler, calculator, world time clock, electronic notepad, handwritten annotations, etc. Users could also use third-party applications by inserting a PCMCIA card or downloading to the phone's internal memory. Due to the speed at which the cellular market was developing, the Simon was discontinued in February of 1995.

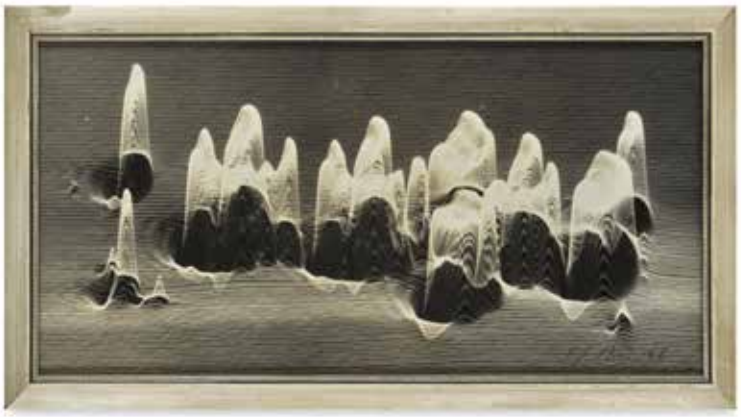
$1,000 - 2,000

611 W

ATLAS ELEKTRONIK SATELLITE PHONE.

Satphone SP 1600 B, Bremen, 1996, with briefcase base station, handset, manual.
Atlas Elektronik is a company that specializes in Naval Electronics. The present unit continues the mid-1990s trend of briefcase-based satellite phones that utilize the lid as an antenna.

$1,000 - 1,500



613

COMPUTING

612
ORDVAC.
ORDVAC Manual, Volume One, 1952. Champaign-Urbana: University of Illinois, October 31, 1951.
xvii, [1], 287 pp. Illustrated. Original tan stiff wrappers. Toned, some stray spots, wrappers rubbed and with some light creases.
Provenance: Collection of Dr. Martin Davis.

The ORDVAC (Ordnance Discrete Variable Automatic Computer) was an early computer built by the University of Illinois for the Ballistic Research Laboratory at Aberdeen Proving Ground. It was based on Institute for Advance Study (IAS) architecture developed by John von Neumann. The computer, which used 2178 vacuum tubes, was the first to have a compiler and was one of the first to be used remotely by telephone.

$800 - 1,200

613
ARAZI, EFRAIM 1937-2013.
Original gelatin silver print, signed ("Efi Arazi"), 1962, and numbered 12 of 50, framed.

THE BEGINNING OF COMPUTER ART.
Israeli-born Arazi was a graduate of the Massachusetts Institute of Technology. He went on to found and head Scitex Corporation (renamed Scailex in 2005), an Israeli company that specialized in developing and manufacturing hardware and software for graphic design, printing and publishing. While at MIT he began to create art using the computer to create striking random number-generated patterns. The present work was featured on the cover of the January 1963 issue of Edmund Berkeley's *Computers and Automation* (considered the first computer magazine). Berkeley coined the term "computer art" to describe the piece. It was popular enough that he initiated the long-running Computer Art Contest the same year. From *Computers and Automation,* January 1963: *"The brush is an electron beam; the canvas, an oscilloscope; the painter, an electronic computer."*

$1,500 - 2,000

614
CONTROL DATA CORPORATION: SEYMOUR CRAY.
Group of 3 CDC modules:
1 & 2. Control Data 3000 Series circuit modules, c.1962, each 75 x 67 mm, with 15-pin male connector, labled 309476 & 309448A on verso.
3. Control Data 6600 "cordwood" circuit module, c.1964, 75 x 66 mm, being a two-board module with 30 pin male connector at one end and 6-pin female connector at the other.
WITH: collection of printed material including sales brochures for Control Data 6500 & 6600; sales sheets for Control Data 6000 Series, 6400, 6500 & 6600; and Control Data 6400/6500/6600 Computer Systems Reference Manual.

THE RISE OF THE SILICON TRANSISTOR.

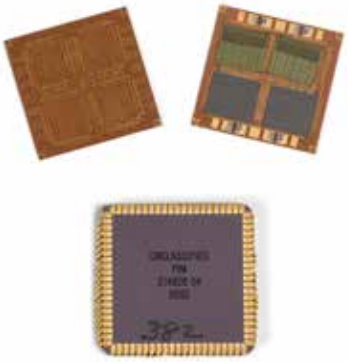
Control Data was formed by early computer pioneer William Norris after he and some other employees of Engineering Research Associates, including Seymour Cray—who there had designed his first computer, the successful ERA 1103—grew dissatisfied when the company was merged with UNIVAC following a sale to Remington Rand. CDC had early success with the Cray-designed 1604, one of the first commercially successful transistorized computers. Over a long weekend, Cray designed what could be called the first truly small computers: the CDC 160 & 160A, minicomputers that would fit on a desk. Cray quickly followed these with designs that were used for the 3000 series. Even before the 3000 series was officially released—destined to become a great success—Cray had already moved on to development of the 6000 series. The 6600 was one of the first successful supercomputers and extremely fast for its day, outperforming the previous record holder by a factor of 3. It was innovative in its early use of silicon transistors, freon for cooling and it was one of the first to use a monitor instead of lights and switches. CDC, due to the vision of Cray and wisely-calculated risk-taking of Norris, provided Fairchild Semiconductor first with a development contract of $500,000 to design a silicon transistor to meet Cray's speed requirements followed by the industry's largest single orders for their new silicon chips&mdashcertainly a boon for a nascent Silicon Valley. IBM CEO Thomas Watson, Jr., whose company had been dominating the scientific computing market, noted in a famous memo *"Last week, Control Data ... announced the 6600 system. I understand that in the laboratory developing the system there are only 34 people including the janitor. Of these, 14 are engineers and 4 are programmers ... Contrasting this modest effort with our vast development activities, I fail to understand why we have lost our industry leadership position by letting someone else offer the world's most powerful computer."* Cray replied: *"It seems like Mr. Watson has answered his own question."*

$1,200 - 1,800

612

614

615



616

617

615
CRAY 3 DEMONSTRATION KIT.
Demonstration kit containing a Cray 3 memory module and the following components:
1. gallium arsenide die
2. SC die
3. SM die (2)
4. Logic Spacer
5. Logic Board with gallium arsenide die and flex connectors
6. Memory spacer
7. Memory board with SM die and capacitors attached
8. Twist pins
9. Power pins
10. Cray Computer Corporation *Cray-3 Supercomputer Systems* brochure.
All housed in custom plastic case.

The Cray 3 was the first offering of the Cray Computer Corporation, Seymour Cray's spin-off from Cray Research, Inc., the company that he created in 1972 after he left Control Data Corporation. The Cray 3 was the first supercomputer to use gallium arsenide integrated circuits for all of its logic circuitry and was the fastest computer of its time. The changing political climate at the end of the cold war drastically shrank the supercomputer market and much of the market turned to massively parallel designs. Cray ended up loaning a Cray 3 to the National Center for Atmospheric Research (NCAR) and another government order the company received was cancelled.
This kit was created for prospective clients demonstrating the construction of the complex three-dimensional Cray-3 modules. From the brochure: *"The Cray-3 logic and memory circuitry is packaged in up to 336 removable modules, each containing up to 1,024 GaAs integrated circuit die. Total integrated circuit population in a 16-processor Cray-3 is over 142,000 die, of which 36,864 are for common memory. The packaging results in a GaAs gate density of approximately 96,000 gates per cubic inch. The modules are three-dimensional structures measuring 121 mm by 107 mm by 7 mm. Nine printed circuit boards make up the module sandwich and contain a total of 69 electrical layers. Circuit connections are made in all three dimensions within the module. X-y traces are as small as 0.048 mm. Z-axis connections are made with approximately 14,000 gold-plates, beryllium-copper twist-pin jumpers per module. The logic signal jumpers, which make up the bulk of the z-axis connections, are only 0.122 mm in diameter."*
This is the only existing kit showing the component parts of the Cray-3 Module and likely some of the only remaining component parts of this project. It comes from a longtime associate of Seymour Cray and an employee of Control Data Corporation, Cray Computer Corporation and SRC Computer.

$4,000 - 6,000

616
CRAY 3/SUPER SCALABLE SYSTEM "PIM" CHIPS.
Group of 2 logic boards, each 25 x 25 mm, and a PIM (Processor-In-Memory) chip, 30 x 30 mm, c.1994.
Provenance: from a longtime associate of Seymour Cray and employee of Control Data Corporation, Cray Computer Corporation and SRC Computer.

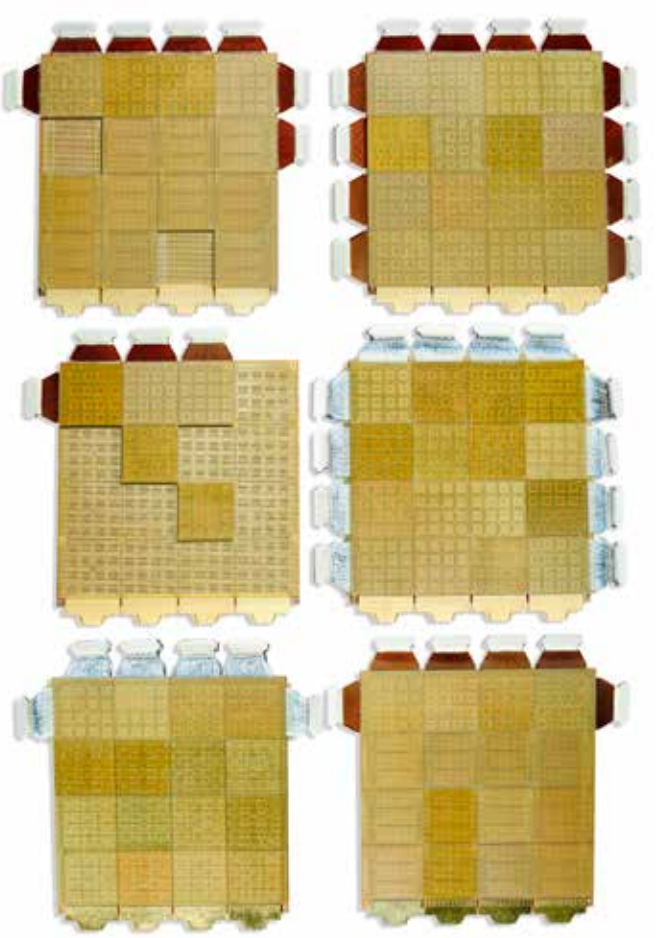
THE BRAIN OF THE ULTIMATE SPYING MACHINE.
The Cray-3/SSS was a joint project with NSA and their Supercomputer Research Center (SRC) to produce a massively parallel supercomputer that combined 2 Cray-3s with a Single Instruction Multiple Data (SIMD) array with up to one million processors, utilizing PIM chips developed by the SRC. This was Seymour Cray's answer to the massively parallel computing that was becoming more prevalent, and he eventually planned to upgrade the system with as many as 30 million processors! The applications for this technology were numerous, but the NSA were, understandably, interested in utilizing it for image processing, pattern recognition, signal processing, sophisticated graphics applications, seismic processing—spying, essentially. Cray Computer Corporation hoped that the project would incite interest in the private sector, but, despite a successful test and demonstration in early March 1995 utilizing 256,000 processors and positive reports in trade journals, Cray was forced to declare bankruptcy a few weeks later.
Included here are likely the some of the few remaining components of this project. They come from a longtime associate and an employee and CDC and later Cray Computer Corporation and SRC Computer.

$2,000 - 3,000

617
CRAY-5.
Group of 2 Cray-5 logic boards, 40 x 32 mm each, with multi-pin connectors, c.1996.

"Father of the supercomputer" Seymour Cray had just put the Cray-4 into production as he began his next project: the Cray-5, a supercomputer which was to be 5-times faster than the Cray-4, was also to use gallium arsenide semiconductors, a material that he had first used in the Cray-3, and would utilize Fluorinert liquid for cooling the modules. He designed a unique 3-dimensional logic multi-board module that had 90 electrical layers with 36,000 z-axis connections. The projected completion date was in 1997. There was a setback when the Cray Computer Corporation was forced to declare bankruptcy in late March, 1995. Cray, almost 70-years old, soldiered on with a new company, SRC Computers. Tragically, Cray, who had also been working on a design for the Cray-6, which was to blaze a new path utilizing lasers and fiber optics, died in early October 1996 as a result of a car accident 2-weeks prior.
Included here are some of the only remaining components of the Cray-5 from a longtime associate of Seymour Cray and an employee of Control Data Corporation, Cray Computer Corporation and SRC Computer.

$4,000 - 6,000



618

618

CRAY SUPERCOMPUTERS.

Collection of 16 Supercomputer Modules & Components including:
Cray-1: Logic module; memory module; rackmount hardware.
Cray X-MP: memory module; logic module.
Cray-2: Logic module; memory module; capacitor bay - with lucite stand; power module - with lucite stand.
Cray Y-MP: Processor module.
Cray-3: 6 modules, each in plastic case.

In 1976 Seymour Cray gave a rare speech at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. When he offered to answer questions afterwards, the programmers in the audience fell silent. The head of the NCAR computing division asked the programmers why they didn't raise a hand and one programmer replied: *"How do you talk to God?"* (Murray pp 3-4).

Cray joined Engineering Research Associates (ERA) in 1951 after graduating from the University of Minnesota with a B.Sc. in Electrical Engineering and a M.Sc. in applied mathematics. He quickly became respected among the engineers and was assigned the difficult task of designing a control system for what would be the EA 1103, which went on to become the first commercially successful scientific computer.
Cray eventually became dissatisfied with ERA after they had been bought first by Remington Rand and then by the Sperry Corporation. He, along with William Norris, one of the ERA's founders, left to form Control Data Corporation (CDC). There he was responsible for the design of the CDC 1604, initial work on the 3000 series, the CDC 6600 - generally considered to be the first successful supercomputer - and the CDC 7600.
In 1972 Cray left CDC to form Cray Research with a sizeable investment from CDC. At Cray Research he designed a supercomputer 5 times faster than the CDC 7600. The Cray 1 was the first supercomputer to successfully implement the vector processor design and was one of the most successful supercomputers in history, selling over 100 units at a cost of almost $8 million. It wasn't only Seymour Cray who was designing Cray Research's supercomputers. Taiwanese computer engineer Steve Chen later joined the company and worked as principal designer of the X-MP and Y-MP multi-processor supercomputers - 2 successful systems that maintained the success of the Cray-1, although were designs derived from the Cray-1, whereas Cray preferred to begin his designs "from clean sheet of paper."
Seymour Cray's follow-up, the Cray-2, which used a unique Fluorinert cooling system that immersed the modules in the liquid, was not as successful as the Cray-1 nor the X-MP, selling only 27 units at a range of $12 to $17 million each. Even before the Cray-2 was complete, Seymour Cray had already moved on to designing the Cray-3. It would again use Flourinert to cool the modules, but also use gallium arsenide semiconductors, a material that had not previously been used in this context and which allowed for greatly increased speed. Cray even had to invest in a semiconductor startup, GigaBit Logic, as there were no current suppliers. Cray further developed the novel 3D integrated circuit packaging he had used for the Cray-2 to greatly decrease the pathways. Each module, measuring 121 x 107 x 7 mm, was composed of 9 printed circuit boards containing 69 electrical layers. Unfortunately, Cray never sold a single unit, although one was loaned to NCAR. Cary went on to design further systems before he died in a 1996 automobile accident, although none of them were brought to market.
Murray. *The Supermen.* NY: [1997].

$30,000 - 50,000

619 W

FRIDEN 132 ELECTRONIC CALCULATOR.

Metal and plastic case, San Leandro, CA, 1965, 11 numerical keys (including decimal point) and 13 additional keys including 5 functions, 14-position decimal dial, CRT screen, detachable power cord.

Friden's 130 series were the first solid state calculators. The 132, issued two years after the 130, added the square root function. Friden, Inc. was purchased by Singer the year that this calculator was made and the company moved to Palo Alto.

$600 - 800

619

620 W

TOSHIBA TOSCAL BC-1411.

Metal case, Tokyo, 1966, 11 numerical keys (including decimal point) and 11 additional keys inlcluding power switch, nixie tube display.

The Toshiba BC-1411 was notable for its use of a unique form of dynamic random access memory (DRAM) built from discrete components and used for its 14-digit memory. The calculator also featured a striking nixie tube 14-digit display.

$2,000 - 3,000

620

621 W

DIGITAL DEVELOPMENT CORPORATION MEMORY SYSTEM.

UL 6200-128 Disk/Drum memory unit, mid-1960s, with blue-painted metal cover.

San Diego-Based Digital Development Corporation created a hybrid of drum memory and what would become the hard disk drive. The present unit utilizes an 11-inch disk and stacks the electronics into a drum format. Apparently a rare piece, this unit is serial number 2.

$2,000 - 3,000

621

622

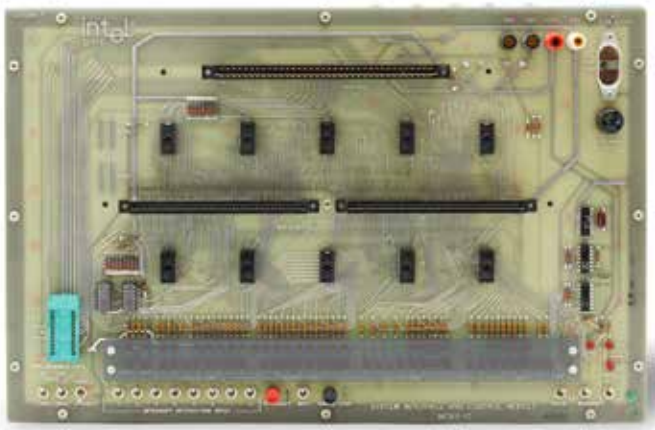
622 W

OLIVETTI MICROCOMPUTER.

Programma-602 Microcomputer, Italy, 1971, being a desktop computer with putty-colored plastic case, with magnetic program card slot, 39 buttons, 4 switches, two dials, built-in printer. included is a P-101 manual.

The P-602 was Olivetti's follow-up to their P-101, one of the first commercial units called a microcomputer. The P-602 was billed as a "super microcomputer" and was able to utilize magnetic program cards for storage, magnetic cartridges, a paper tape reader, a tape punch, an XY plotter and other peripherals. Also, like the P-101, it featured a slick Italian design.

$2,000 - 3,000



623

623 W

INTEL MICROCOMPUTER.

MCB 8-10 Interface and Control Module, 1972, printed circuit board affixed to blue metal box, 14 switches, ZIF connector, 4 binding posts, a.c. line socket, 60 LEDs protected under tinted plexliglas, without CPU board.

The MCB-8-10 was one of the first microcomputers to use the 8008 microprocessor. It was the first Intel 8-Bit Development System and it was intended to develop hardware, software and program EPROMs. Unfortunately, this unit lacks the CPU module, but is extremely rare in any form.

$800 - 1,200

624

624 W

COMPUTER PRODUCTS MICROCOMPUTER.

Model 070-044, Fort Lauderdale, early 1970s, metal case, front panel with 16 Output Word Select switches, 16 Command Word Select switches, 16 Data Word Display LEDs, 10 Interrupt Vector Display LEDs, 6 Control Display LEDs, 2 Instruction Rate dials, 6 Device Address Select switches, 5 Instruction Select switches, Reset switch and Man/Comp switch, interior with 5 boards, 3 of which are hand-wired.

An interesting hybrid of professional and homebrew computing. We can find little on Computer Products of Fort Lauderdale, but the face plate looks to be professionally printed. The hand-wired boards give another impression.

$1,000 - 1,500

625

626

625 W

ALTAIR 8800.

8-bit microcomputer by MITS, c.1974, metal case with removable top, face panel with 36 LEDs, 25 switches, cooling fan, additional power supply and interface cables at back, containing 13 modules: 1. MITS CPU, REV 0; 2-5. Godbout 114a Econoram II; another; another; another 6. Godbout 114c Econoram II2; 7. Godbout 4K Byte Ram Module; 8. Godbout 8K Byte Rom Module; 9. MITS 1K Stat Mem Board Rev 0; 10. Imsai SIO Rev-3; 11. Processor Technology Corp Cuts Rev. B; 12. Processor Technology unlabeled board; Jade Double Disk Controller; 13. Vector 8800V; with modification. Lot also includes: 8-inch floppy disk drive in unbranded matching metal case; assorted manuals per condition report. *Provenance:* Original MITS invoice for this unit dated 2/3/1975 to Henry E. Ahler of Huntsville, Alabama.

THE MODEL THAT INSPIRED GATES AND ALLEN.

MITS ALTAIR 8800 holds the distinction of being the first microcomputer to catch on with the hobbyist market. It was originally offered in kit form for $439 or assembled for $621. Bill Gates, then in his Sophomore year at Harvard, and Paul Allen came across the December 1974 issue of Popular Electronics which featured the Altair on the cover and decided to join the computer revolution by writing a BASIC interpreter that would run on Altair's Intel 8080 microprocessor. "It would become the first commercial native high-level programming language for a microprocessor. And it would launch the personal computer software industry" (Isaacson p 332). This example contains the Processor Technology Subsystem B group of 5 modules. Processor Technology Corporation, a company founded originally to create products for S-100 business systems like the Altair and noted for their high quality, went on to produce their own microcomputer with the successful Sol 20. Isaacson. *The Innovators.* NY: [2014].

$2,000 - 3,000

626 W

INTEL INTELLEC-8.

8-bit microcomputer, 1974, metal rack mount case, front panel with 31 switches, 48 LEDs, ZIF socket and key switch with key; containing 7 modules, cooling fan, 2 female serial connectors at back, without power cord. Modules include: 1. Intel 8080 I CPU, 1974; 2. Intel PROM Programmer Module, 1973; 3&4. Intel RAM boards, 1972; 5. Intel PROM Memory Module, 1973; 6. Intel 8080 I F/P Controller; 7. Intel I/O Module, 1974. Lot also includes *Programming Manual for the 8080 Microcomputer System.*

One of America's first microcomputers, the Intel Intellec-8 was produced in relatively limited numbers and was extremely expensive. Intel led the way, demonstrating what the 8080 microprocessor could do while others, such as MITS and their Altair 8800, took the 8080 to the masses. It's generally considered the first widespread microprocessor. Intel eventually left the computer business to others while they went on to become the dominant supplier of microprocessors.

$3,000 - 5,000

627

627 [W]

IBM 62GV HARD DRIVE.

Metal base with plexiglas cover and General Electric A.C. motor, 710 x 500 x 185 mm, c. 1974.

The IBM 62GV was the first known hard drive to ship over 100,000 units. The 5 MB hard drive was developed at the company's Hursley, England laboratory under the code name Gulliver. It used a rotary actuator with one 14-inch disk. The unit here is driven by a General Electric AC motor and the 14-inch disk itself along with the read/write head is visible under a formed Plexiglas cover.

$800 - 1,200

628 [W]

INTEL INTELLEC 4 MOD 40.

4-bit microcomputer, 1975, metal case with hinged top and magnetic closures, face plate with 46 LEDs, 31 switches, ZIF socket and key switch; rear with cooling fan, 4 female serial connectors, two-way switch, without power cord. Containing power supply and 9 modules: 1. I/O module, 1974; 2. RAM module, 1972; 3-4. PROM Memory Modules, 1973; 5. CPU module, to which is wired a switch to choose RAM or ROM; 6&7. Unidentified board with a homemade board piggybacked on recto; 8. Memory Controller; 9. Prom Programmer Module, 1973. Accompanied by Intel paper tape reader, front panel with tape reading mechanism, power switch; rear with power cord and interface cable. Lot also includes a collection of paper tape programs, a group of 9 Intel manuals including schematics, a Remex tape reader manual and an additional Intel folder of updates.

RARE INTELLEC 4 MOD 40 WITH PAPER TAPE READER. The Intellec 4 was, along with the Intellec 8, one of the first American microcomputers. It used Intel's 4004 microprocessor chip. The Mod 40 came out a couple of years later and used the much faster, although still 4-bit 4040 chip. Though the Intellecs were offered to the public, they were created as microcomputer development systems and very few were produced.

$4,000 - 6,000

628

629 [W]

IMSAI 8080.

8-bit microcomputer, c.1975, metal case with removable top, 174 x 439 x 498 mm, faceplate with 22 alternating red and blue switches, numerous LEDs, reverse with serial ports labled: "JI TTY," "J2 VIDEO," "J3 PARALLEL," "VBD KBD," "MODEM" and one unlabeled; and coaxial port labeled "VBD VIDEO," toggle switch labled "FAN," interior with IMC Boxer fan, Tranex 4 3751 power supply; 13 modules: 1. TDL (Technical Design Labs) The ZPU, Rev.1 Feb 77 with Zilog Z80 microprocessor. 2. RDC Enterprises Compu/Time. 3. IMS RAM 4, Rev-2, 1975. Labeled "0000-0FFF" 4. TDL The Z16, Rev 2, 1976. Labeled "1000-4FFF." 5. *Another - Labeled "5000-8FFF." 6. TDL The Z16, Rev A, 1976. Labeled "9000-CFFF." 7. *Another - Labeled "D000-DFFF" 8. PTCO 2KRO. Labeled "E800-EFFF" 9. Processor Technology 3P+S, I/O Rev a. 10. Micromation Doubler. 11-12. Technical Design Labs 46-77 Rev 1. 1977 13. Godbout BM 106. 1977; Serial number 003158.

629

Former IBM employee William Millard formed IMS in 1972 as a computer consulting and engineering concern. He and his chief engineer Joe Killian were impressed with the then new Intel 8080 chip and began development of the IMSAI 8080 using MITS Altair 8800's S-100 bus. By late 1975 they were shipping what was to be the first Altair clone. IMS were able to correct many shortcomings of the original Altair 8800 by providing a larger power supply, a 22 slot motherboard, and easier wiring of the front panel. Willard famously went on to found ComputerLand and become known as the "father" of modern computer retailing. Many are familiar with the IMSAI 8080 from the 1983 film *WarGames* where the main character uses one to hack a military supercomputer and almost causes a nuclear war.

$2,000 - 3,000

630

630 W

APPLE-1 COMPUTER.

Apple 1 motherboard, with label "Apple Computer 1 / Palo Alto. Ca. Copyright 1976," includes printed circuit board with four rows A-D, and columns 1-18, MOS Technologies 6502 microprocessor, labeled MCS 6502 1576; keyboard interface and connector; 8K bytes RAM in 16-pin 4K memory chips; 3 "Big Blue" Sprague capacitors; firmware in PROMS (A1, A2); low-profile sockets on all integrated circuits; inked in security pen "01-0044" on underside; heatsink; expansion connector; cassette board connector; and original cassette interface, labeled Apple 1 Cassette Interface Copyright 1976 with "NTI" lettered in triangle on component side, overall approximately 15 x 9 x 2½ inches.

WITH: 2 Stancor power transformers; George Risk Industries keyboard model 756; Panasonic RQ-309DS cassette recorder, Hitachi VM-900U 9-inch monitor; custom plexiglas-covered wooden case with power supply and cooling fan. Lot also includes *Apple-1 Operation Manual*. Palo Alto, CA: Apple Computer Co., 1976. 4to. 8pp, fold-out schematic, warranty printed on inside of back wrapper. White paper wrappers with first type Apple Computer logo, depicting Isaac Newton sitting below an apple tree, stapled binding. *Preliminary Apple Basic Users Manual October 1976*. Palo Alto, CA: Apple Computer Co., 1976. 4to. 14 pp. Green paper front wrapper with first type Apple Computer Co. logo, bound with a single staple at upper left. One horizontal fold crease, soiling to back page, handling smudges.

Paper documentation, including *Apple-1 Cassette Interface* [Users' Manual]. Oblong octavo. White printed wrappers, folded and staple bound at top edge; an Apple Computer Co. customer return tag dated August 1977, for Bob Reinemer, marked "*'Doesn't load BASIC,' no -5V regulator*"; Apple Computer Company marketing flyer, 4to, with first type logo and "*Byte into an Apple*" slogan; UHF Industries TV-1 computer monitor parts list and instruction sheet, 1p, 4to, folded; George Risk Industries Model 756 keyboard manual and specification sheet, 4 pp, 4to, on yellow paper, staple bound.

Computer operational as of October 2018; a video of that operation is linked to the online description of this lot at http://www.bonhams.com/video/******/. It was examined and operated by Corey Cohen, Apple-1 expert. Mr. Cohen notes the Apple-1 is currently in 7.0 (out of 10) condition. Request condition report for further information. *Provenance:* Bob Reinemer (return tag); Apple Computer; Sent by Steve Jobs to present owner circa 1977.

APPLE-1 COMPUTER GIFTED BY STEVE JOBS AND IN EXCELLENT WORKING CONDITION.

The Apple-1 computer is the first pre-assembled personal computer to come to market, heralding the dawn of the personal computer revolution. Steve Wozniak, in his autobiography, recounts: "I didn't realize it at the time, but that day, Sunday, June 29, 1975, was pivotal. It was the first time in history anyone had typed a character on a keyboard and seen it show up on their own computer's screen right in front of them" (p 166).

The story of its production and sale has become one of the most potent legends in 20th century history. "People who saw my computer could take one look at it and see the future. And it was a one-way door. Once you went through it, you could never go back" (Wozniak p 168).

Wozniak and Steve Jobs demonstrated the breakthrough design at the Homebrew Computer Club in Palo Alto. The next day, the ever enterprising Jobs obtained an order from Byte Shop owner Paul Terrell for 50 assembled boards to be delivered in 30 days at $500 apiece. Jobs scrambled to come up with the $15,000 of parts needed and enlisted friends and family in the assembly process. Approximately 200 units were eventually made, but this is thought to be one of the first batch of 50 with the PCB manufacturer unidentified on the front copper layer of the board. It also bears the inked number "01-0044" on the reverse, of unknown significance, though generally considered to be a Byte Shop inventory number. Only 68 surviving authentic Apple-1's are listed in Mike Willegas's Apple 1 Registry as of October 2018. Although the first Byte Shop order sold extremely well (at a retail price of $666.66), there were at least some remainders from the additional 150 and also many Apple-1s were eventually traded in for Apple IIs, many of which are thought to have been destroyed by Jobs.

The present example was consigned by a friend of Steve Jobs. The two had met during the 8th grade school year and became fast friends, even backpacking and camping with each other's family. They maintained contact even after they each went off to college. The owner recounts a visit to Jobs in 2007 where he was stopped by a couple of men in black suits as he neared Jobs' house. The men directed the consignor where to park and he was escorted to the entryway where Jobs introduced the consignor to former President Bill Clinton!

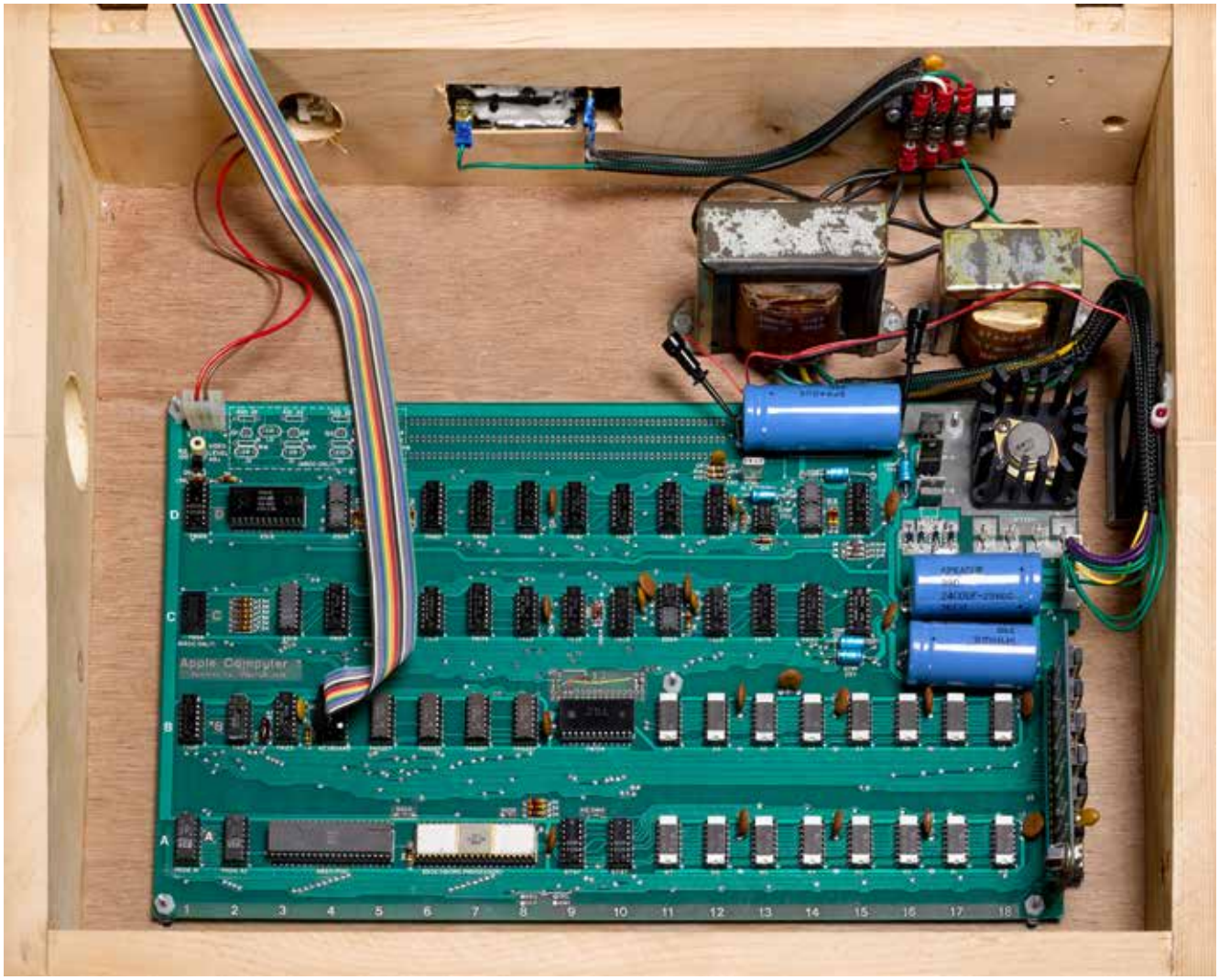
Regarding the Apple-1, the consignor contacted Jobs late in 1977, after the Apple II was already a big success, to see if there were any Apple-1s around that he could be used for experimentation. Jobs sent the present unit, which was part of the Apple exchange program. The tag bore the name Bob Reinemer and stated "Doesn't load Basic." The consignor worked on the unit for some time before he was able to finally get it working.

The lack of an NTI logo, the Byte Shop's security penned number on the PCB verso, and the low number indicates that this example was likely from the first batch of 50 that Jobs and Wozniak sold. It was probably returned to Apple through the Byte Shop for the exchange program.

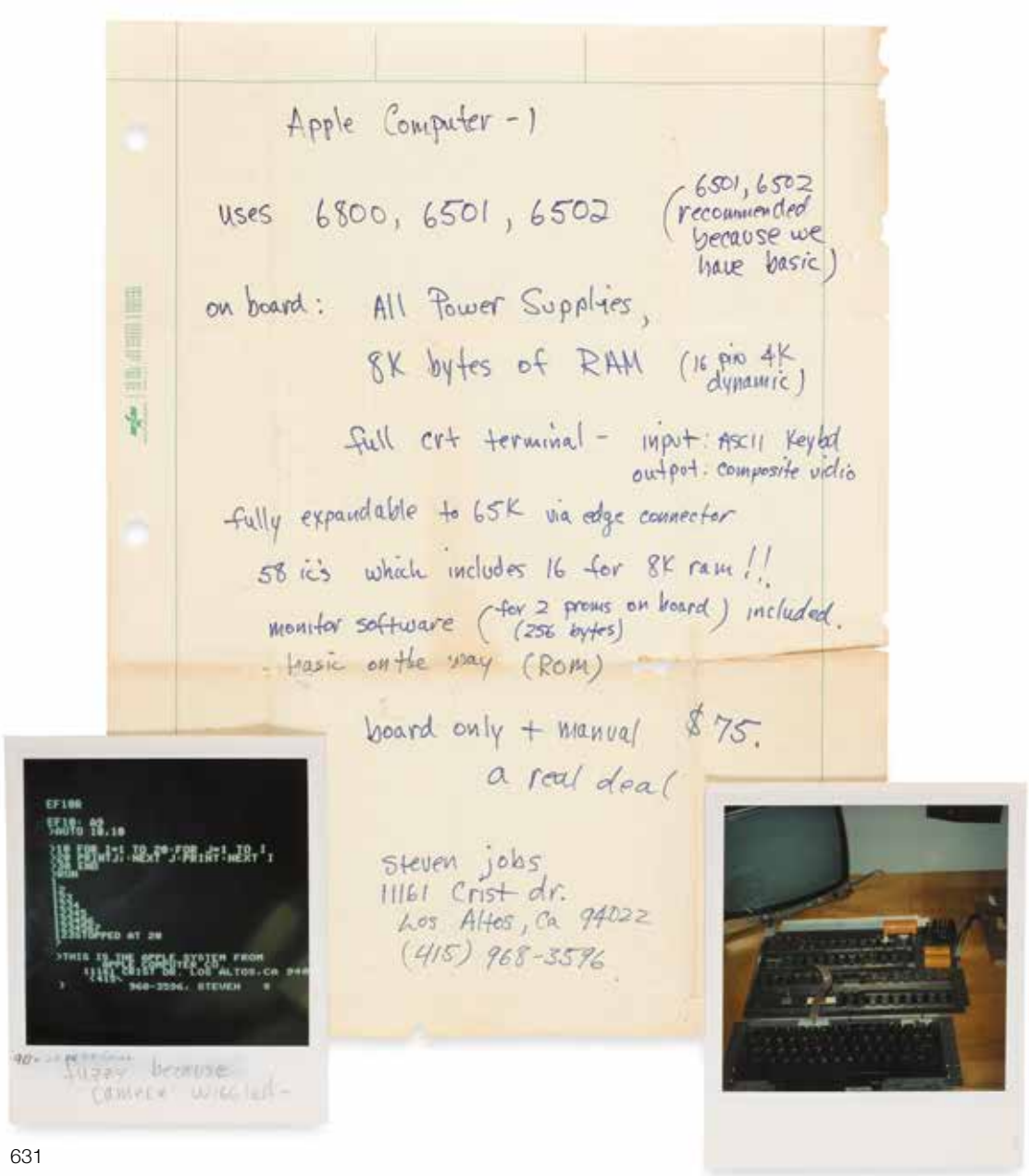
Wozniak, Steve & Gina Smith. *iWoz.* NY: 2006; Isaacson, Walter. Steve Jobs. NY: 2011.

$250,000 - 350,000

"EVERY COMPUTER BEFORE THE APPLE I HAD THAT FRONT PANEL OF SWITCHES AND LIGHTS. EVERY COMPUTER SINCE HAS HAD A KEYBOARD AND A SCREEN. THAT'S HOW HUGE MY IDEA TURNED OUT" —STEVE WOZNIAK



630



631

631

JOBS, STEVE. 1955-2011.

Autograph Manuscript Signed ("Steven Jobs"), 1 p, quarto, n.d. [1976], not addressed, offering an Apple 1 motherboard and manual for $75, in blue ink on 3-hole punched graph paper, folded, chips to edges, holes at fold crease and lower blank areas, not affecting text. WITH: 2 Polaroid photographs of Apple-1 computer and monitor display.

Provenance: From a longtime friend of Steve Jobs. See provenance for Apple-1, lot 630.

STEVE JOBS PROMOTES THE APPLE-1."

With the first 50 boards sold to the Byte Shop, Steve Jobs continued the momentum by marketing bare Apple-1 printed circuit boards (PCBs) to friends and acquaintances. The present manuscript is essentially a specification sheet for the computer and was given to the consignor during a visit to Jobs' garage. Jobs refers to the computer as *"Apple Computer-1"* and states that it uses either the 6800, 6501 or 6502 microprocessor, but that the 6501 or 6502 was *"recommended because we have basic."* He touts the *"full crt terminal"* the *"58 ic's which includes 16 for 8K ram!!"* Curiously, Jobs states *"basic on the way (ROM),"* which never materialized for the Apple-1, but did the following year for the Apple II. Jobs quotes the price of $75 for the board and manual, *"a real deal"* and lists his mailing address and phone number at the bottom.

The manuscript is accompanied by two Polaroid photographs. The first shows an Apple-1 on a wooden table with a keyboard, monitor and power supply partially visible in the right edge. It looks very much like the "Production Prototype," number 2 in Mike Willegal's Apple-1 Registry, with its orange capacitors, white ceramic MOS MCS 6502 and with a similar power supply setup. The other Polaroid shows the Apple-1 screen with "Apple Computer Co. at the bottom and Jobs' address and phone number for contact. Jobs has written on the lower margin *"40x24 OR 26 lines / fuzzy because camera wiggled."*

$40,000 - 60,000

"A REAL DEAL!"

632 W

MITS ALTAIR 680.

8-Bit Microcomputer, 1976, metal case with removable top, face plate with 27 switches and corresponding LEDs, reverse with serial port, 2 toggle switchs and 2 3.5mm jacks, interior containing MITS 680 Expander Rev 0 - 1; MITS KCACR 680 Rev 0, 1976. With fan and power supply, 116 x 278 x 279 mm.

Announced in November, 1975, the Altair 680, based on the 6800 microprocessor, was finally ready to be shipped in May of 1976. Paul Allen of newly-formed Microsoft rewrote his and Bill Gates's 8080 assembler to support the 6800 processor and had their high school friend and second employee Ric Weiland convert the Altair BASIC's 8080 assembly language to 6800 assembly language. Microsoft, having suffered per-copy royalty loss with their 8080 BASIC due to software sharing, licensed 680 BASIC to MITS on a non-exclusive basis for a flat fee of $31,200. Reports indicate that the 680 BASIC was quite fast compared to 8080 BASIC, but the 680's limited capacity and incompatibility with the popular 8800 led to poor sales and few are available today.

$2,000 - 3,000

632

633 W

NORTH STAR COMPUTERS HORIZON.

8-Bit Microcomputer, 1977, wooden cover over metal case, 194 x 521 x 443 mm, brushed aluminum face plate with anodized blue aluminum label, with two 5 1/4-inch disk drives, two serial ports, power supply, fan, 6 boards including: 1. North Star Z-80 Processor Board ZPB-A2. 2-5. North Star 16K RAM Board, 1977. 6. North Star Micro Disk Controller MDS-AD2.

Begun by the Berkeley, CA-based Drs. Chuck Grant and Mark Greenberg under the name Kentucky Fried Computers, they were eventually convinced to change the name. Their first big product was the North Star disk system which, coupled with a S-100 bus controller and offered for $699 in kit form, was the first floppy disk system that was affordable for hobbyists. They converted the profits from that success into their own S-100 computer system, the North Star Horizon—one of the first microcomputers to include disk drives.

$1,000 - 2,000

633

634 W

CASI VP-4001 MICROCOMPUTER.

8-Bit Microcomputer, 1977, metal case with QWERTY keyboard, front panel with 10 buttons, 2 dials, lighted power switch, 14 LEDs, back panel with 2 printer ports, one remote control port, 2 monitor connectors, camera connector, volume dial and counter; inside is one board, power supply, speaker, also included is a Mitsubishi P51U Video Printer rebranded CASI, and 7 5 1/4 inch diskettes some of which include CASI Colortron Version 1.7.

The CASI AP-4001 was a single-purpose computer based around an Intel 8085, a microprocessor that was binary-compatible with the better known 8080. CASI produced the first commercially available computer portrait system, which was used to print portraits onto clothing. The earliest units, such as the above example, took a still image from a video camera and then converted it into typographical characters reproducing the same image.

$500 - 700

635

635 W

MOSTEK AID-80F.

8-bit microcomputer, late-1970s, white and blue fiberglass case with hinged top, front panel with 2 8-inch disk drives, power switch and red power indicator light, rear panel with 5 multi-pin female connectors, containing power supply, fan and 3 modules: ASSY 450-00174 REV B CPU board; ASSY 450-00186-00 REV E memory board?; ASSY 450-00243-00 REV D floppy controller. Lot also includes additional material including Prom Programmer PPG-8/16; AIM-80X; an uninstalled module: ASSY 450-00257-00 REV C; 6-Slot Monitor Board with 5 smaller boards, and a large collection of software on 8-inch diskettes.

Mostek, like Intel, was a chip manufacturer that briefly engaged in the microcomputer market. The Mostek AID-80F was a Z-80-based microcomputer sold as a development system or as an OEM computer for custom applications. It had a CP/M-like operating system named M/OS-80 that was partially compatible with some CP/M applications. The original list price was $5995 and they are now rarely encountered.

$2,000 - 3,000

636

636 W

OHIO SCIENTIFIC CHALLENGER 8P.

8-bit microcomputer, Model C8PDF, Serial #14920; metal case with removable top, includes original matching keyboard, 6 ports and 2 coaxial connectors in back, power supply and fan, 250 x 434 x 385 mm. Contains 6 Main modules: OSI 520 x3; OSI 470 Rev B; OSI 505 REV B 1979; and another with identification not accessible.

Ohio Scientific Inc. was formed by Mike and Charity Cheiky in 1975 and was based in Hiram, Ohio. Their earliest products were microcomputers based around the MOS 6502 microprocessor, the same used in the Apple-1, Commodore PET & VIC 20, etc. The company introduced the model 500 CPU card design in 1978 and was primarily used in the Challenger systems. The 8P, introduced in 1979 was the most expandable of that series and used a 6502A microprocessor.

$2,000 - 3,000

637

637 W

INTEL MDX 431A.

8-bit microcomputer, 1979, plastic case with removable top, with built-in monitor, 5 1/4-inch disk drive, hard drive, interior with power supply, 3 fans and the following modules: 1. CPU; 2. Slave Execution Unit Board; 3. Slave Processing Unit; 4. 012B/056B memory board; 5. 51/4 Winchester Disk Controller; 6. Controller Board; 7. Trace Board. Does not include keyboard.

The MDX 431A was part of Intel's Series IV Micorcomputer Development System which utilized both 8086/8088-based and 8080/8085-based development environments. Like the Intellec series, this was a system created for software and hardware development and only sold in very limited numbers.

$1,000 - 2,000

638

639

638 W

VECTOR ELECTRONIC VP1.

8-bit microcomputer, c. 1979/80, metal case, 230 x 446 x 436 mm. Front panel with reset button, power switch and indicator light; rear panel with the following ports: floppy interface; modem, printer, terminal and spare.
Interior with power supply, fan and with the following modules on the Jade ISO-Bus: 1. SD Systems SBC-200 FAB Rev C with Zilog Z80A microprocessor. 2. SD Systems Expandoram II Rev D. 3. SD Systems Versafloppy II.

An interesting example of a homebrew 8-bit S-100 bus microcomputer using Dallas, Texas company SD Systems' SBC (Single Board Computer)-200 which was based upon the Zilog Z80 microprocessor so popular at that time. Although the unit is labeled on the front panel with a company name and model number, we can find no information on how many were made or anything about the company, which surely would have had trademark issues with Vector Graphic had the VP1 been widely distributed.

$1,000 - 2,000

639 W

HARD DRIVE TECHNOLOGY.

Box of 8 Seagate ST-506 5MB 5.25-inch hard drives, Cupertino, 1980, in original shipping carton. The ST-506 was the first 5.25-inch hard drive to hit the market and quickly became a huge success for the company—especially after it was used in the IBM XT. It was a milestone in the growth of the personal computer market, bringing increased convenience and power. The original retail price was $1,500 in 1980.

$1,500 - 2,000

640

AXLON DATALINK SERIES 1000.

Personal computer terminal, 165 x 85 x 35 mm, San Jose, 1982, plastic and aluminum, full QWERTY keyboard with case, television interface with connector cable, acoustic coupler with case, power adaptor, original manual.

Nolan Bushnell moved on after selling Atari and tried a number of ventures including Axlon who produced toy robots, but also this portable, battery-powered computer terminal which allowed users to go online with its internal modem and 16-character display. It also allowed the user to utilize a television for display, the interface for which is included here. Advertisements of the time touted that the unit was "ready for action for stock quotes, airline schedules, electronic banking and mail, government and business reports, remote order entries, or a thousand-and-one other tasks." Clearly decades ahead of its time.

$600 - 800

641 W

APPLE LISA.

Microcomputer, Cupertino, CA, 1983, with built-in monitor, 2 5.25-inch floppy disk drives, and with original keyboard, mouse, Apple Profile Hard Drive, Apple Dot Matrix Printer and a collection of software and manuals.

Provenance: Purchased by the consignor as new in 1983.

The Xerox Corporation's Palo Alto Research Center, known as Xerox PARC, had been established in 1970 in order to foster new ideas in the digital realm. Alan Kay, one of the visionary computer scientists who worked there, had a vision for a personal computer, which he called the "Dynabook," that would be simple enough for even a child to use. The computer would trade the command lines and DOS prompts for a graphical user interface (GUI). Steve Jobs had already been working with a team to create a computer that would be many steps ahead of the competition thoroughly integrating graphics and text before he made a deal with Xerox during the summer of 1979 where he allowed them to buy 100,000 shares of Apple stock in exchange for access to Xerox PARC's technology. At first, some of the Xerox PARC team resisted the instructions sent down from the head office and showed the Apple team very little, but eventually, after Jobs complained to the Xerox venture capital division, they were finally given full access.

"When Tesler (Xerox scientist Larry Tesler, who would eventually leave Xerox for Apple) finally showed them what was truly under the hood, the Apple folks were astonished. Atkinson (who would design the Apple Lisa's GUI including the revolutionary overlapping windows and later become a member of the original Apple Macintosh development team) stared at the screen, examining each pixel so closely that Tesler could feel the breath on his neck. Jobs bounced around and waved his arms excitedly. 'He was hopping around so much I don't know how he actually saw most of the demo, but he did, because he kept asking questions,' Tesler recalled. 'He was the exclamation point for every step I showed.' Jobs kept saying that he couldn't

believe that Xerox had not commercialized the technology. 'You're sitting on a gold mine,' he shouted. 'I can't believe Xerox is not taking advantage of this.'" Jobs later recalled the event: "It was like a veil being lifted from my eyes. I could see what the future of computing was destined to be" (Isaacson p 97).

Jobs closely guided the Lisa's development. The project was so personal that he named it after his own daughter even though the company officially stated that the name was an acronym for "Locally Integrated Software Architecture." He often rankled John Couch, who was supposed to be in charge of the project, by dealing with the engineers directly. He pushed for a white background rather than a dark one, a smooth rolling mouse that used a ball rather than the two wheels that the Xerox example utilized, and to make the computer simple and inexpensive. But Couch and a number of others were aiming for a corporate market and eventually Jobs was removed from the project.

The Apple Lisa was released in January of 1983 at a price of $9,995. It was one of the first personal computers to offer a graphical user interface. Unfortunately, due to the high price and the unreliable "Twiggy" floppy disks, only 100,000 units were sold. A year later the Macintosh was released, also based on a Motorola 68000 microprocessor, but running at a faster speed and for a much lower price. The present unit was purchased new by the consignor in 1983. As of October 2018, the computer, including the notoriously unreliable "Twiggy" floppy drives, is operational - an extreme rarity on the market. Isaacson. *Steve Jobs.* NY: 2011.

$30,000 - 50,000

642

642 W

APPLE IIE CLONE.

Multitech Micro-Professor MPF III/312 Computer, Taiwan, 1983 CPU and keyboard in original shipping box, includes original manuals.

Multitech, renamed Acer in 1987, created one of the first Apple IIe clones with their MPF III. The computer used a MOS Tech 6502 microprocessor, had 64K RAM, had MBASIC built on its 24KB of ROM and used DOS 3.3 or ProDOS as its operating system. Multitech also gave its users an option run a CP/M operating system with the addition of a Z80 CP/M emulator card. The fact that Multitech chose to clone the Apple IIe shows how dominate Apple was at that time in the personal computer market.

$800 - 1,200

643

643 W

DIGITAL PHOTOGRAPHY.

Canon RC-701 Camera, Tokyo, 1986, various materials, body with two lenses, flash, batteries, storage disks, strap, original hardshell case.

The first commercially-marketed “still video” camera. Although it stored images on 2-inch video floppy disks as analog scan lines, it was an important step in the development of the digital camera.

$2,000 - 3,000

644

644 W

SAIC V2 LC.

Portable military computer, San Diego, 1991, housed in metal container, 238 x 410 x 230 mm, hinged front panel opens to reveal 8 1/4-inch LCD screen, full QWERTY keyboard and trackball built into built inside front panel, smaller panels open on the sides to reveal 3.5 inch floppy drive on one side and hard drive on the other, back panel with various connections, nylon carrying strap, external power module with cables, nylon case which fits into hardshell case.

A nice example of a “bombproof” military computer where every precaution is taken.

$600 - 800

645

646

645 W

IBM PALM TOP PC110.

Palmtop computer, Japan, c.1995, clamshell metal and plastic case, 157 x 113 x 32 mm, with built-in monitor, miniature full QWERTY keyboard also with Japanese kanji, with 2 docking stations, insertable hard drive, two 3.5-inch external disk drives, 2 battery packs, charger, cablres, original manuals and box.

IBM's Palm Top PC110 was essentially a miniature laptop with full-size laptop capabilities. It has a color screen, internal modem, could run Windows 95 and most other contemporary PC software, but was small and light enough to fit into a jacket pocket. It was desirable enough that a limited number made their way into the U.S. despite the manuals and installed operating system being in Japanese.

$1,000 - 1,500

646 W

SOLID STATE FLASH STORAGE.

Texas Memory Systems SAM-450, solid state drive housed in metal case, LED readout on front panel, 11 interface modules accesible on back panel 483 x 402 x 741 mm, Houston, 1998.

Texas Memory Systems, founded in 1978, was among the earliest companies to offer solid state drives. The SAM-450 was their top-of-the-line SSD in the late 1990s and featured an early use of flash memory. The unit was able to store 16GB, had a bandwidth of 6400 MB/second and had a processing speed of 30 GFLOPS. The company was purchased by IBM in 2012.

$5,000 - 7,000

647

648

647
LINK TRAINER.
Group of 3 original pastel on paper designs, 203 x 302 mm to 260 x 451 mm, New York, Butler-Zimmermann for Link Aviation, 1948-1950, being designs for LT-5 Jet Trainer flight simulator including console, each matted

Ed Link created the first Link Trainer flight simulator in 1929 using his knowledge of organ mechanics—pumps, valves and bellows—that he learned working at his father's Link Piano and Organ. The device allowed for safe training of pilots with immersive device that included controls and instruments which provided accurate readings. The simulators were utilized not only by the US, but also by Australia, Canada, Germany, UK, Israel, Japan, Pakistaon and the USSR. It's easy to see how the successful Link Trainer would lead the way for the use of the virtual reality aviation trainers that were to come. The present renderings demonstrate how realistic the flight simulators were designed to be with the trainee completely enclosed in what appears to be an actual jet cockpit. It certainly gives the impression of being a step along the way to the fully immersive virtual reality of the flight simulators that would begin to emerge in the 1970s.

$2,000 - 3,000

648 W
VIRTUAL REALITY.
Group of virtual reality components, including:
1. VPL Research Spatial Tracking System Model 2, no date. Serial no 1.
2. Future Vision Tecnologies VictorMaxx Stuntmaster Virtual Reality Headset, 1993. In original box with manual and power adapter.
3. Kasier Electro-Optics Inc. Professional Stereo HMD Controller, Carlsbad, CA, mid 1990s.
4. Mattel Power Glove Virtual Reality Controller, 1989. In original box with manual and cables.
5. Another example without box.
6. Ascension Technology Corporation. A Flock of Birds, model 6DFOB Motion Tracking Unit, Colchester, Vermont, 1992.
7. Another example.
8. Ascension Technology Corporation. The Bird, ERT (Extended Range Tracker) Controller - Motion Tracker, model 6DERT. Colchester, Vermont, 1990.

A nice assortment of early virtual reality gear including a tracking system from VPL, whose founder Jaron Lanier is considered one of the fathers of virtual reality. The Mattel Power Glove was based on VPL's Thomas G. Zimmerman's DataGlove and Lanier and Zimmerman assisted in the Power Glove development. Kaiser Electro-Optics produced virtual reality gear mainly for the military market. Acension Technology are another company early in the virtual reality field.

$800 - 1,200

649

649 W

VIRTUAL REALITY: VIRTUALITY.

2 Virtuality Cyber 1000 CS SU Virtual Reality Pods, Leicester, 1991, mixed materials, 1450 x 1400 x 1470 mm, each with HMD (head mounted display) hand controller, computer system and external monitor and with additional material including software, manuals, brochures, banners, etc.

The Virtuality Group was formed by Dr. Jonathan D. Waldern in 1990 and was originally supported by IBM Research Labs. They introduced their 1000 CS (Cyber Space) virtual reality arcade Pod in October 1991. The original units, including the present examples, were powered by the Exapality 2000, which was a modified Commodore Amiga 3000 32-Bit computer which resided under the metal flooring in the gaming unit. The first four games were *Dactyl Nightmare* in which players battle a pterodactyl with modern weapons, *Legend Quest*, a fantasy adventure, the robot shoot-em-up *Grid Busters* and *Hero,* a locked door puzzle. The present examples include software for the first two games. The units were the first of their kind and despite the crude graphics and latency, they were originally well-received, but due to the high expense, one report has them at $65,000 per unit, only limited numbers were produced and only a few are known to exist now. The company did go on to produce a SD (for sit down) model of the 1000 CS as well as a 2000 and a 3000 Series as well as develop the Jaguar VR system for Atari.

$25,000 - 35,000

650

650
VIRTUAL REALITY: VIRTUALITY.
Group of 7 Visette-2 VR head mounted displays, one hand controller and one HMD controller box, Leicester, 1994, with cables, 2 Polhemus trackers, condition varies.

Dr. Jonathan D. Waldern's Virtuality, founded in 1987, further developed their arcade sytems begun with the 1000 Series with the 2000 Series. The heart of the system was an Intel 486 PC using Motorola 88110 processors for graphics rendering. Games included a sequel of the 1000 Series *Dactyl Nightmare*, *Zone Hunter* and *Pac-Man VR.* Included here are a group of the HMDs for that system along with a hand controller, an HMD controller box and Polhemus motion trackers.

$800 - 1,200

651

651
VIRTUAL REALITY: LIQUID IMAGE.
Two MRG2 head mounted displays with controller, 1994, Winnipeg, fiberglas and foam with LCD screen, metal HMD control box, cables.

Winnipeg-based Liquid Image Corporation formed in 1992 to produce commercially-available HMDs for military, scientific and entertainment purposes. The first product offered was the MRG2 which had a monocular 5.7 inch LCD display and was considered one of the better units at that time. They are considered to have sold well at the original price of $6,800, making over $1,100,000 with the product. Still, that comes to well under 200 units, which accounts for their rarity on the market.

$800 - 1,200

652

652
VIRTUAL REALITY: N-VISION.
Datavisor 10X Head Mounted Display & Video Control Unit, McLean, Virginia, c.1992, HMD in mixed materials, control unit in aluminum chassis, with connection cables from HMD.

N-Vision has focused on military, medical and other scientific applications for their virtual reality technology. Their products have been used by NASA (who have used a number of Datavisor models in the Johnson Space Center Virtual Reality Lab), Boeing, Lockheed and all branches of the armed services. The Datavisor 10X uses 2 CRTs to project images to the HMD wearer at what was a relatively high resolution for the time. The cost was somewhere in the mid 5 figures, so certainly not obtainable for the average consumer.

$2,000 - 2,500

653

653 W

AUGMENTED REALITY: WEARABLE COMPUTING.

Extensive archive of wearable computers and equipment, 1990s, by various manufacturers including Rockwell Collins, Xybernaut, Kopin and others.

Wearable computing, which now includes items like the Apple Watch, the Fitbit and Google Glass, has origins that can be traced back as far as the 16th century with the wearable watch and the 17th century Qing Dynasty with the fully functional abacus ring. More recently, the 1970s saw the first calculator watch in the Hewlett-Packard HP-01. General purpose wearable computers began to emerge in the 1980s and development in some cases merged with that of virtual reality. The 1990s saw the introduction of systems such as the Rockwell Trekker and the Xybernaut Mobile Assitant series that combined a portable CPU, wearable keyboard and a head mounted display (HMD) that allowed the wearer to view an attached miniature projected computer screen that appeared to the wearer as if it were a 15-inch screen and also included a camera and microphone for voice activation. These systems were generally too expensive for the average consumer and found themselves most often used in industry on factory or facility floors and by the armed forces. The present archive focuses mainly on the wearable systems by Rockwell Trekker and Xybernaut and also includes many accessories. A complete list is available upon request.

$10,000 - 15,000

654

655

ROBOTS

654 W

IROBOT ATRV-JR.

All-Terrain Robot Vehicle, c.2000, metal case with four wheels with all-terrain tires, approximately 640 x 760 x 630 mm, body with inset sensors, inset screen, camera and wireless router on top, body with hinged top that opens to reveal computer system, with power station.

Although iRobot is best known for domestic robots, they have also produced a number of high-level robots for industry, military and research applications with their Research Robots Division. The present example was issued with a base price of $19,150, but includes extra accessories such as a larger hard drive (60 GB) and a wireless camera system.

$2,500 - 3,500

655 W

IROBOT COWORKER.

Pair of six-wheeled plastic and metal robots, 2002, approximately 470 x 620 x 360 mm, with camera on movable arm, body surrounded by sensors and with two speakers, computer system under metal case and removable plastic body, each with remote control, manuals, each with shipping crates.

The CoWorker was a mobile robot created for industry to be a virtual presence. The model never made it into full production and the present examples are 2 of about 30 beta test models produced. The manuals state: “M1 Beta Field Test.”

$3,000 - 5,000

656

K-TEAM KHEPERA II.

Pair of mobile robots, Lausanne, Switzerland, 2002, approximately 60 x 60 x 30 mm, each with computer interface, additional parts, power adaptor, manual, support software on CD-ROM, all in original case.

The Khepera II is a small differential wheeled mobile robot built around a Motorola 68331 CPU and intended for the academic research setting. The manual lists these as version 1.1.

$2,000 - 3,000

656

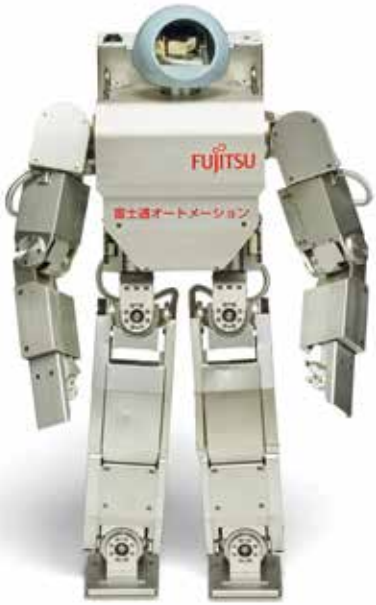
657 W

FUJITSU HOAP-2.

Humanoid robot, Kawasaki, Japan, 2003, aluminum body with plastic head, approximately 480 x 240 x 160 mm, movable joints including articulated fingers, plastic-covered backpack containing LAN, with original shipping box, battery pack, interface cable, support strap.

Fujitsu Automation's Humanoid for Open Architecture Platform (HOAP) was created for research applications and likely rarely saw use outside of the academic lab environment. This example is serial number 14, apparently from an extremely limited run. HOAP-2 demonstrations show smooth movement of the joints and show the robot walking on flat terrain, ramps and up and down stairs, performing sumo movements, standing from a seated position, cleaning a whiteboard, kicking a ball, doing a headstand, grasping and using thin objects such as pens, brushes, etc. Interestingly, research has been done with the HOAP-2 demonstrating the ability of humanoid robots to successfully perform tasks in unknown environments such as needed in space exploration.

$5,000 - 7,000



657

658 W

ROBOTS: CONSUMER.

2 items:
1. HiTec Robonova-1, Humanoid Robot, SIZE?, c.2007, mixed materials, in original box with remote control, charger, manual.
2. Kyosho Manoi AT01, Humanoid Robot, Japan, 2006, mixed materials, 340 x 205 mm, unbuilt kit components in original box with manual and instructions.

Two robots created for the hobbyist and educational markets. The HiTec Robonova is programmable with a form of BASIC called ROBOBASIC whereas the Manoi uses Heart to Heart 3 software. Both examples are extremely capable - especially the HiTec which is able to balance on a single foot, do cartwheels and even perform a dance routine. The Kyosho, billed as an "Athletic Robot," is capable of walking and moving its multi-jointed arms.

$1,500 - 2,000

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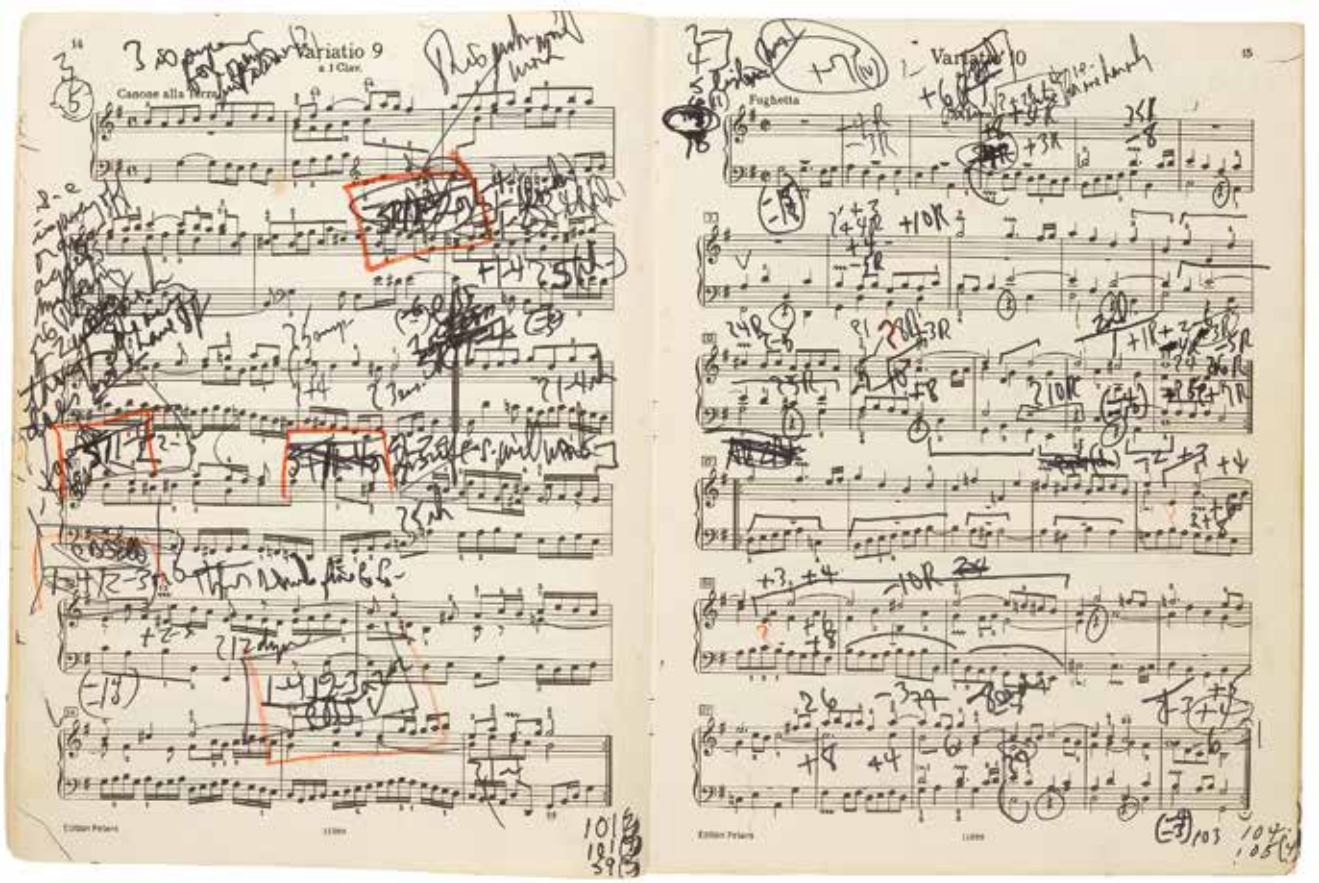

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11. These Conditions of Sale and the purchaser's and our respective rights and obligations hereunder are governed by the laws of the State of California. By bidding at an auction, each purchaser and bidder agrees to be bound by these Conditions of Sale. Any dispute, controversy or claim arising out of or relating to this agreement, or the breach, termination or validity thereof, brought by or against Bonhams (but not including claims brought against the consignor by the purchaser of lots consigned hereunder) shall be resolved by the procedures set forth below.

SALES AND USE TAX

New York sales tax is charged on the hammer price, buyer's premium and any other applicable charges on any property collected or delivered in New York State, regardless of the state or country in which the purchaser resides or does business. Purchasers who make direct arrangements for collection by a shipper who is considered a "private" or "contract" carrier by the New York Department of Taxation and Finance will be charged New York sales tax, regardless of the destination of the property. Property collected for delivery to a destination outside of New York by a shipper who is considered a "common carrier" by the New York Department of Taxation and Finance (e.g. United States Postal Service, United Parcel Service, and FedEx) is not subject to New York sales tax, but if it is delivered into any state in which Bonhams is registered or otherwise conducts business sufficient to establish a nexus, Bonhams may be required by law to collect and remit the appropriate sales tax in effect in such state. Property collected for delivery outside of the United States by a freight-forwarder who is registered with the Transportation Security Administration ("TSA") is not subject to New York sales tax.

MEDIATION AND ARBITRATION PROCEDURES

(a) Within 30 days of written notice that there is a dispute, the parties or their authorized and empowered representatives shall meet by telephone and/or in person to mediate their differences. If the parties agree, a mutually acceptable mediator shall be selected and the parties will equally share such mediator's fees. The mediator shall be a retired judge or an attorney familiar with commercial law and trained in or qualified by experience in handling mediations. Any communications made during the mediation process shall not be admissible in any subsequent arbitration, mediation or judicial proceeding. All proceedings and any resolutions thereof shall be confidential, and the terms governing arbitration set forth in paragraph (c) below shall govern.

(b) If mediation does not resolve all disputes between the parties, or in any event no longer than 60 days after receipt of the written notice of dispute referred to above, the parties shall submit the dispute for binding arbitration before a single neutral arbitrator. Such arbitrator shall be a retired judge or an attorney familiar with commercial law and trained in or qualified by experience in handling arbitrations. Such arbitrator shall make all appropriate disclosures required by law. The arbitrator shall be drawn from a panel of a national arbitration service agreed to by the parties, and shall be

selected as follows: (i) If the national arbitration service has specific rules or procedures, those rules or procedures shall be followed; (ii) If the national arbitration service does not have rules or procedures for the selection of an arbitrator, the arbitrator shall be an individual jointly agreed to by the parties. If the parties cannot agree on a national arbitration service, the arbitration shall be conducted by the American Arbitration Association, and the arbitrator shall be selected in accordance with the Rules of the American Arbitration Association. The arbitrator's award shall be in writing and shall set forth findings of fact and legal conclusions.

(c) Unless otherwise agreed to by the parties or provided by the published rules of the national arbitration service:

(i) the arbitration shall occur within 60 days following the selection of the arbitrator;

(ii) the arbitration shall be conducted in the designated location, as follows: (A) in any case in which the subject auction by Bonhams took place or was scheduled to take place in the State of New York or Connecticut or the Commonwealth of Massachusetts, the arbitration shall take place in New York City, New York; (B) in all other cases, the arbitration shall take place in the city of San Francisco, California; and

(iii) discovery and the procedure for the arbitration shall be as follows:

(A) All arbitration proceedings shall be confidential;

(B) The parties shall submit written briefs to the arbitrator no later than 15 days before the arbitration commences;

(C) Discovery, if any, shall be limited as follows: (I) Requests for no more than 10 categories of documents, to be provided to the requesting party within 14 days of written request therefor; (II) No more than two (2) depositions per party, provided however, the deposition(s) are to be completed within one (1) day; (III) Compliance with the above shall be enforced by the arbitrator in accordance with California law;

(D) Each party shall have no longer than eight (8) hours to present its position. The entire hearing before the arbitrator shall not take longer than three (3) consecutive days;

(E) The award shall be made in writing no more than 30 days following the end of the proceeding. Judgment upon the award rendered by the arbitrator may be entered by any court having jurisdiction thereof.

To the fullest extent permitted by law, and except as required by applicable arbitration rules, each party shall bear its own attorneys' fees and costs in connection with the proceedings and shall share equally the fees and expenses of the arbitrator.

LIMITED RIGHT OF RESCISSION

If within one (1) year from the date of sale, the original purchaser (a) gives written notice to us alleging that the identification of Authorship (as defined below) of such lot as set forth in the **BOLD TYPE** heading of the catalog description of such lot (as amended by any saleroom notices or verbal announcements during the sale) is not substantially correct based on a fair reading of the catalog (including the terms of any glossary contained therein), and (b) within 10 days after such notice returns the lot to us in the same condition as at the time of sale, and (c) establishes the allegation in the notice to our satisfaction (including by providing one or more written opinions by recognized experts in the field, as we may reasonably require), then the sale of such lot will be rescinded and, unless we have already paid to the consignor monies owed him in connection with the sale, the original purchase price will be refunded.

If, prior to receiving such notice from the original purchaser alleging such defect, we have paid the consignor monies owed him in connection with the sale, we shall pay the original purchaser the amount of our commissions, any other sale proceeds to which we are entitled and applicable taxes received from the purchaser on the sale and make demand on the consignor to pay the balance of the original purchase price to the original purchaser. Should the consignor fail to pay such amount promptly, we may disclose the identity of the consignor and assign to the original purchaser our rights against the consignor with respect to the lot the sale of which is sought to be rescinded. Upon such disclosure and assignment, any liability of Bonhams as consignor's agent with respect to said lot shall automatically terminate.

The foregoing limited right of rescission is available to the original purchaser only and may not be assigned to or relied upon by any subsequent transferee of the property sold. The purchaser hereby accepts the benefit of the consignor's warranty of title and other representations and warranties made by the consignor for the purchaser's benefit. Nothing in this section shall be construed as an admission by us of any representation of fact, express or implied, obligation or responsibility with respect to any lot. THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AGAINST BONHAMS FOR ANY REASON WHATSOEVER IS THE LIMITED RIGHT OF RESCISSION DESCRIBED IN THIS SECTION.

"Authorship" means only the identity of the creator, the period, culture and source or origin of the lot, as the case may be, as set forth in the **BOLD TYPE** heading of the print catalog entry. The right of rescission does not extend to: (a) works of art executed before 1870 (unless these works are determined to be counterfeits created since 1870), as this is a matter of current scholarly opinion which can change; (b) titles, descriptions, or other identification of offered lots, which information normally appears in lower case type below the **BOLD TYPE** heading identifying the Authorship; (c) Authorship of any lot where it was specifically mentioned that there exists a conflict of specialist or scholarly opinion regarding the Authorship of the lot at the time of sale; (d) Authorship of any lot which as of the date of sale was in accordance with the then generally-accepted opinion of scholars and specialists regarding the same; or (e) the identification of periods or dates of creation in catalog descriptions which may be proven inaccurate by means of scientific processes that are not generally accepted for use until after publication of the catalog in which the property is offered or that were unreasonably expensive or impractical to use at the time of such publication.

LIMITATION OF LIABILITY

EXCEPT AS EXPRESSLY PROVIDED ABOVE, ALL PROPERTY IS SOLD "AS IS." NEITHER BONHAMS NOR THE CONSIGNOR MAKES ANY REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, AS TO THE MERCHANTABILITY, FITNESS OR CONDITION OF THE PROPERTY OR AS TO THE CORRECTNESS OF DESCRIPTION, GENUINENESS, ATTRIBUTION, PROVENANCE OR PERIOD OF THE PROPERTY OR AS TO WHETHER THE PURCHASER ACQUIRES ANY COPYRIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS IN LOTS SOLD OR AS TO WHETHER A WORK OF ART IS SUBJECT TO THE ARTIST'S MORAL RIGHTS OR OTHER RESIDUAL RIGHTS OF THE ARTIST. THE PURCHASER EXPRESSLY ACKNOWLEDGES AND AGREES THAT IN NO EVENT SHALL BONHAMS BE LIABLE FOR ANY DAMAGES INCLUDING, WITHOUT LIMITATION, ANY COMPENSATORY, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SELLER'S GUIDE

SELLING AT AUCTION

Bonhams can help you every step of the way when you are ready to sell art, antiques and collectible items at auction. Our regional offices and representatives throughout the US are available to service all of your needs. Should you have any further questions, please visit our website at **www.bonhams.com/us** for more information or call our Client Services Department at +1 (212) 644 9001.

AUCTION ESTIMATES

The first step in the auction process is to determine the auction value of your property. Bonhams' world-renowned specialists will evaluate your special items at no charge and in complete confidence. You can obtain an auction estimate in many ways:

- Attend one of our Auction Evaluation Events held regularly at our galleries and in other major metropolitan areas. The updated schedule for Bonhams Auction Evaluation Events is available at **www.bonhams.com/us.**
- Call our Client Services Department to schedule a private appointment at one of our galleries. If you have a large collection, our specialists can travel, by appointment, to evaluate your property on site.
- Send clear photographs to us of each individual item, including item dimensions and other pertinent information with each picture. Photos should be sent to Bonhams' address in envelopes marked as "photo auction estimate". Alternatively, you can submit your request using our online form at **www.bonhams.com/us**. Digital images may be attached to the form. Please limit your images to no more than five (5) per item.

CONSIGNING YOUR PROPERTY

After you receive an estimate, you may consign your property to us for sale in the next appropriate auction. Our staff assists you throughout the process, arranging transportation of your items to our galleries (at the consignor's expense), providing a detailed inventory of your consignment, and reporting the prices realized for each lot. We provide secure storage for your property in our warehouses and all items are insured throughout the auction process. You will receive payment for your property approximately 35 days after completion of sale.

Sales commissions vary with the potential auction value of the property and the particular auction in which the property is offered. Please call us for commission rates.

PROFESSIONAL APPRAISAL SERVICES

Bonhams' specialists conduct insurance and fair market value appraisals for private collectors, corporations, museums, fiduciaries and government entities on a daily basis. Insurance appraisals, used for insurance purposes, reflect the cost of replacing property in today's retail market. Fair market value appraisals are used for estate, tax and family division purposes and reflect prices paid by a willing buyer to a willing seller.

When we conduct a private appraisal, our specialists will prepare a thorough inventory listing of all your appraised property by category. Valuations, complete descriptions and locations of items are included in the documentation.

Appraisal fees vary according to the nature of the collection, the amount of work involved, the travel distance, and whether the property is subsequently consigned for auction.

Our appraisers are available to help you anywhere and at any time. Please call our Client Services Department to schedule an appraisal.

ESTATE SERVICES

Since 1865, Bonhams has been serving the needs of fiduciaries – lawyers, trust officers, accountants and executors – in the disposition of large and small estates. Our services are specially designed to aid in the efficient appraisal and disposition of fine art, antiques, jewelry, and collectibles. We offer a full range of estate services, ranging from flexible financial terms to tailored accounting for heirs and their agents to world-class marketing and sales support.

For more information or to obtain a detailed Trust and Estates package, please visit our website at **www.bonhams.com/us** or contact our Client Services Department.

BUYER'S GUIDE

BIDDING & BUYING AT AUCTION
Whether you are an experienced bidder or an enthusiastic novice, auctions provide a stimulating atmosphere unlike any other. Bonhams previews and sales are free and open to the public. As you will find in these directions, bidding and buying at auction is easy and exciting. Should you have any further questions, please visit our website at **www.bonhams.com** or call our Client Services Department at +1 (212) 644 9001.

Catalogs
Before each auction we publish illustrated catalogs. Our catalogs provide descriptions and estimated values for each "lot." A lot may refer to a single item or to a group of items auctioned together. The catalogs also include the dates and the times for the previews and auctions. We offer our catalogs by subscription or by single copy. For information on subscribing to our catalogs, you may refer to the subscription form in this catalog, call our Client Services Department, or visit our website at
www.bonhams.com/us.

Previews
Auction previews are your chance to inspect each lot prior to the auction. We encourage you to look closely and examine each object on which you may want to bid so that you will know as much as possible about it. Except as expressly set forth in the Conditions of Sale, items are sold "as is" and with all faults; illustrations in our catalogs, website and other materials are provided for identification only. At the previews, our staff is always available to answer your questions and guide you through the auction process. Condition reports may be available upon request.

Estimates
Bonhams catalogs include low and high value estimates for each lot, exclusive of the buyer's premium and tax. The estimates are provided as an approximate guide to current market value based primarily on previous auction results for comparable pieces, and should not be interpreted as a representation or prediction of actual selling prices. They are determined well in advance of a sale and are subject to revision. Please contact us should you have any questions about value estimates.

Reserves
Unless indicated by the ¤ symbol next to the lot number, which denotes no reserve, all lots in the catalog are subject to a reserve. The reserve is the minimum auction price that the consignor is willing to accept for a lot. This amount is confidential and does not exceed the low estimate value.

Auction House's Interest in Property Offered at Auction
On occasion, Bonhams may offer property in which it has an ownership interest in whole or in part or otherwise has an economic interest. Such property, if any, is identified in the catalog with a ▲ symbol next to the lot number(s).

Bonhams may also offer property for a consignor that has been guaranteed a minimum price for its property by Bonhams or jointly by Bonhams and a third party. Bonhams and any third parties providing a guarantee may benefit financially if the guaranteed property is sold successfully and may incur a financial loss if its sale is not successful. Such property, if any, is identified in the catalog with a ○ symbol next to the lot number(s).

Bidding at Auction
At Bonhams, you can bid in many ways: in person, via absentee bid, over the phone, or via Bonhams' live online bidding facility. Absentee bids can be submitted in person, online, via fax or via email.

Valid Bonhams client accounts are required to participate in bidding activity. You can obtain registration information online, at the reception desk or by calling our Client Services Department.

By bidding at auction, whether in person or by agent, by absentee bid, telephone, online or other means, the buyer or bidder agrees to be bound by the Conditions of Sale.

Lots are auctioned in consecutive numerical order as they appear in the catalog. Bidding normally begins below the low estimate. The auctioneer will accept bids from interested parties present in the saleroom, from telephone bidders, and from absentee bidders who have left written bids in advance of the sale. The auctioneer may also execute bids on behalf of the consignor by placing responsive or consecutive bids for a lot up to the amount of the reserve, but never above it.

We assume no responsibility for failure to execute bids for any reason whatsoever.

In Person
If you are planning to bid at auction for the first time, you will need to register at the reception desk in order to receive a numbered bid card. To place a bid, hold up your card so that the auctioneer can clearly see it. Decide on the maximum auction price that you wish to pay, exclusive of buyer's premium and tax, and continue bidding until your bid prevails or you reach your limit. If you are the successful bidder on a lot, the auctioneer will acknowledge your paddle number and bid amount.

Absentee Bids
As a service to those wishing to place bids, we may at our discretion accept bids without charge in advance of auction online or in writing on bidding forms available from us. "Buy" bids will not be accepted; all bids must state the highest bid price the bidder is willing to pay. Our auction staff will try to bid just as you would, with the goal of obtaining the item at the lowest bid price possible. In the event identical bids are submitted, the earliest bid submitted will take precedence. Absentee bids shall be executed in competition with other absentee bids, any applicable reserve, and bids from other auction participants. A friend or agent may place bids on your behalf, provided that we have received your written authorization prior to the sale. Absentee bid forms are available in our catalogs, online at **www.bonhams.com/us**, at offsite auction locations, and at our San Francisco, Los Angeles and New York galleries.

By Telephone
Under special circumstances, we can arrange for you to bid by telephone. To arrange for a telephone bid, please contact our Client Services Department a minimum of 24 hours prior to the sale.

Online
We offer live online bidding for most auctions and accept absentee bids online for all our auctions.
Please visit **www.bonhams.com/us** for details.

Bid Increments
Bonhams generally uses the following increment multiples as bidding progresses:

$50-200	by $10s
$200-500	by $20/50/80s
$500-1,000	by $50s
$1,000-2,000	by $100s
$2,000-5,000	by $200/500/800s
$5,000-10,000	by $500s
$10,000-20,000	by $1,000s
$20,000-50,000	by $2,000/5,000/8,000s
$50,000-100,000	by $5,000s
$100,000-200,000	by $10,000s
above $200,000	at auctioneer's discretion

The auctioneer may split or reject any bid at any time at his or her discretion as outlined in the Conditions of Sale.

Currency Converter
Solely for the convenience of bidders, a currency converter may be provided at Bonhams' auctions. The rates quoted for conversion of other currencies to U.S. Dollars are indications only and should not be relied upon by a bidder, and neither Bonhams nor its agents shall be responsible for any errors or omissions in the operation or accuracy of the currency converter.

Buyer's Premium
A buyer's premium is added to the winning bid price of each individual lot purchased, at the rates set forth in the Conditions of Sale. The winning bid price plus the premium constitute the purchase price for the lot. Applicable sales taxes are computed based on this figure, and the total becomes your final purchase price.

Unless specifically illustrated and noted, fine art frames are not included in the estimate or purchase price. Bonhams accepts no liability for damage or loss to frames during storage or shipment.

All sales are final and subject to the Conditions of Sale found in our catalogs, on our website, and available at the reception desk.

Payment
All buyers are asked to pay and pick up by 3pm on the business day following the auction. Payment may be made to Bonhams by cash, checks drawn on a U.S. bank, money order, wire transfer, or by Visa, MasterCard, American Express or Discover credit or charge card or debit card. All items must be paid for within 5 business days of the sale. Please note that payment by personal or business check may result in property not being released until purchase funds clear our bank. For payments sent by mail, please remit to Cashier Department, 220 San Bruno Avenue, San Francisco, CA 94103.

Sales Tax
Residents of states listed in Paragraph 1 of the Conditions of Sale must pay applicable sales tax. Other state or local taxes (or compensation use taxes) may apply. Sales tax will be automatically added to the invoice unless a valid resale number has been furnished or the property is shipped via common carrier to destinations outside the states listed in the Conditions of Sale. If you wish to use your resale license please contact Cashiers for our form.

Shipping & Removal
Bonhams can accommodate shipping for certain items. Please contact our Cashiers Department for more information or to obtain a quote. Carriers are not permitted to deliver to PO boxes.

International buyers are responsible for all import/export customs duties and taxes. An invoice stating the actual purchase price will accompany all international purchases.

Collection of Purchases
Please arrange for the packing and transport of your purchases prior to collection at our office. If you are sending a third party shipper, please request a release form from us and return it to +1 (212) 644 9009 prior to your scheduled pickup. To schedule collection of purchases, please call +1 (212) 644 9001.

Handling and Storage Charges
Please note that our office has requirement for freight elevator usage. Please contact us to schedule an elevator appointment for pickup of any large or awkward items. On Thursday 6 December oversized lots (noted as W next to the lot number and/or listed on page 158) will be sent to Door to Door Services where transfer and full value protection fees will be immediately applicable. Storage charges will begin accruing for any W lots not collected within 5 business days of the date of auction. All other sold lot will be retained in Bonhams Gallery until Wesnesday 19 December. Collection of lots will be by appointment only. Please call +1 (212) 644 9001 at least 24 hours in advance to make an appointment.

Storage charges of $5 per lot, per day will begin accruing for any lots not collected within 14 calendar days. Bonhams Reserve the right to remove uncollected sold lots to the warehouse of our choice at the buyer's risk and expense. Further transfer, handling, storage and full value protection fees will apply if move to a warehouse of our choice.

Auction Results
All you need is a touch-tone telephone and the lot number. Auction results are usually available on the next business day following the sale or online at **www.bonhams.com/us.**

IMPORTANT NOTICE TO BUYERS

COLLECTION & STORAGE AFTER SALE

Please note that all oversized lots listed below and marked with a W in the catalogue will be removed to the warehouse of Door to Door Services herein referred to as Door To Door on Thursday 6 December. Lots not so listed will remain at Bonhams.

W LOTS WILL BE AVAILABLE FOR COLLECTION FROM DOOR TO DOOR BEGINNING AT 9AM ET ON FRIDAY 7 DECEMBER.

Address
Door To Door Services
50 Tannery Rd #8A
Somerville, NJ 08876

Lots will be available for collection 24hrs following transfer to Door to Door every business day from 9am to 5pm ET.

Collections appointments must be booked 24 hours in advance (subject to full payment of all outstanding amounts due to Bonhams and Door To Door) by contacting Door To Door at 1-908-707-0077 ext 2070

HANDLING & STORAGE CHARGES

Please note: For sold lots removed to Door To Door there will be transfer and Full value protection charges but no storage charge due for lots collected within 5 business days of the auction. For sold lots that remain at Bonhams, there will be no storage charge for lots collected within 14 days of the sale date.

The per-lot charges levied by Door To Door Services are as follows (plus any applicable sales tax):

FURNITURE/LARGE OBJECTS
Transfer $75
Daily storage..... $10
Full value protection (on Hammer + Premium + tax) 0.3%

SMALL OBJECTS
Transfer $37.50
Daily storage..... $5
Full value protection (on Hammer + Premium + tax) 0.3%

Please contact Michael Van Dyke at Door To Door
+1 908 707 0077 ext 2070
+1 908 707 0011 (fax)
quotes@dtdusa.com

For more information and estimates on domestic and International shipping Please contact Michael Van Dyke at Door To Door
+1 908 707 0077 ext 2070
+1 908 707 0011 (fax)
quotes@dtdusa.com

PAYMENT

All amounts due to Bonhams and all charges due to Door To Door Services must be paid by the time of collection of the property from their warehouse.

TO MAKE PAYMENT IN ADVANCE
Telephone +1 (908) 707 0077 ext 2070 to ascertain the amount due, payable by cash, check, or credit card.

PAYMENT AT TIME OF COLLECTION
May be made by cash, check, or credit card.

Lots will only be released from Door To Door's warehouse upon production of the "Collection Slip" obtained from the Cashier's office at Bonhams.

The removal and/or storage by Door To Door of any lots will be subject to their standard Conditions of Business, copies of which are available at Bonhams.

PLEASE NOTE
Door To Door does not accept liability for damage or loss, due to negligence or otherwise, exceeding the sale price of such goods, or at their option the cost of repairing or replacing the damaged or missing goods.

Door To Door reserves a lien over all goods in their possession for payment of storage and all other charges due them.

OVERSIZED LOTS

428	455	540	583	593	602	611	625	633	641	649
440	456	541	584	594	603	619	626	634	642	653
442	480	573	585	595	605	620	627	635	643	654
444	510	576	586	598	606	621	628	636	644	655
450	520	579	587	599	607	622	629	637	645	657
452	528	581	588	600	608	623	630	638	646	658
454	531	582	589	601	609	624	632	639	648	

CONTACTS

OFFICERS

Malcolm Barber
Co-Chairman

Matthew Girling
Chief Executive Officer

Laura King Pfaff •
Chairman Emeritus

Leslie Wright
Deputy Chairman Vice President,
Trusts and Estates

Vice Presidents, Specialists
Rupert Banner
Mark Fisher
Dessa Goddard
Jeremy Goldsmith
Jakob Greisen
Bruce MacLaren
Scot Levitt
Mark Osborne
Brooke Sivo
Catherine Williamson

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David Kelsey, (514) 894 1138 •

BONHAMS *
NEW YORK DEPARTMENTS
580 Madison Avenue
New York, New York 10022
(212) 644 9001

Books & Manuscripts
Ian Ehling, (212) 644 9094
Darren Sutherland, (212) 461 6531

Chinese Works of Art & Paintings
Bruce MacLaren, (917) 206 1677
Ming Hua, (646) 837 8132
Harold Yeo, (917) 206 1628 •

Collectors' Motorcars & Motorcycles
Rupert Banner, (212) 461 6515
Eric Minoff, (917) 206 1630
Evan Ide, (917) 340 4657
Michael Caimano, (929) 666 2243

American Art
Jennifer Jacobsen, (917) 206 1699
Elizabeth Goodridge, (917) 206 1621

Contemporary Art
Jeremy Goldsmith, (917) 206 1656
Jacqueline Towers-Perkins,
(212) 644 9039

European Paintings
Madalina Lazen, (212) 644 9108

Impressionist & Modern Art
Caitlyn Pickens, (212) 644 9135

Himalayan Art
Mark Rasmussen, (917) 206 1688

Japanese Works of Art
Jeff Olson, (212) 461 6516

Jewelry
Caroline Morrissey, (212) 644 9046
Camille Barbier, (212) 644 9035

Modern Decorative Arts & Design
Benjamin Walker, (212) 710 1306
Dan Tolson, (917) 206 1611

Photographs
Laura Paterson, (917) 206 1653

Prints and Multiples
Deborah Ripley, (212) 644 9059

Russian Fine & Decorative Arts
Yelena Harbick, (212) 644 9136

Trusts & Estates
Sherri Cohen, (917) 206 1671

Watches & Clocks
Jonathan Snellenburg, (212) 461 6530

BONHAMS *
SAN FRANCISCO DEPARTMENTS
220 San Bruno Avenue
San Francisco California 94103
(415) 861 7500

20th Century Fine Art
Sonja Moro, (415) 503 3412

Books & Manuscripts
Adam Stackhouse, (415) 503 3266

Chinese Works of Art
Dessa Goddard, (415) 503 3333
Henry Kleinhenz, (415) 503 3336
Daniel Herskee, (415) 503 3271
Lingling Shang, (415) 503 3207 •
Amelia Chao, (415) 503 3397

Furniture & Decorative Arts
Caroline Cole, (415) 503 3400

Jewelry & Watches
Shannon Beck, (415) 503 3306

Collectors' Motorcars & Motorcycles
Mark Osborne, (415) 503 3353
Jakob Greisen, (415) 503 3284

Museum Services
Laura King Pfaff, (415) 503 3210

Native American Art
Ingmars Lindbergs, (415) 503 3393

California & Western
Paintings & Sculpture
Aaron Bastian, (415) 503 3241

Prints & Photographs
Morisa Rosenberg, (415) 503 3259

Space History
Adam Stackhouse, (415) 503 3266

Wine
Christine Ballard, (415) 503 3221

Trusts & Estates
Victoria Richardson, (415) 503 3207
Celeste Smith, (415) 503 3214

BONHAMS *
LOS ANGELES DEPARTMENTS
7601 W. Sunset Boulevard
Los Angeles California 90046
(323) 850 7500

20th Century Decorative Arts & Design
Angela Past, (323) 436 5422
Jason Stein, (323) 436 5466

Post-War & Contemporary Art
Alexis Chompaisal, (323) 436 5469

Asian Works of Art
Rachel Du, (323) 436 5587

African, Oceanic & Pre-Columbian Art
Fredric W. Backlar, (323) 436 5416 •

Books & Manuscripts
Catherine Williamson, (323) 436 5442

Coins & Banknotes
Paul Song, (323) 436 5455

Impressionist & Modern Art
Kathy Wong, (323) 436 5415

Entertainment Memorabilia
Catherine Williamson, (323) 436 5442
Dana Hawkes, (978) 283 1518

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Dana Ehrman, (323) 436 5407
Alexis Vourvoulis, (323) 436 5483

Collectors' Motorcars & Motorcycles
Michael Caimano, (929) 666 2243

Prints & Photographs
Morisa Rosenberg, (323) 436 5435

Natural History
Thomas E. Lindgren, (310) 469 8567 •
Claudia Florian, G.J.G., (323) 436 5437 •

California & Western
Paintings & Sculpture
Scot Levitt, (323) 436 5425
Kathy Wong, (323) 436 5415

European Paintings
Mark Fisher, (323) 436 5488
Rocco Rich, (323) 436 5410

Trusts & Estates
Leslie Wright, (323) 436 5408
Joseph Francaviglia, (323) 436 5443

*** Indicates saleroom**
• Indicates independent contractor

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Auction Registration Form

(Attendee / Absentee / Online / Telephone Bidding)
Please circle your bidding method above.

Bonhams

Paddle number (for office use only)

General Notice: This sale will be conducted in accordance with Bonhams Conditions of Sale, and your bidding and buying at the sale will be governed by such terms and conditions. Please read the Conditions of Sale in conjunction with the Buyer's Guide relating to this sale and other published notices and terms relating to bidding.
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If successful
I will collect the purchases myself ☐
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Please email or fax the completed Registration Form and requested information to:
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New York, New York 10022
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Fax +1 (212) 644 9009
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Sale title: History of Science and Technology	**Sale date:** December 5, 2018
Sale no. 24898	**Sale venue:** New York

General Bid Increments:

$10 - 200 .....by 10s	$10,000 - 20,000 .....by 1,000s
$200 - 500 .....by 20 / 50 / 80s	$20,000 - 50,000 .....by 2,000 / 5,000 / 8,000s
$500 - 1,000 .....by 50s	$50,000 - 100,000 .....by 5,000s
$1,000 - 2,000 .....by 100s	$100,000 - 200,000 .....by 10,000s
$2,000 - 5,000 .....by 200 / 500 / 800s	above $200,000 .....at the auctioneer's discretion
$5,000 - 10,000 .....by 500s	The auctioneer has discretion to split any bid at any time.

Customer Number	Title
First Name	Last Name
Company name (to be invoiced if applicable)	
Address	
City	County / State
Post / Zip code	Country
Telephone mobile	Telephone daytime
Telephone evening	Fax

Telephone bidders: indicate primary and secondary contact numbers by writing ① or ② next to the telephone number.

E-mail (in capitals) _____

By providing your email address above, you authorize Bonhams to send you marketing materials and news concerning Bonhams and partner organizations. Bonhams does not sell or trade email addresses.

I am registering to bid as a private client ☐ I am registering to bid as a trade client ☐

Resale: please enter your resale license number here
_____ We may contact you for additional information.

SHIPPING

Shipping Address (if different than above):

Address: _____ Country: _____

City: _____ Post/ZIP code: _____

Please note that all telephone calls are recorded.

Type of bid (A-Absentee, T-Telephone)	Lot no.	Brief description (In the event of any discrepancy, lot number and not lot description will govern.) If you are bidding online there is no need to complete this section.	MAX bid in US$ (excluding premium and applicable tax) Emergency bid for telephone bidders only*

You instruct us to execute each absentee bid up to the corresponding bid amount indicated above.

* Emergency Bid: A maximum bid (exclusive of Buyer's Premium and tax) to be executed by Bonhams only if we are unable to contact you by telephone or should the connection be lost during bidding.

BY SIGNING THIS FORM YOU AGREE THAT YOU HAVE READ AND UNDERSTAND OUR CONDITIONS OF SALE AND SHALL BE LEGALLY BOUND BY THEM, AND YOU AGREE TO PAY THE BUYER'S PREMIUM, ANY APPLICABLE TAXES, AND ANY OTHER CHARGES MENTIONED IN THE BUYER'S GUIDE OR CONDITIONS OF SALE. THIS AFFECTS YOUR LEGAL RIGHTS.

Your signature:	Date:

§2. Die geodätischen Linien im R_5.

Wir führen die Bezeichnungen ein

$$\left.\begin{aligned} g_{mn} &= \gamma_{mn} - \gamma_{0m}\gamma_{0n} \\ \varphi_m &= \gamma_{0m} \end{aligned}\right\} \quad \ldots (8)$$

Dann wissen wir, dass in kovarianten Bezeichnungen nur die g_{mn} und die antisymmetrischen Ableitungen der φ_m auftreten dürfen. Die Matrix der $\gamma_{\mu\nu}$ drückt sich in den g_{mn} und φ_m so aus:

$$\left.\begin{array}{cccc} g_{11}+\varphi_1\varphi_1 & g_{12}+\varphi_1\varphi_2 & \cdot\ \cdot & \varphi_1 \\ g_{21}+\varphi_2\varphi_1 & g_{22}+\varphi_2\varphi_2 & \cdot\ \cdot & \varphi_2 \\ \cdot & \cdot & \cdot\ \cdot & \cdot \\ \cdot & \cdot & \cdot\ \cdot & \cdot \\ \varphi_1 & \varphi_2 & \cdot\ \cdot & 1 \end{array}\right\} \quad \ldots (9)$$

Hieraus folgt, dass $d\sigma^2$ die Form annimmt

$$(g_{mn}+\varphi_m\varphi_n)\,dx^m dx^n + 2\varphi_m\,dx^m dx^0 + dx^{0\,2}$$

oder

$$d\sigma^2 = g_{mn}\,dx^m dx^n + (dx^0 + \varphi_m\,dx^m)^2 \quad \ldots (10)$$

Es sei nun τ ein beliebiger Parameter im R_5 und

$$W^2 = g_{mn}\frac{dx^m}{d\tau}\frac{dx^n}{d\tau} + \left(\frac{dx^0}{d\tau} + \varphi_m\frac{dx^m}{d\tau}\right)^2, \quad \ldots (10a)$$

so ist die geodätische Linie in bekannter Weise durch die Gleichung

$$\delta\left\{\int W\,d\tau\right\} = 0 \quad \ldots (11)$$

charakterisiert, d. h. durch die Gleichungen

$$\frac{\partial W}{\partial x^\alpha} - \frac{d}{d\tau}\left(\frac{\partial W}{\partial \dot{x}^\alpha}\right) = 0 \quad \ldots (11a)$$

Für $\alpha = 0$ erhält man

$$\frac{d}{d\tau}\left\{\frac{1}{2W}\cdot 2\left(\dot{x}^0 + \varphi_m\dot{x}^m\right)\right\} = 0$$