

THE CODEX ATLANTICUS
OF
LEONARDO DA VINCI

*A CATALOGUE
OF ITS NEWLY RESTORED SHEETS*

CARLO PEDRETTI

PART ONE - VOLUMES I-VI

JOHNSON REPRINT CORPORATION
HARCOURT BRACE JOVANOVICH, PUBLISHERS

16 RECTO [17, the no. 16 on the lower right added by the « restorers »]
- 3 verso-a, pen and ink and wash, c. 1490-3.

Drawing of a volley type of artillery piece.

STYLE and subject point to the early 1490s. Preliminary sketches are on ff. 1110 RECTO and VERSO. Compare also the artillery studies in MS. H, ff. 106, 107, 109, a series dated 1493, and the related ones in the CA, f. 1060 VERSO (*Windsor Fragments*, pl. 31). See also the drawing on f. 67ii RECTO. A possible earlier date, c. 1485, is suggested by sketches of a similar device on f. 977 RECTO, to which see note.

Feldhaus, p. 40.

16 VERSO. New. Blank.

17 RECTO - 4 recto-a, pen and ink, c. 1478-80.

Drawings of locking devices and details of machinery and instruments, with notes to them.

SKETCHES of the same devices are on f. 1057 RECTO, which has the early collector's number '11' and to which this sheet might have been originally joined. See the early collector's number '10' on the VERSO below.

Calvi, pp. 23-26.

17 VERSO [10] - 4 verso-a, pen and ink, c. 1478-80.

Drawings of a podometer and of a machine for the production of concave mirrors, with details of the latter and notes to them.

SEE note to RECTO above. See also note to f. 1 RECTO for the drawings of podometers. Calvi, has shown that a number of early sheets in the CA contain drawings of machinery for the production of concave mirrors, that is, burning mirrors which must have been used for soldering. Later notes on such mirrors, in MS. G, c. 1515, contain a reference to the soldering of the copper ball for the lantern of Florence Cathedral - a work commissioned from Verrocchio's workshop in 1469. See also the note on a 'burning mirror' in MS. A, f. 55 recto, c. 1492.

Baratta, pp. 41-2. Beck, pp. 424, 444, figs. 603, 656. Calvi, p. 26, fig. 9. Canestrini, p. 106, fig. 45. Pedretti, *BHR*, XXV, 1963, pp. 82-4.

18 RECTO - 4 recto-b, pen and ink, c. 1478-80.

Drawings of cannon hoists and carriages and scribbled memoranda which include the name of Antonio Vinci (Camelli) da Pistoia and which are given by Richter, § 1553.

OTHER versions of such military machines are on the VERSO as well as on f. 94 RECTO, which also contains five drawings of 'wall-sweeper' devices as

112ii RECTO [9] - 39 *verso-d*, pen and ink and wash, *c.* 1487-90.

Drawing of a hydraulic pump.

ONE of a series of studies mentioned in note to f. 25 RECTO.

112ii VERSO. New. Blank.

113 RECTO [17] - 40 *recto-a*, pen and ink, *c.* 1487.

Studies of weapons and lifting devices.

FROM the time of MS. B, or slightly earlier. See note to VERSO. See also note to f. 745 RECTO.

Beck, p. 448, fig. 670.

113 VERSO - 40 *verso-a*, pen and ink, *c.* 1487.

Sketches of chariots armed with scythes, of a horseman with three lances, and of a machine for hurling stones from battlements.

PRELIMINARY sketches for the drawings at Windsor (no. 12653) and at Turin, reproduced by Popham, pls. 309 and 310, with the date 1485-8. Compare also f. 868 RECTO.

Popham, pl. 311.

114 RECTO - 40 *recto-b*, pen and ink and black chalk, *c.* 1480-2.

Sketches of screw devices to effect the beating of wings in a flying machine; slight sketch of a chariot, apparently operated by a seated man.

GIACOMELLI considers the sketches of screw devices to be details of a drawing in MS. B, f. 77 *recto*, and dates them accordingly, *c.* 1486-90. They are not much later than the drawings on the VERSO, perhaps just a year or two, as suggested by similar studies on ff. 1051 VERSO and 1059 VERSO. Calvi, p. 41. Giacomelli, p. 124, figs. 95a, 95b.

114 VERSO [2] - 40 *verso-b*, pen and ink, *c.* 1480-2.

Drawing of an artillery piece in firing position with detail and note to it; diagram of the multiplication of power by way of a gear system, and note to it, written from left to right.

A PRELIMINARY sketch of the artillery piece is on f. 94 RECTO, to which see note; and a copy of it, not by Leonardo, is on f. 49 RECTO.

Calvi, p. 41.

115 RECTO. New. Blank.

Another indication of a misjudgement by the «restorers»: the sheet is mounted with its blank verso as recto.

THE CODEX ATLANTICUS
OF
LEONARDO DA VINCI

*A CATALOGUE
OF ITS NEWLY RESTORED SHEETS*

CARLO PEDRETTI

PART TWO - VOLUMES VII-XII

JOHNSON REPRINT CORPORATION
HARCOURT BRACE JOVANOVICH, PUBLISHERS

are crossed through); compare also ff. 67 *recto* and 68 *recto* in the same notebook for the drawings of a plow and windows. It is in the context of such studies (MS. B, f. 66 *recto*) that Leonardo refers to work carried out at Pavia, and so all these studies might date from the time of the first project of Pavia Cathedral, in 1488, as fully discussed in my *Leonardo architetto*.

Calvi, pp. 110-11, fig. 34. Firpo, p. 17. Pedretti, *Leonardo architetto*, pp. 21, 336, fig. 531, *Studi Vinciani*, p. 193, and *Windsor Fragments*, p. 25.

809 VERSO. New. Blank.

810 RECTO [113] - 296 *recto*-a, pen and ink with traces of black chalk, c. 1517-18.

Studies of the valve system in a fountain mechanism, with the note (top center): 'anbosa a vna fonte reale senza acq^a' (Amboise has a royal fountain without water). At bottom right, sketch of a seated figure in profile to left as part of a diagram of perspective, with the note: 'La figura effatta / allochio stabilito he / de veduta dj sito libero' (The figure is made according to a fixed eye and is seen from any place).

ONE of a series of French sheets pertaining to the study of a fountain at Amboise. Compare f. 69ii RECTO, to which see note and bibliography.

Pedretti, *Commentary*, note to § 1076, *Leonardo*, p. 72, *Leonardo architetto*, p. 310, fig. 490, and *Romorantin Palace*, p. 97, fig. 133.

810 VERSO. New. Blank.

811 RECTO and VERSO. New Pen and ink on coarse brown paper, c. 1515-16.

Diagram of geometry pertaining to a problem of the conical sections.

THERE is no record whatsoever of this fragment in the previous edition and it can only be surmised that the « restorers » had found it buried somewhere in between two of known sheets, perhaps to serve as a mending patch or as a reinforcement of a weak area in another sheet. It is undoubtedly by Leonardo, style and paper suggesting a late date.

The VERSO is blank.

812 RECTO [152] - 296 *verso*-a, pen and ink, c. 1478.

Studies of an automotive cart, its power provided by a system of springs.

A FAMOUS drawing, often referred to as Leonardo's 'automobile'. It was probably intended for some festival, as a float in a parade. The style and character of the drawing points to the earliest period of Leonardo's known technological drawings, e.g. f. 878 RECTO and VERSO, a sheet dating

from the time of the 1478 studies for an *Adoration of the Shepherds*. Compare also the 1478 sheet at the Uffizi (Popham, pl. 127).

Canestrini, pp. 112-30, fig. 48 (as dating c. 1482-4). Pedretti, *Leonardo architetto*, p. 320, fig. 504. Uccelli, RV, XV-XVI, 1935-1939, pp. 191-99 (with full bibliography).

812 VERSO. New. Pen and ink. Not by Leonardo.

Outline sketch of a coat-of-arms, inscribed with references to its colors: 'azzurro / oro / R[osso] / b[ianco]' (Blue. Gold. Red. White).

THIS might refer to some decoration for tournaments, such as the famous one of 1475 which was the occasion of Poliziano's *Stanze per la giostra di Giuliano de' Medici*. See also note to f. 926 VERSO.

813 RECTO [96 or 98] - 296 verso-b, pen and ink on coarse brown paper, c. 1515.

Notes on wind and water given by MacCurdy, *Atmosphere* and *The Nature of Water*. A note by Melzi in the lower part of the sheet preceded Leonardo's, since the latter circumscribes the former.

DATED by ductus, contents and media. It belongs to the same series as f. 433 RECTO, to which see note for related sheets.

813 VERSO. New. Blank.

814 RECTO [125] - 297 recto-a, red chalk and pen and ink, c. 1495.

Studies of a textile machine.

THIS belongs to the same series as f. 56v RECTO, to which see note for related sheets. The lower part of the sheet contains blots and impressions of lines of Leonardo's writing, possibly left by the prolonged contact of a late sheet, which does not appear to have been the preceding f. 813 RECTO (notice the clear indication of three 'dj' ligatures which are not found anywhere in the notes on that sheet).

Strobino, pp. 58-60, fig. 59.

814 VERSO. New. Blank.

815 RECTO [68] - 297 recto-b, pen and ink, c. 1490.

Sheet of notes: geometry (subdivision of a line into three equal parts); painting (on man's walking), given by Brizio, p. 238, MacCurdy, *Physiology*, and Richter, § 826; on how oxen feed on tall plants, given by MacCurdy, *Natural History*; and two notes on the control of rivers, given by MacCurdy, *Canalization*.

DUCTUS and contents point to the early part of MS. A. See my *Commentary*,

sketches of interlaces, possibly for embroidery or wall decoration, and calculations, as well as a right profile of a young lady, a highly finished small drawing of a leaf, and a detail of folds in drapery. The remainder of the notes are the drafts of a letter to Lodovico Sforza, given by Brizio, p. 638, MacCurdy, *Letters*, and Richter, § 1344.

THE draft of a letter to Lodovico Sforza, together with the fragmentary draft on f. 914i RECTO, were first interpreted by Müller-Walde in 1897 as a reference to difficulties that Leonardo was experiencing in his relation with his patron in 1497. See my *Commentary*, notes to §§ 1344 and 1345. Style and ductus confirm a date at the time of the Forster MSS. II and III, from 1493 to 1497. Compare also f. 77 VERSO, to which see note. The drawings of interlaces are related to those on f. 884 VERSO, again a sheet dating in the mid-1490s.

Beck, 1906, p. 567, fig. 97. Calvi, pp. 156-7. Marinoni, RV, XX, 1964, pp. 183-5, 191. Müller-Walde, 1897, p. 165.

867 VERSO. New. Pen and ink.

Slight profile of a man wearing a helmet in the form of a shell, not by Leonardo, possibly related to the costume for a masquerade.

868 RECTO - 316 *recto-a*, pen and ink, c. 1487.

Two sketches of chariots armed with scythes and driven by teams of galloping horses. Slight sketch of a cart with the rear wheels connected to a crank system to provide manual motive power. Large diagram of a wheel (?).

THIS is related to f. 113 VERSO, to which see note. A date to the time of MS. B is confirmed by the contents of the VERSO.

868 VERSO [138] - 316 *verso-a*, pen and ink, c. 1487.

Various types of cord ladders, step and folding ladders, and other devices to climb the walls of a fortress, with details showing two human figures in action.

THE type of drawing in general and the character of the human figures in particular point to the time of MS. B, in which similar devices are found, e.g. on ff. 50 *recto* and 59 *verso*. A rougher sketch of the folding stepladders is on the earlier f. 30 VERSO.

869 RECTO [88] - 316 *recto-b*, pen and ink, c. 1478-80.

Sketch of a hydraulic machine and various details of gear mechanisms; sketch of a mariner compass inscribed 'busola' (compass) and of a cart.

ONE of the earliest drawings. Compare f. 1068 VERSO, which contains rough studies of the same gear system. For a later sketch of the same compass compare f. 783 RECTO.

Beck, 1906, p. 530, fig. 35. Canestrini, p. 105, fig. 44. Feldhaus, pp. 119-20.

877 VERSO - 319 *verso-b*, red chalk and pen and ink, *c.* 1503-5.

Diagrammatic sketches of birds spiralling up in the sky, with notes to them crossed through; geometrical patterns, possibly for ceiling decoration; a sketch of a compass with decorative interlaces, and two slight technological sketches with various calculations. A note of household expenses given by Richter, § 1534, and another note of four items only, not by Leonardo. Red chalk profile of a youth, not by Leonardo either.

SEE note to RECTO. See also my *Commentary*, note to § 1534. The notes on the flight of birds are related to those on f. 591 RECTO and VERSO, which also are on the gliding flight of the 'gru' (crane). This, in turn, relates to the notes on ff. 825 RECTO and 843 RECTO, in which the same ductus and the same type of diagrams as the notes on our VERSO. so-called 'Salai profile', compare f. 606 RECTO, to which see note. See also the Hamburg drawing reproduced in my *Lettura Vinciana* XV, fig. 46. Giacomelli, pp. 314-15, figs. 410, 411 (portion of the second diagram). E. Möller, in *Jahrbuch der Kunsthistorischen Sammlungen in Wien*, 1928, p. 147, fig. 11. Uccelli-Zammattio, p. 68.

878 RECTO - 320 *recto-a*, pen and ink, *c.* 1478.

Technological sketches, possibly for a clock mechanism.

SEE note to VERSO.

878 VERSO [179] - 320 *verso-a*, pen and ink, *c.* 1478.

Technological sketches, possibly for a clock mechanism, with notes to them; two profiles and the memorandum excerpted by Richter, § 1449.

THIS is the parent sheet of the Windsor fragments nos. 12438, '460, and '464, which confirm the date of about 1478 at the time of Leonardo's studies for an *Adoration of the Shepherds*. Same ductus and style as the 1478 drawing at the Uffizi (Popham, pl. 127). See also note to f. 1054 RECTO. The technological sketches are difficult to interpret. They may refer to a clock mechanism such as those on ff. 926 RECTO and VERSO, a sheet dating from the same time, or they may pertain to the project of an automotive cart as shown on f. 812 RECTO, to which see note.

Calvi, p. 191, fig. 5. Pedretti, *Leonardo architetto*, pp. 320-1, and *Windsor Fragments*, pp. 32, 35-6, pl. 22.

879 RECTO [91] - 320 *recto-b*, pen and ink and wash, *c.* 1478.

Studies of a machine for the production of concave mirrors; slight geometrical diagrams; a few words to test the pen, possibly a line of poetry given by MacCurdy, *Miscellaneous*, and Richter, § 1163A.

COMPARE f. 801 RECTO, to which see note for related sheets. See also my *Commentary*, note to § 1163A.

Calvi, p. 23, fig. 6.

[VOLUME XI]

926 RECTO [153] - 339 *recto-a*, pen and ink, *c.* 1478.

A large, partly diagrammatic drawing of a water device ('modo daqua'), apparently to lift a weight, as suggested by a note to it.

THE roughness of the drawing and the ductus indicate a very early date. The purpose of the machine is not clear. The apparently related drawing on f. 956 RECTO is inscribed with words ('zodiacho', 'mercurio', 'venere', 'luna') which might suggest the mechanism of a planetarium or astronomical clock like the one of Lorenzo della Golpaja at Palazzo Vecchio. But the sketches are too rough and slight for interpretation. Compare f. 878 VERSO, to which see note. See also note to VERSO.

926 VERSO - 339 *verso-a*, pen and ink, *c.* 1478.

Technological sketches showing a cart and devices to lift weights by means of screws.

SEE note to RECTO. These drawings are inspired by tools devised by Brunelleschi at the time of the construction of the cupola of Florence Cathedral. Compare f. 1078ii RECTO, to which see note.

On both sides of the sheet are traces of glue (better visible before «restoration») which suggest the shape of a heraldic escutcheon as shown in a tracing of its outline. These traces must have been produced by the glue in excess brushed over the edges of such an escutcheon which had come to be placed on this sheet. In fact the sheet must have served as table protection when the silhouetted escutcheon received the glue with which it was to be attached to a support or to some decorative surface. A sketch of a coat-of-arms, not by Leonardo, is on the newly revealed VERSO of f. 812, a sheet which dates from the same early period. Compare also the sketch of a tripartite escutcheon on f. 18 VERSO, again a sheet of about 1478-80.

At top right is the number 'xlviii', i.e. 48, showing that this sheet is out of a book, possibly a discarded ledger. See note to f. 705 VERSO.

Reti, *Brunelleschi*, p. 13, fig. 6.

927i RECTO [117] - 339 *recto-b*, pen and ink, *c.* 1506-8.

Geometrical studies (duplication of the cube and calculation of the diagonal of prisms).

Notes on optics excerpted by MacCurdy, *Astronomy and Optics*.
SEE note to RECTO.

956 RECTO [147] - 347 *recto*-b, pen and ink, c. 1478-80.

Schematic drawing of a mechanism, the purpose of which is unexplained; it is inscribed with the words 'zodiacho', 'terra' (at the center), 'luna', 'venere', and 'mercurio', thus suggesting a planetarium. But the note at the top, apparently related to the drawing, mentions a millstone ('macina'). SAME series as f. 878 RECTO and VERSO, to which see note for related sheets. The calligraphic script of the note at the top may point to a slightly later period. Compare f. 304 RECTO and VERSO [148].

Calvi, p. 21.

956 VERSO - 347 *recto*-b, pen and ink, c. 1478-80.

Schematic drawing of a mechanism, possibly a clock, and detail of a gear device.

SEE note and bibliography to RECTO. An application of the same gear device is shown among the technological sketches on a sheet of Adoration studies at the Uffizi (Popham, pl. 50).

957 RECTO [41] - 347 *verso*-b, pen and ink on coarse brown paper, c. 1517-18.

Geometrical studies (hexagon for curvilateral star construction).

THIS fragment, one of the French series of geometrical studies, had been laid down on the VERSO of the preceding f. 956, which is one of the earliest sheets of technological studies, thus giving the extremes of the dates of the material contained in the Codex Atlanticus: 1478 and 1518.

McCabe, p. 345 and GBA, March 1974, p. 186. Pedretti, GBA, November 1970, p. 312.

957 VERSO. New. Blank.

958 RECTO [101] - 348 *recto*-a, pen and ink, c. 1480-2.

A series of scientific or society games and riddles, e.g. a play with numbers as a variation on the theme of the so-called 'magic square', how to twist any thick iron spike by hand, how to drop coins into a glass filled with water without making the water spill, and so on.

DATED by ductus and style. Compare f. 1112 VERSO, to which see note. Several such games and riddles are recorded in Luca Pacioli's unpublished *De viribus quantitatis* (MS. 250 in the University Library, Bologna). They were a fashionable aspect of the social entertainments at the courts of the