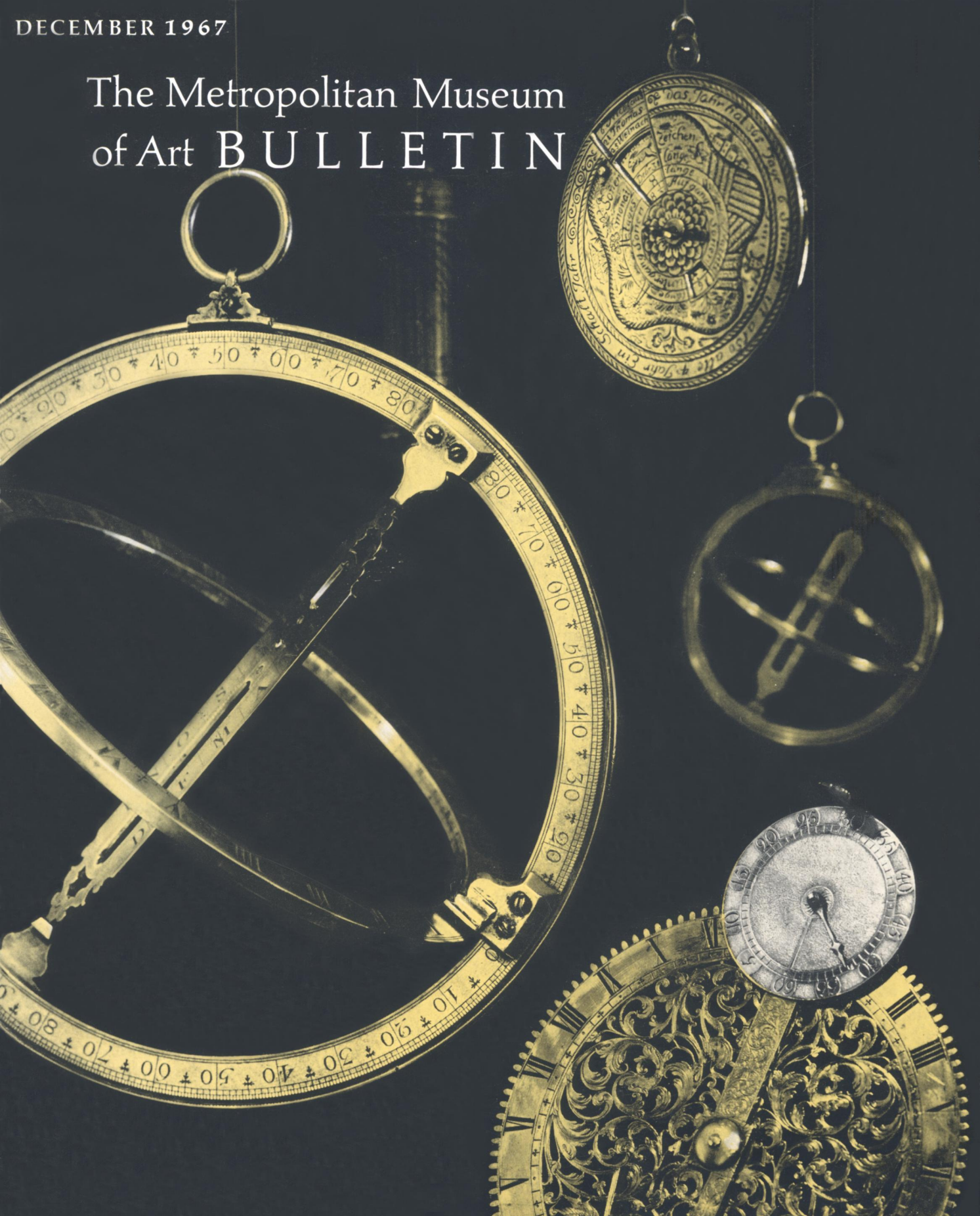
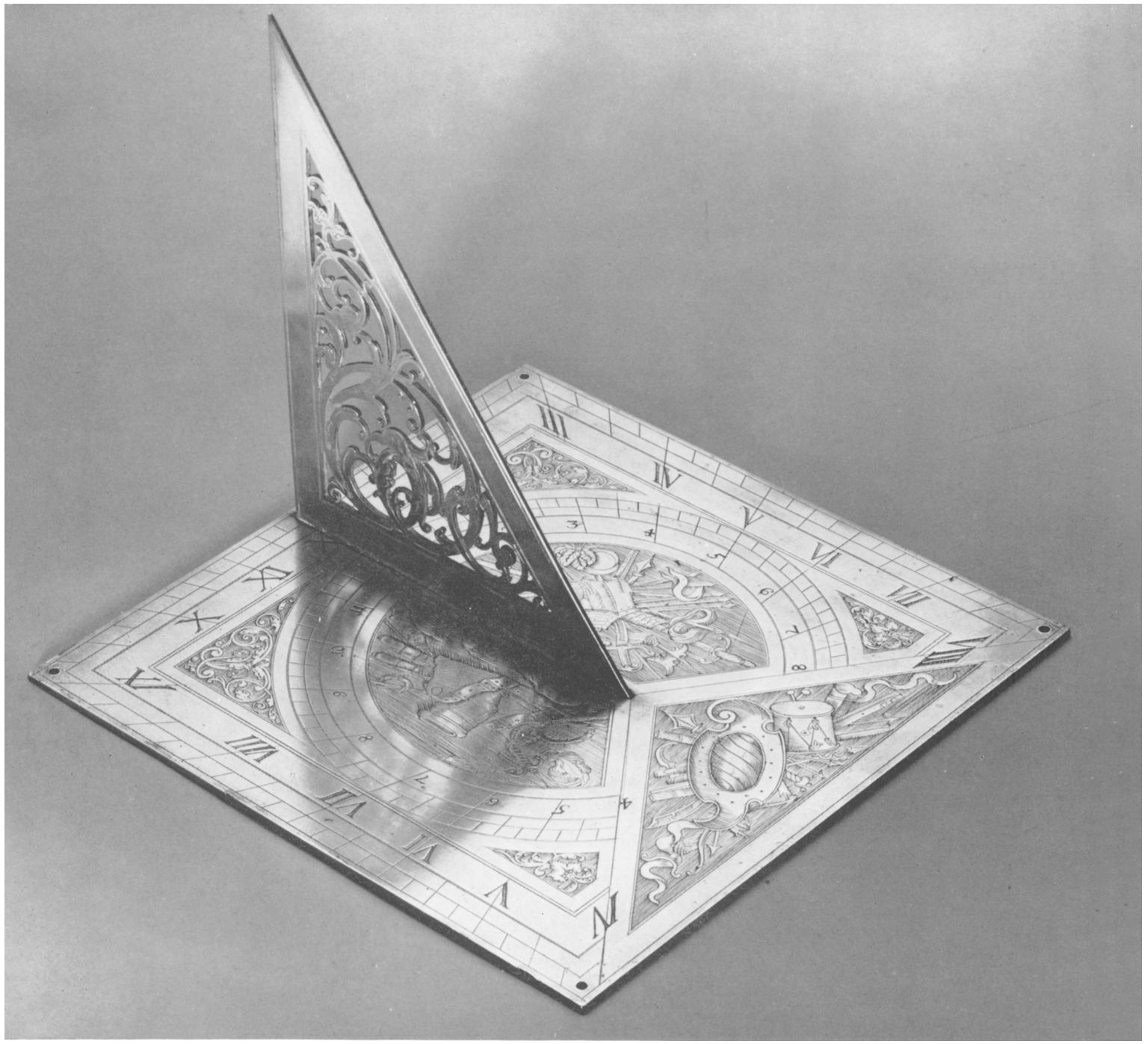
DECEMBER 1967

# The Metropolitan Museum of Art BULLETIN





*Brass horizontal dial made for use on the latitude circle passing about thirty miles north of London, as can be deduced from the fact that the base and long side (hypotenuse) of the triangular style form an angle of 52 degrees. English, late XVIII century. Height 6¼ inches. Acc. no. 03.21.1. The sundials illustrated in this issue are the gift of Mrs. Stephen D. Tucker*

On the 4th of this month the Metropolitan Museum is opening a gem of an exhibition. It is a "small but choice collection," to use Clare Vincent's words, of seventeenth- and eighteenth-century sundials in the Museum. Miss Vincent, who is an Assistant Curator in the Department of Western European Arts, collaborated on the article that follows, describing these intricate, fascinating, and beautiful devices for telling the time.

The Metropolitan's collections comprise a maddening diversity of things. There are the big, obvious masterpieces, lesser "minor" works, study objects, all the way down the scale to a limbo category called "related material." These qualitative straitjackets are something we impose on objects, following, I suppose, man's restless impulse to classify and evaluate. But the objects themselves have a will and life of their own, and a way of bursting out of the pigeonholes.

Sundials, for example, are first of all objects of mundane utility, and so, slightly suspect. Everyone knows that all you can do with a painting is hang it. It has an ethereal purity of purpose. Not so with Byzantine bronze hanging lamps, Chinese belt buckles, eighteenth-century French lyre-guitars, or nineteenth-century American Shaker furniture. But the fact is that these commonplace (in their time) objects have an uncommon beauty. And the Museum's collections are thick with such pieces, although we may have given them short shrift, storing or tucking them away in gallery corners as "supplementary material."

It's time we brought them out of the half-light and into special exhibitions of their own. The first of these opened in mid-September, when Emanuel Winternitz, Curator of Musical Instruments, put together a show of seventy string and wind instruments from the Middle Ages to the baroque period. Like the current sundial show it was a refreshing change of pace from the large spectacular exhibitions that we hold. Small, intimate, dramatically lit and displayed, they permit the visitor to focus on objects of art he might ordinarily overlook.

Incidentally, the story behind the Museum's collection of musical instruments is relevant here. Almost a century ago in Florence, Mrs. John Crosby Brown happened to fall in love with an ivory flute. The little bell that Gertrude Stein used to say "rang in my head," telling her that Picasso's works were high art, rang that day for Mrs. Brown. With a discerning eye and some courage she decided that the object in question was an object of art. I can tell you it is no mean decision to make. She bought the flute, and thirty years later had amassed one of the richest collections of instruments in the world.

Most curators have in the back of their minds somewhere a small private passion for particular corners of their discipline. I imagine that among Miss Vincent's weightier preoccupations there was a nagging conviction that these sundials were marvelous art. As we all know, passion and conviction will out.

THOMAS P. F. HOVING, *Director*

# Contents

# A Sure Reckoning:

## *Sundials of the 17th and 18th Centuries*

BRUCE CHANDLER *Assistant Professor, Department of Mathematics, New York University*

CLARE VINCENT *Assistant Curator of Western European Arts*

"Certa Ratio 1772" (a Sure Reckoning), the motto of a sundial on the south porch of the Kirk Deighton church in Yorkshire, suggests a serious use of the sundial in an age when the rapid development of clock- and watchmaking would seem to have made telling of time by the sun obsolete. On the contrary, advances in clockmaking during the seventeenth and eighteenth centuries actually spurred interest in sundials, the instruments for setting and regulating the clock. European efforts throughout these two centuries to perfect the sundial are recorded by a small but choice collection in the Metropolitan Museum, the gift of Mrs. Stephen D. Tucker. This collection not only shows the improvement in accuracy during two centuries, but also demonstrates some of the diverse solutions to the problem of "dialing," the technical name for the construction of sundials.

The uncertainty of timekeeping in the early part of the seventeenth century is well illustrated during the fourth act of Middleton's *Women Beware Women:*

BIANCA. How goes your watches, ladies? What's o'clock now?
FIRST LADY. By mine, full nine.
SECOND LADY. By mine, a quarter past.
FIRST LADY. I set mine by St. Mark's.
SECOND LADY. St. Anthony's they say goes truer. . . .
BIANCA. I'll end this strife straight: I set mine by the sun;
I love to set by the best; One shall not then be troubled to set often.

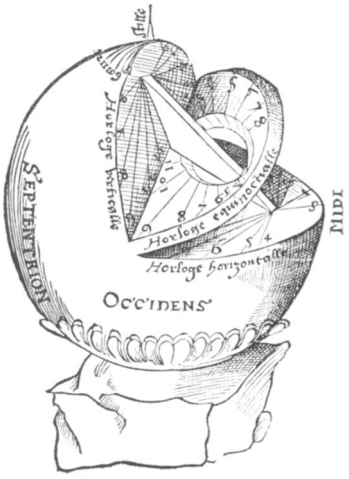
The working principle of any dial is that a pointer, called a style or a gnomon, casts a shadow on a calibrated surface. A horizontal garden sundial (Frontispiece), a product of mid-eighteenth-century England, serves to introduce the complexities involved in dialing. It also demonstrates, in its engraved and pierced decorations and in its precise construction, the high quality of the anonymous craftsmanship of the period. If this dial is fastened to a horizontal surface anywhere on the latitude circle of 52 degrees north, in England north of London, and is fixed so that the right angle at the base of the triangular style points due north, the shadow cast by the longest side of the style will indicate the time of day. The calibration of this dial is based on the orientation of the sun to the earth during the course of the day. The procedure that works for setting this sundial will not necessarily work for another dial (see Technical Aside, p. 158).

Among the earliest sundials in the collection is an ivory diptych dial (Figure 8) made by Paul Reinman, or Reinmann (worked 1575-1609), one of the best and most prolific of all Nuremberg craftsmen. During the second half of the sixteenth century, Nuremberg became the most important center for craftsmen who specialized in the making of sundials as well as other scientific instruments. The dial bears Reinman's mark (an open crown), his signature, and the date 1602. It is a good example of a portable Nuremberg dial that could be oriented to the north by means of a compass recessed into the base, a characteristic that accounts for the inclusion of most of the city's sundial makers in the guild of compass makers. Although the charming scenes of courtly life on the vertical leaf and the various lines that divide the dials are engraved, the decorative borders, the numbers, and the letters are stamped and tinted red or black.

The history of portable dials in the seventeenth and early eighteenth centuries is the history of attempts to achieve ever greater accuracy. The sundial makers of Germany, England, and France invented or developed instruments with distinctive national characteristics. In Germany, refinement in dialing passed in the second half of the seventeenth century to the guilds of compass makers and clockmakers of Augsburg. An octagonal portable sun- and moondial of about 1700 (Figure 10) is probably the work of the Augsburg master Johann Martin (1642-1721). Although the dial was formerly attributed to Martin's younger contemporary, Nikolaus III Rugendas, the recent publication of a signed Martin dial in a private collection in Innsbruck, Austria, shows the engraved hour rings and inscriptions of the two to be almost identical.

Martin's step-brother, Johann Willebrand, came to Augsburg in 1682. In 1703 he set up his own shop, producing, until his death in 1726, some of Augsburg's best dials. A water-gilt copper dial with its silver fittings (Figure 11) is a fine example of the special type of portable equatorial, or equinoctial, dial invented in Augsburg and known to have been made as early as about 1700 by Martin and by Nikolaus III Rugendas. The engraved circle of the months and the zodiac on the plate of the Willebrand dial together with the discreet but lovely designs on the hour ring, the level, and the reverse (Figure 12) make it one of the finest in the collection.

A beautiful dial of brass and silver, signed at the edge of the compass by Ludewig of Dresden (Figure 13), also belongs to the first quarter of the eighteenth century. Few of Ludewig's instruments survive, but the pleasing proportions of this one, the relation




*1. A diagram opposite page 7 of Jean Bullant's Recueil d'Horlogiographie (Paris, Jean Bridier, 1561) shows how the plates of a horizontal, an equinoctial or equatorial, and a vertical sundial are positioned in relation to the earth's axis (stille). Woodcut, 6½ x 7½ inches. Harris Brisbane Dick Fund, 28.46.2*

THE METROPOLITAN MUSEUM OF ART *Bulletin*
VOLUME XXVI, NUMBER 4 DECEMBER 1967

Published monthly from October to June and quarterly from July to September.  Second class postage paid at New York, N. Y. Subscriptions $5.00 a year. Single copies fifty cents. Sent free to Museum members. Four weeks' notice required for change of address. Back issues available on microfilm from University Microfilms, 313 N. First Street, Ann Arbor, Michigan. Associate Editor in Charge of Publications: Leon Wilson. Editor-in-chief of the *Bulletin*: Katharine H. B. Stoddert; Editors of the *Bulletin*: Suzanne Boorsch, Joan K. Foley, and Anne Preuss; Designer: Peter Oldenburg.

of the lines of the minute divisions in the hour ring to one another, the careful scaling of numbers and letters in the deceptively casual list of city latitudes around the edge of Ludewig's compass have rarely been equaled. Like Willebrand's, Ludewig's dial has the advantage of being usable in all latitudes from 10 to 90 degrees – that is any place on the earth except a small band around the equator – and its compass is adjustable for local variations in the magnetic declination. The reverse (Figure 14) is an elaborate perpetual calendar.

The problem of dividing sundial time into one-minute intervals was ingeniously solved in 1671 by Michael Bergauer, an Augsburg master of Austrian origin. Two elegant dials in the Tucker collection (Figures 15-17) are based on Bergauer's solution. The two graphically demonstrate the different aesthetic approaches to dialmaking of the Continental and English schools in the eighteenth century. The larger dial, with its finely engraved and pierced foliate scroll designs on the equatorial plate and chased silver minute dial, is one of at least five surviving minute dials signed and dated by Claude Dunod at Düsseldorf between 1711 and 1716. A Burgundian, Dunod spent most of his working life in Germany where in 1672 he learned to make the instrument from Bergauer. The smaller dial reflects its English origins in the austerity of its structure and the precision of its hand-engraved graduations, relying on pleasing proportions rather than decorative motifs to achieve a strictly functional, but nonetheless genuine, beauty. Thomas Wright (about 1686-1748), who signed this dial as instrument maker to the king (Figure 16), was one of the best craftsmen of his time, and was appointed instrument maker to the Prince of Wales, afterward George II, not later than 1718. The Museum's dial must have been made after George's accession to the throne in 1726.

The same aesthetic characteristics distinguish an English universal ring dial (Figure 18, left) signed by William Collier, who worked in London between 1707 and 1730. The universal ring dial was an invention of about 1600 by the English mathematician William Oughtred (1575-1660), and was first made by the Englishman Elias Allen in the 1620s. Although an older invention than the minute dial, the universal ring is quite accurate and has the advantage of not needing a compass for its orientation. It depends instead on the place of the sun in the ecliptic during the course of the year (see Technical Aside).

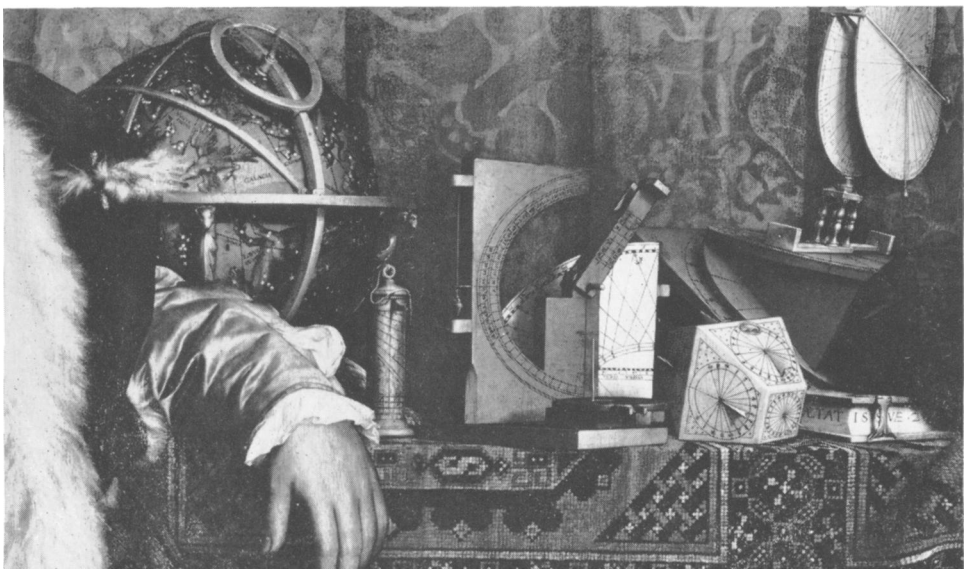
Another Englishman, Michael Butterfield, who worked in Paris between 1678 and 1727, is believed to have been the inventor of a class of portable dial that bears his name, and it became the standard French model. These are small horizontal dials with a recessed compass, engraved with three or four circles or chapters of hour lines for several latitudes. They have folding styles that adjust to the correct angle of latitude, indicated by the characteristic little bird beak. (This class of sundial is represented by three French dials in the collection.) The type is clearly illustrated in the third edition of the most popular treatise on scientific instruments of the eighteenth century, Nicolas Bion's *Instruments de Mathématiques* (Figure 19, center). The prevalence of this design is seen on a beautifully engraved brass and silver instrument for making sundials (Figure 20) on which the multiple hour rings and small silver bird reappear. Bion explained that the use of this instrument avoids the necessity of having to calculate the positions of the hour lines mathematically.

The sundials discussed so far are highly sophisticated and finely finished instruments. The collection also contains two dials made for common use. Both depend on the sun's position in the ecliptic and are classified as altitude dials (see Technical Aside). Like all altitude dials, they do not need to be oriented to the north, but must be adjusted, however roughly, for the time of the year. A small local ring dial (Figure 22, right) of brass with punched calibrations employs a ray of light cast on the interior surface of the ring on which the hours have been marked (see the diagram in Figure 19, right) in much the same fashion as the universal ring dial. The dial is English and bears the punched initials T.W., for an unidentified master who is thought to have been working about 1730.

A fruitwood pillar or cylinder dial (Figure 22, left) is an ingeniously compact version of a type that goes back to Roman times. The months are marked off by the vertical lines and the hours by the diagonally curved lines that reflect the changes in the sun's position in the zodiac. A flattened diagram of a cylinder dial's calibrations appears in Figure 21. When the dial is suspended from its ring and the pointer, or gnomon, is erected over the line of the proper month, the tip of its shadow will indicate the time. Although this dial was made to be used in latitude 50½ degrees, the lack of decoration and signature makes it impossible to suggest its country of origin or even a satisfactory date for it. Dials of this type are known, however, to have been used in France until the early twentieth century, long after sophisticated sundials were more or less relegated to the status of toys.

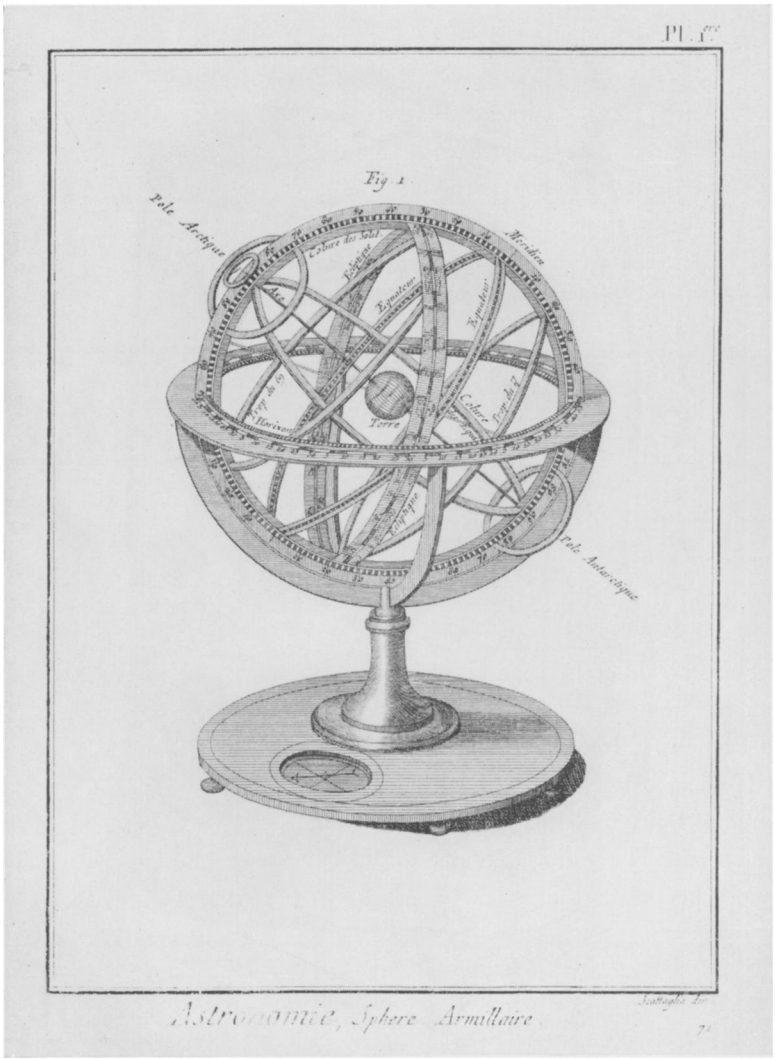
Although David Beringer first made his five-sided dial in the eighteenth century, the cube dial in Figure 23 is a product of the Nuremberg Beringer workshop of the early nineteenth century. The whimsical character of the dial is perhaps symptomatic of the decline of the sundial.

In principle, the cube dial and the cylinder are no different than their illustrious ancestors made by Nicolas Kratzer, astronomer to King Henry VIII, which occupy a position of honor between the figures of The French Ambassadors, painted by Hans Holbein the Younger in 1533 (Figure 2). In Holbein's time they were the dignified symbols of the cultural attainments of the Lord of Polisy and the Bishop of Lavour and the pride of a scholar like Kratzer. Three centuries later and after extraordinary improvements they were reduced to everyday objects or playthings.



2. *Detail from The French Ambassadors at the English Court, by Hans Holbein the Younger. Oil and tempera on wood. Signed and dated 1533. National Gallery, London. Reproduced by courtesy of the Trustees*

# *The "Doctrine of the Sphere," or a Technical Aside*




*3. Design for an armillary sphere engraved by Pietro Scattaglia for a Venetian edition of the Encyclopédie méthodique: Mathématiques, by Denis Diderot and Jean le Rond d'Alembert, new ed. (Padua, 1787), III, p. 71. 9⅝ x 6⅛ inches. Private collection, New York. Photo: Taylor & Dull*

The style and plate of a sundial are positioned in such a way that it is possible to predict mathematically the position of the shadow on the plate at any time. Dialing (the construction of sundials), therefore, was considered a branch of mathematics. An early manual on the subject, Sebastian Münster's *Horologiographia*, illustrated by Hans Holbein the Younger, was published in 1533, and a profusion of books appeared during the next two centuries giving constructions for various types of sundials. These books often presupposed a rather extensive mathematical background, as one of the English practitioners of dialing, Charles Leadbetter, complained in the preface to his *Mechanick Dialling*, new ed. (London, 1769):

> Seeing the business of Dialling Mechanically considered, is of itself a Thing so natural and easy, one would wonder, after so much learned Bustle as the Mathematicians have made about it, that they should have more perplexed and obscured than promoted the Knowledge of that useful and entertaining Art amongst the Generality of Mankind.
>
> The different Ways, in which these Gentlemen have hitherto chose the World should see that useful Subject handled, would certainly have been right and proper, and liable to no Exception, if all Men were Mathematicians: But how few are such? And therefore their having treated of Dialling in a Geometrical, Instrumental or Arithmetical Method, I am sure cannot possibly be of any Use or Signification to such as know nothing at all of those Sciences, or the Doctrine of the Sphere.

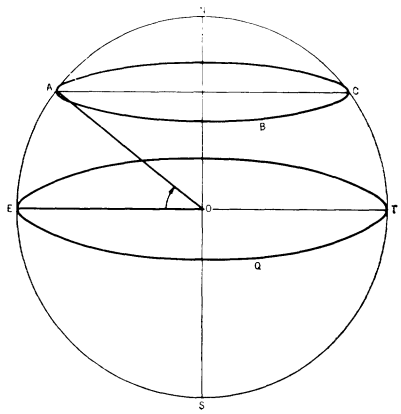
Although the plotting of dials requires more mathematical knowledge than Leadbetter allows, some insight into the problems can be gained by a brief consideration of the relationship between the sun and the earth.

Historically there have been two major models for visualizing the relationship of the sun and the earth. The current conception puts the sun in the center of our solar system, imbedded in one of the galaxies of an immense universe. The earth travels in a nearly ellip-

tical orbit about the sun in a little more than 364 days, while simultaneously revolving on its own north-south axis approximately every 24 hours. The older Ptolemaic system postulates a stationary earth at the center of the whole universe. All objects in the sky are called stars, but a distinction is made between the fixed stars, which keep a uniform relationship to one another over long periods of time, and the wandering stars, or planets, including the sun, which do not.

For an understanding of the working of the Museum's dials, a slightly modified version of the Ptolemaic system – the model still employed during the seventeenth and eighteenth centuries in dialing books – giving the relationship between the earth, the fixed stars, and the sun will be used. Consider the earth as a sphere at the center of a much larger sphere to which the fixed stars are attached. The sun travels in an earth-centered orbit between the earth and the fixed stars once every year. In contrast to the motionless earth of the Ptolemaic system, the earth is assumed to rotate once every twenty-four hours on its north-south axis, while the fixed stars are stationary. An eighteenth-century engraving of an armillary sphere (Figure 3) illustrates the system. The outer sphere to which the fixed stars are attached is not fully drawn, but is bounded by various circles, such as the equator, ecliptic, meridian, and the horizon. The axis of the earth *(Terre)* is extended to form a diameter *(Axe)* of the outer or celestial sphere; *Pole Arctique* being the continuation of the north extension and *Pole Antarctique* of the south extension. Positions on the earth are given in terms of latitude and longitude (Figures 4, 5) and those on the celestial sphere, by projecting the latitude and longitude circles from the center of the earth onto the larger sphere (Figure 6).

The sun is not indicated on the armillary sphere, but its orbit is projected on the celestial sphere as the great circle called the ecliptic or zodiac. The ecliptic cuts the celestial equator at an angle of approximately 23½ degrees, and at the northernmost point of its travels cuts the Tropic of Cancer (♋) – latitude 23½ degrees north – and at its southernmost point,

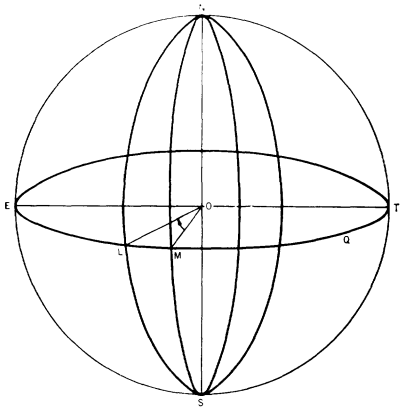



*4. Every place on the earth's surface can be located by two coordinates, latitude and longitude. The coordinate of latitude of a point is determined by the circle that passes through the point and is parallel to the equator. If EQT is the equatorial circle, A the point of latitude to be determined, ABC the latitude circle and O the center of the earth, the coordinate of latitude is given by the angle EOA stated in degrees and with the indication north. If the point is in the northern hemisphere the latitude has a value between 0 and 90 degrees north, and in the southern hemisphere, 0 to 90 degrees south.*

the Tropic of Capricorn (♑) – latitude 23½ degrees south. The corresponding latitude circles on earth (Tropic of Cancer and Tropic of Capricorn) are so named because their projections on the celestial sphere are the two circles that bound the ecliptic (see Figure 6).

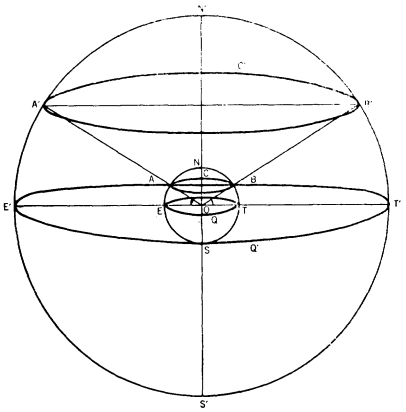
The ecliptic circle was divided by the ancients into twelve equally spaced segments, and in each the stars were grouped into the twelve constellations called the zodiac. The sun's position on any given day of the year was located by its position in the zodiac, rather than by its latitude and longitude.

At any instant the shadow on the sundial depends on two main factors, the position of the sundial on the earth, and the relative position of the style and the calibrated surface of the dial. An intuitive grasp of these relationships may be gained from a fanciful construction illustrated in a treatise on dialing by the Frenchman Jean Bullant, better known for his Renaissance architectural projects (Figure 1).




*5. The coordinate of longitude of point L is determined by the angle made by a fixed great circle (a circle on the sphere which has the same center as the sphere) passing through the north and south poles and Greenwich, England, and the great circle passing through the north and south poles and the point. Angle MOL is the angle of longitude of the point L if NMS is the great circle through Greenwich. In the eighteenth century, latitude and longitude were thought of as measurements on the surface of the sphere and not measurements from the center of the earth.*

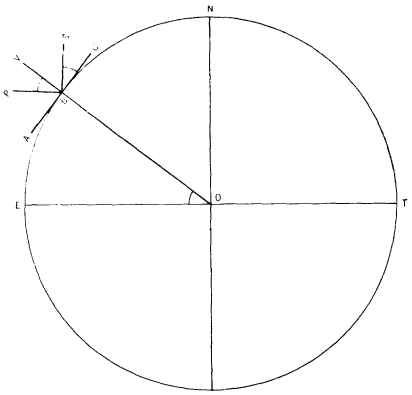
6. *ESTBNA represents the sphere of the earth, E'S'T'B'N'A' the celestial sphere, ABC a circle of latitude on the earth. A'B'C' is the projected latitude circle on the celestial sphere. O is the center of the earth and angle E'OA' is the same as angle EOA. The coordinates of latitude of both circles are, therefore, the same.*



The relationship is best illustrated by the garden sundial (Frontispiece). The horizontal placement and northern orientation of this dial insures that at the instant of midday when the sun is at its zenith or directly overhead, the sun, the style, and the axis of the earth will be in one plane, so that no shadow is cast by the style at twelve o'clock. At any point on the given latitude circle, this alignment of style, sun, and axis occurs when the sun is at its zenith. The acute angle that the hypotenuse (the side opposite the right angle) of the triangular style makes with the base of the triangle is equal to the angle of latitude, insuring that the hypotenuse is parallel to the earth's axis (Figure 7). Hence, although this particular dial can be used in any longitude, it can be used in only one latitude.

With the dial correctly positioned, the shadow of the style's hypotenuse correctly indicates the hour of the day. In some dials, for example the altitude dials in this collection, there is a third factor, the sun's position in the ecliptic, which must also be measured by the dial.

7. *The diagram illustrates the use of a horizontal and an equatorial sundial on the earth's surface at point B. N represents the north pole. Angle EOB is the angle that measures the latitude. BC is the plate of a horizontal sundial, and BS, the style. If angle CBS, the angle made by the style and the plate, is equal to the angle of latitude, BS is parallel to ON, the axis of the earth. The ring on an equatorial dial represented by BP is parallel to the earth's equator ET, when angle PBV is equal to the angle of latitude. The latitude on an equatorial dial is measured from the vertical to the horizontal, as can be seen in Figure 13.*




REFERENCES

The material concerning the German sundial makers appears in Ernst Zinner's *Astronomische Instrumente des 11. bis 18. Jahrhunderts* (Munich, 1956) and Maximilian Bobinger's *Alt-Augsburger Kompassmacher* (Augsburg, 1966). The portable dial signed by Johann Martin appears on p. 269 of the latter work.

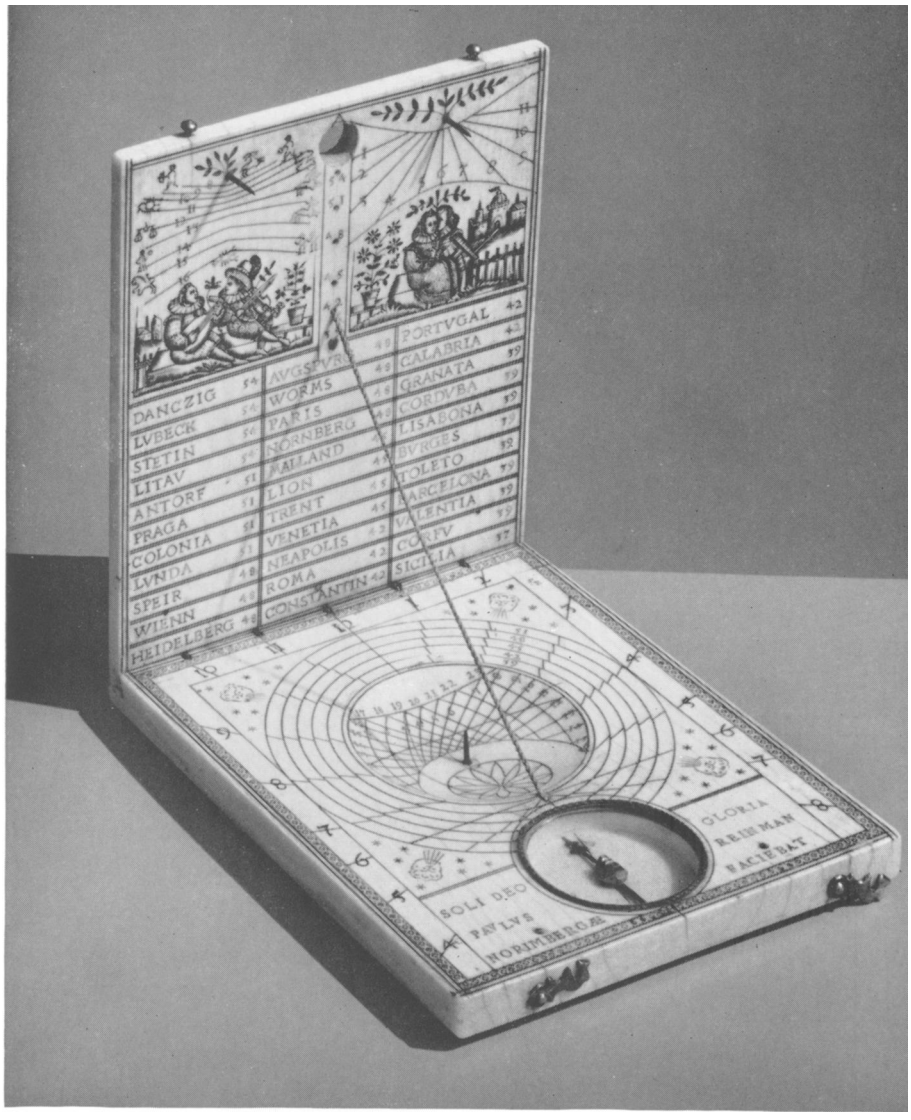
The English makers are discussed by R. T. Gunther in *Early Science in Oxford*, 2 vols., (Oxford, 1923), and E. G. R. Taylor in two volumes *The Mathematical Practitioners of Tudor and Stuart England* (Cambridge, 1954) and *The Mathematical Practitioners of Hanoverian England* (Cambridge, 1966). *Les Instruments scientifiques aux XVII^e et XVIII^e siècles*, by Maurice Daumas (Paris, 1953), provided the information about Michael Butterfield and Nicolas Bion (pp. 107-110).

For the technology and classification of sundials, see R. Newton Mayall and Margaret Mayall, *Sundials: How to Know, Use, and Make Them* (Boston, 1938); K. Higgins, "The Classification of Sundials," *Annals of Science*, IX, no 4, 1953, pp. 342-358; Henri Michel, *Les Cadrans solaires Max Elskamp* (Liège, 1966); Derek J. Price's chapters (22 and 23) in Vol. III, *A History of Technology*, ed. by Charles Singer (Oxford, 1957). For an exhaustive treatment of the mathematical aspects of dialing see Joseph Drecker's *Theorie der Sonnenuhren*, I, part E (Berlin, 1925) of *Die Geschichte der Zeitmessung und der Uhren*, ed. by Ernst von Bassermann-Jordan.


8. This portable ivory sundial by Paul Reinman can be used from Danzig to the island of Corfu, as the latitude table on the vertical leaf indicates. The basic dial found on the horizontal leaf of the diptych works on the same principle as the garden sundial (Frontispiece), but may be used in any one of six different latitudes. If the string that serves as the style is inserted in one of the six numbered holes, the angle it makes with the horizontal is the angle of latitude, and the time may be read from one of the six rings on the horizontal

surface. That the geometrical construction of the hour lines varies for each latitude is clearly demonstrated by the irregular pattern of the lines on each of the circles. At best, the shadow indicates the hour; finer divisions of the hour must be guessed at.

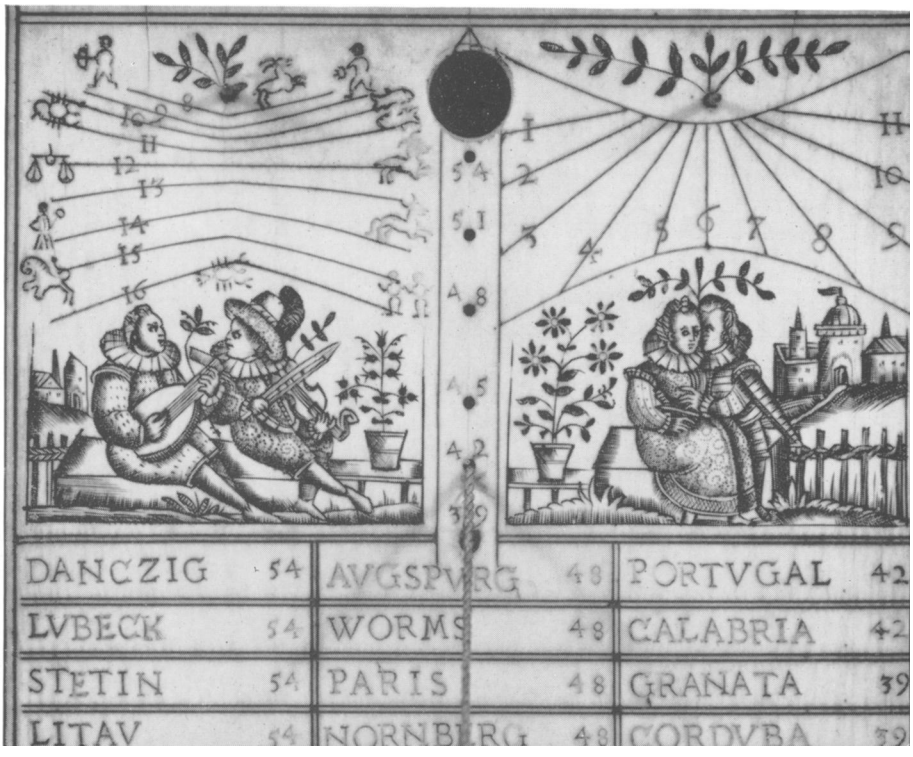
The Reinman diptych, like most dials of the period, is distinguished by the multiplicity of its functions. The concave surface at the center of the horizontal leaf is another sundial. Here the shadow cast by the tip of the fixed vertical pin, or gnomon, falls on a line that indicates the hour in two separate systems for recording the passage of twenty-four hours. One, known as the Babylonian hours, begins at sunrise (middle and right side of the bowl), and the other, known as the Italian hours, begins at sunset (left side and top of bowl). In this illustration the horizontal dial reads a few minutes after 10:00 A.M., and the concave dial shows that it is six hours since sunrise on the Babylonian scale and fourteen since sunset on the previous day on the Italian scale. German (Nuremberg), 1602. 4½ x 3½ inches. Acc. no. 03.21.24

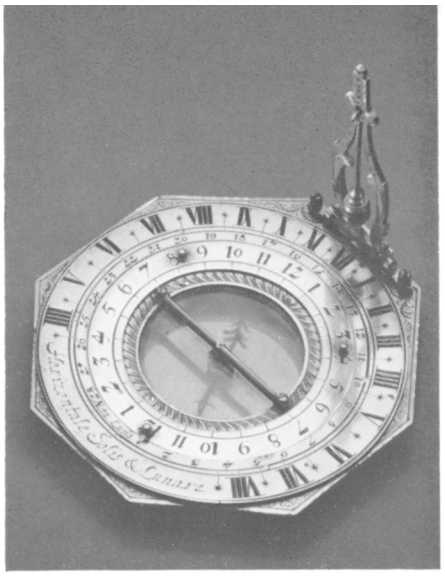



**9.** Detail of the vertical leaf, showing additional functions. The dial and gnomon on the left side indicate the number of hours of daylight in a given day of the year. The one on the right divides the daylight hours into twelve equal parts that vary in length according to the time of the year. These hours are called the temporary, or Jewish, hours.

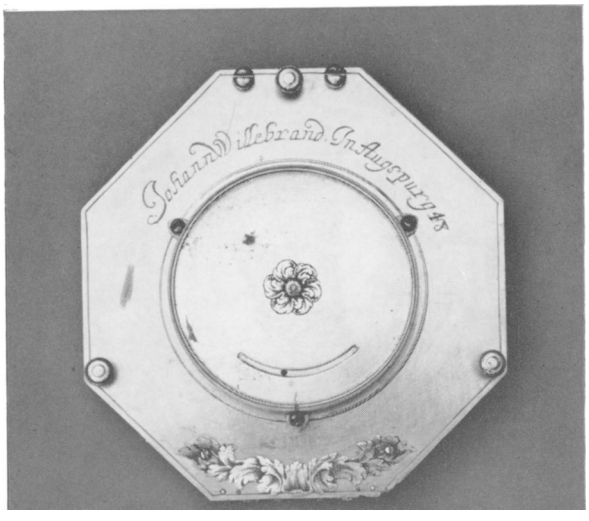
The shadow of the gnomon of the left dial indicates the position of the sun in the ecliptic. The number of daylight hours depends on this position and varies from eight to sixteen hours, as indicated on the dial. The designs around the dial's edge represent the signs of the zodiac. From the right side of the gnomon: Capricorn, Aquarius, Pisces, Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, and Sagittarius.

The top of the instrument (not illustrated) is a windrose to be used by navigators for identifying the direction of the prevailing winds. On the bottom of the diptych is an epact, a device used to calculate the date of Easter.



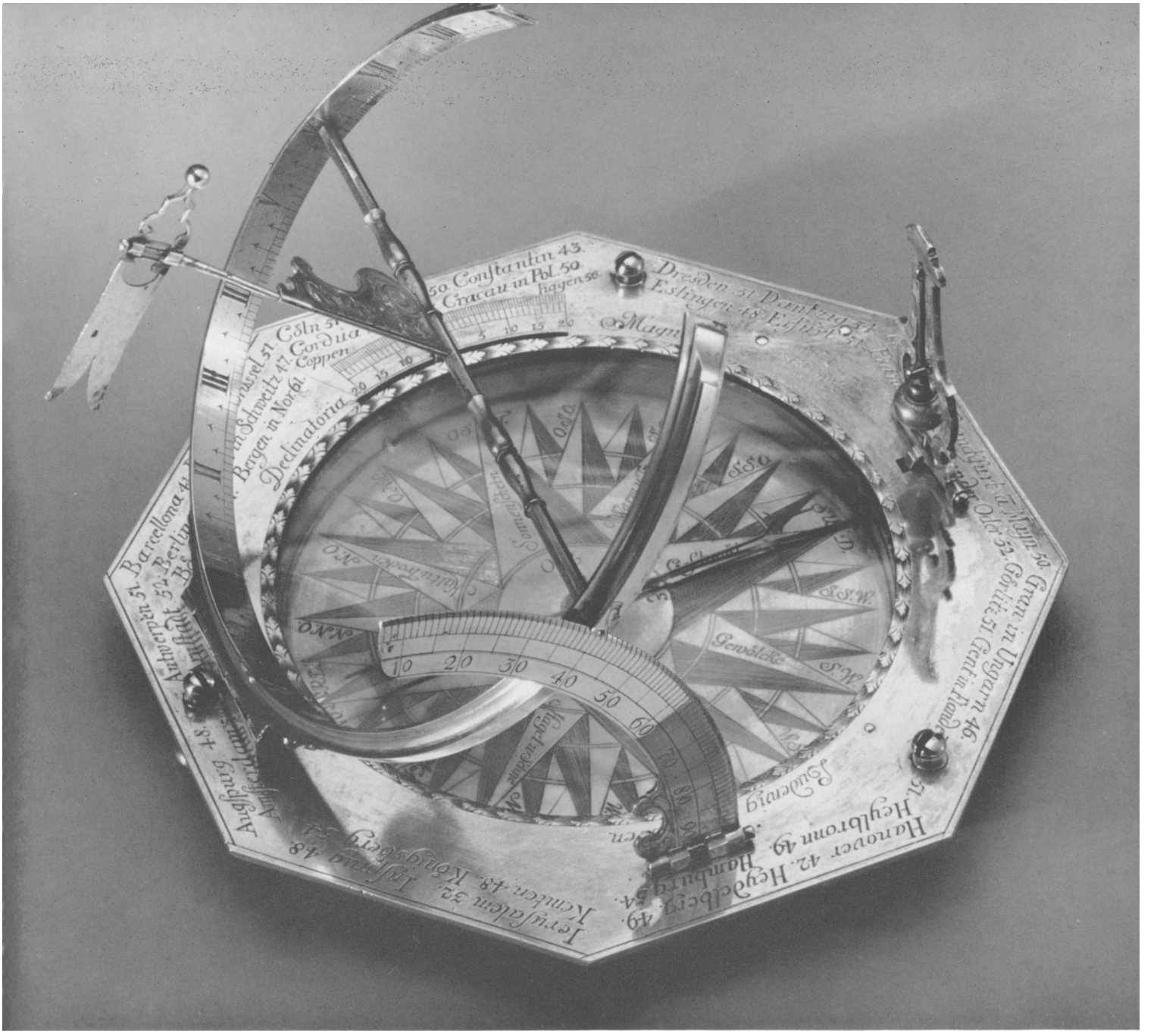


**10.** Portable sundial and moondial probably made by Johann Martin. The sundial, basically a horizontal one (see Technical Aside), is oriented to the north by a central, recessed compass, which, like the folding level with a plumb, is characteristic of Augsburg portable dials. In this dial the level serves the additional purpose of anchoring the string style, now missing. The style, like the one on the Reinman dial (Figure 8), was adjustable for only a few latitudes, and those are not very far apart. The outermost ring of numbers, giving the hours of the day, is divided with precision, although still not to a period of less than half an hour. No provision was made for the change in calibration of the hour lines required when the dial is used in more than one latitude. Martin's dial retains the seventeenth-century tendency to combine several functions in one instrument, for as its inscription indicates it is also a moondial. When the innermost ring is revolved into the position governed by the age of the moon (calibrated on the middle dial), it registers the hours by moonlight. The moondial in this illustration is set for use on December 1, 1967. German (Augsburg), about 1700. 2 x 2⅝ x 2½ inches. Acc. no. 03.21.61

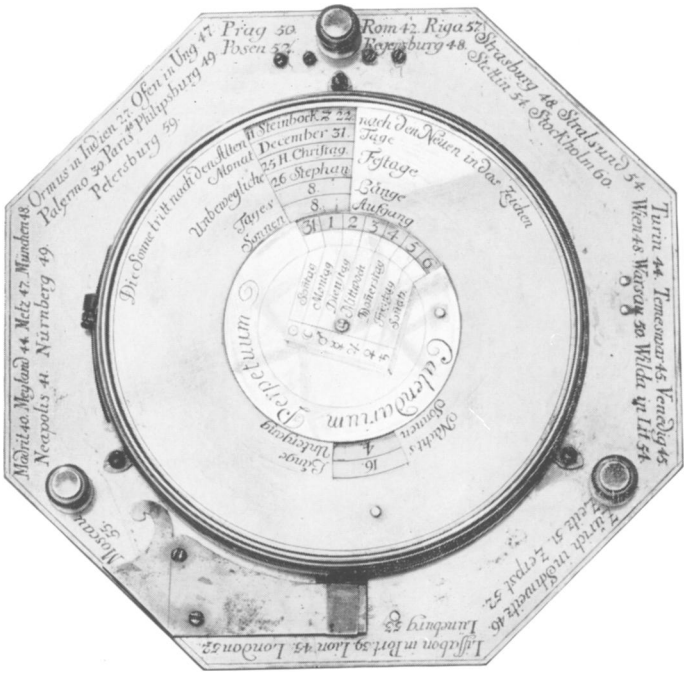



**11, 12.** Portable equatorial, or equinoctial, sundial of the type invented in Augsburg. In these dials, the dial plate of the horizontal sundial is replaced by a hinged ring that when positioned for the correct latitude and oriented to the north is parallel to the earth's equator (see Technical Aside and Figure 7). Hence the name equatorial sundial. The pointer, or gnomon, is attached perpendicularly to the hour ring so that it is automatically parallel to the earth's axis whenever the instrument is correctly positioned. The gnomon projects either above or below the ring according to the sun's place on its ecliptic, above or below the equator, so that its shadow can always be read on the interior of the hour ring. The ring's advantage is that the hour lines can easily be marked off, using equal divisions of the circle (15 degrees per hour), and that it is adjustable for use in any latitude by means of a graduated quarter circle or quadrant. The silver hour ring, level, and quarter circle fold flat when the dial is not in use.

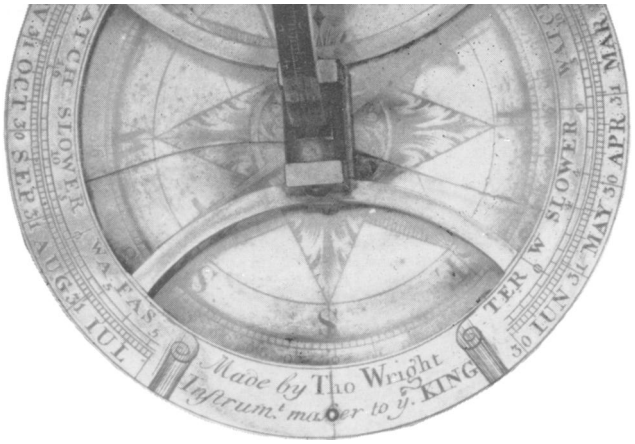
The reverse shows Willebrand's signature. The engraved spring of silvered brass at the bottom of the plate serves to support the level. The slot and pinhole device is used to adjust the compass for local variations in the magnetic field. Made by Johann Willebrand, German (Augsburg), first quarter of the XVIII century. Size of compass plate 3¾ x 3 1/16 inches. Acc. no. 03.21.43




**13.** Portable equatorial sundial signed "Ludewig, Dresden." Brass with silver fittings. Like the Willebrand dial, it serves to illustrate German refinements in dial calibration, here scaled to five-minute intervals on the hour ring and to one degree of latitude (indicated by the tiny pointing finger on the molding of the silver hour ring). In this illustration, the hour ring is set for use during the summer months at latitude 42 degrees north. With the flag-shaped wind gauge at the end of the gnomon, the compass also serves as a windrose. German (Dresden), about 1725. Diameter of compass plate 5⅛ inches. Acc. no. 03.21.22




**14.** Reverse of the dial in Figure 13. The central circle is a perpetual calendar showing the day of the week. The sign of the zodiac (Capricorn), the month of the year (December), the number of days in the month (31), the most important festivals of the month (Christmas, St. Stephen's Day), the length of the day and of the night, and the hours of sunrise and sunset are all shown through slots cut to reveal the revolving circle of the calendar. Around the edge of the plate various city latitudes are inscribed.

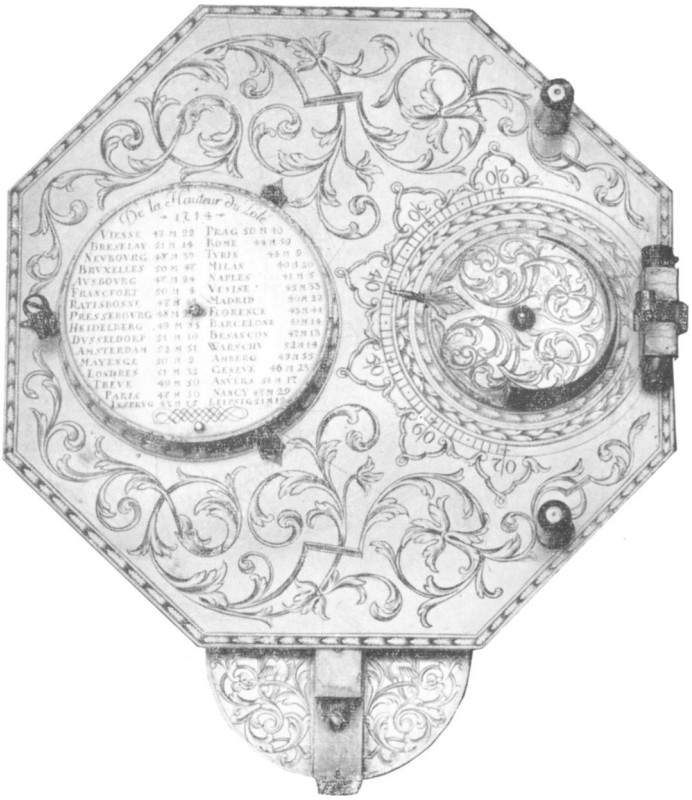


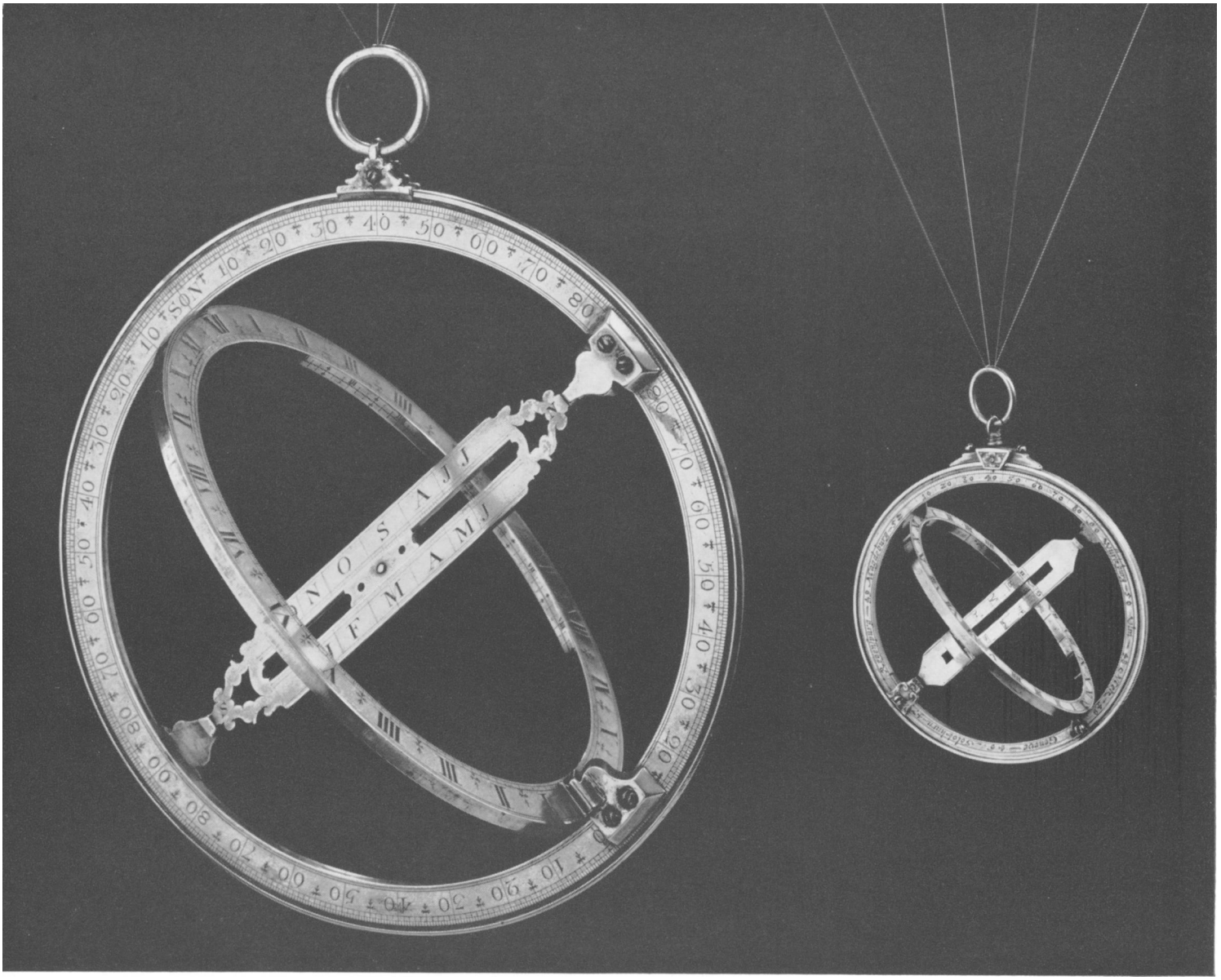

**15-17.** Two portable dials with minute wheels (opposite). Both are basically equatorial dials, oriented so that their hour plates are parallel to the equatorial plane. Because the style of the larger dial is missing, the principle of Bergauer's invention is better understood on the instrument on the right. A small wheel divided into sixty minutes is geared to the larger circle of hours. The minute wheel is moved along the circumference of the hour wheel until the shadow of the style attached to the minute wheel falls directly on the diameter engraved on it. At this moment the hand on the small dial points to the minute, and the pointer on the larger ring indicates the hour.

Both dials in the illustration opposite register the time 12:20 P.M. The dial on the left is by Claude Dunod. German (Düsseldorf), 1714. Diameter of compass plate 5½ inches. Acc. no. 03.21.37. The dial on the right is by Thomas Wright. English (London), 1726-1748. Diameter of compass plate 3¼ inches. Acc. no. 03.21.52

The detail of the compass plate (above) on the smaller dial shows Wright's signature. The one-minute calibration of these dials accentuated the difference between sundial time and clock time. A clock records an arbitrary twenty-four-hour day. But the sundial's day, due to one rotation of the earth, is measured from the sun's zenith of one day to the sun's zenith of the next. The period may be more or less than twenty-four hours, because of the sun's slight motion along the ecliptic during the course of a day. Clock time is called mean time, and sundial time, solar time. The relation between the two is represented by the scale marked "watch slower, watch faster" on the compass plate of the dial (the relationship is called the equation of time), indicating that the minute dial was used in the second quarter of the eighteenth century for the regulation of pocket watches.

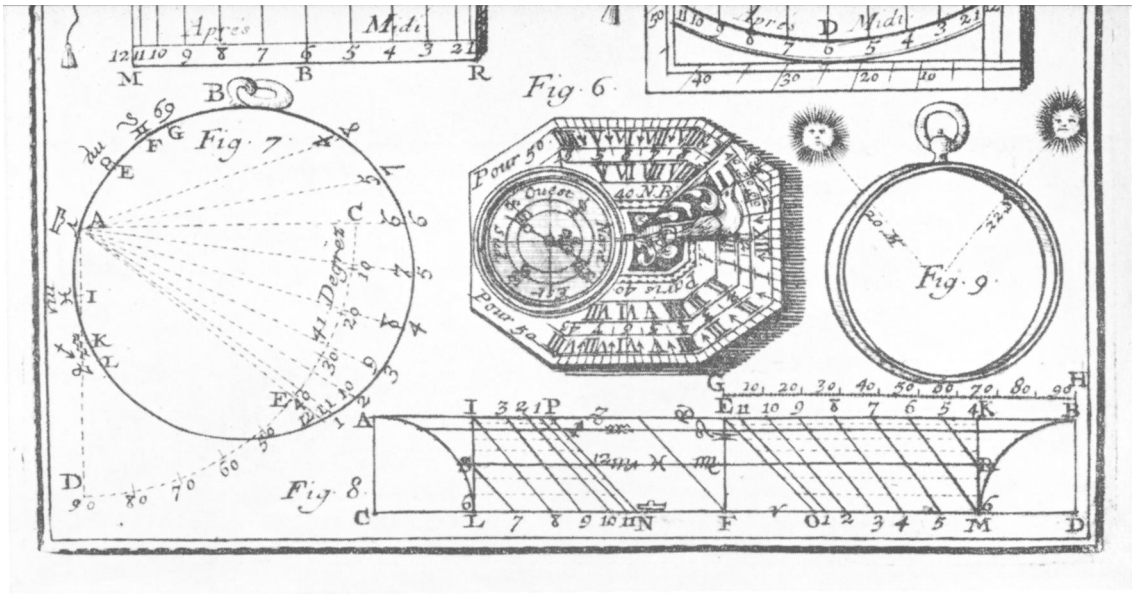
The reverse of the Dunod dial (right) shows the ingenious circular device with an inclined flange used for positioning the ring of hours at the correct latitude. The plate is of engraved brass, the chart of city latitudes of silver, and the latitude setting device of silvered brass.





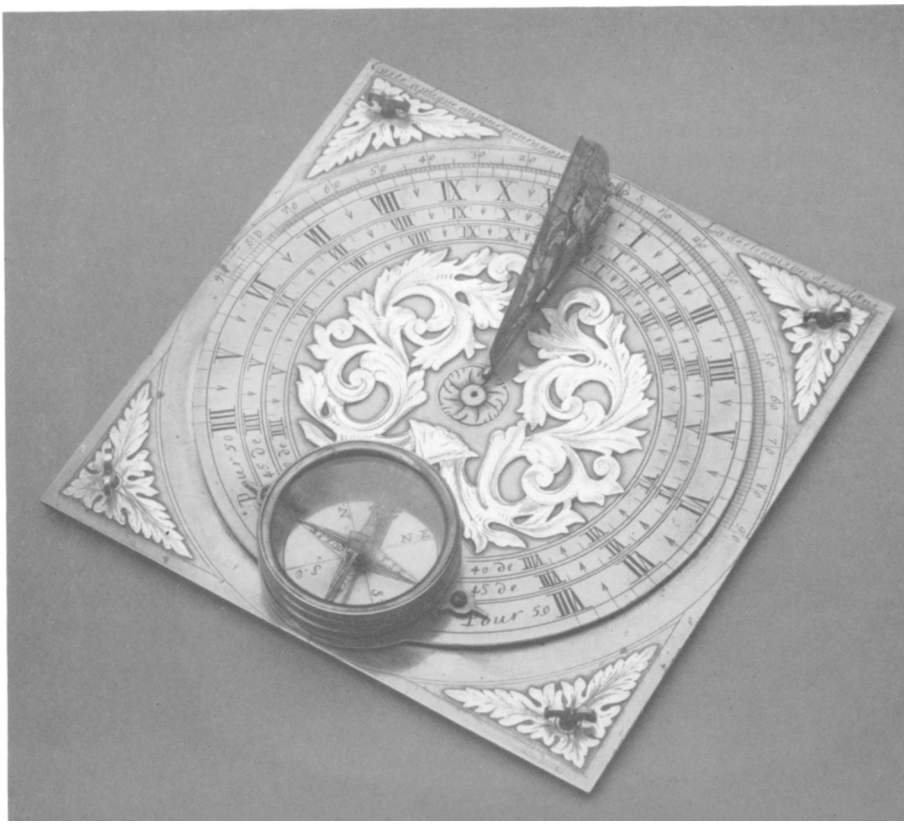
18. The larger universal ring dial of brass is set as illustrated here for use on March 30 or September 20 at latitude 40 degrees north. The outer circle is graduated to show the latitudes, and the inner circle fixed perpendicularly to it shows the hour lines. The months of the year are marked on the rotating flat plate on a diameter of the outer circle. The flat plate is equipped with a sliding index pierced by two pinholes. One pinhole is set opposite the appropriate month of the year, after which the suspension ring, attached to a clip that slides along the outer edge of the latitude circle, is fixed for the appropriate latitude. Then the whole instrument and the flat plate are rotated until a ray of sunlight passes through the pinhole and strikes the inside edge of the hour ring, giving the correct hour. When the light strikes the hour ring the instrument becomes a small model of an armillary sphere (Figure 3), the latitude circle being the meridian, the hour circle, the equator, and the diameter plate, the polar axis. On this dial, Collier calibrated the latitudes for the entire northern and southern hemisphere. The smaller universal ring dial, which, because of the character of its engraving and the location of the majority of the city latitudes, is probably of German origin, is graduated for use in only one hemisphere.

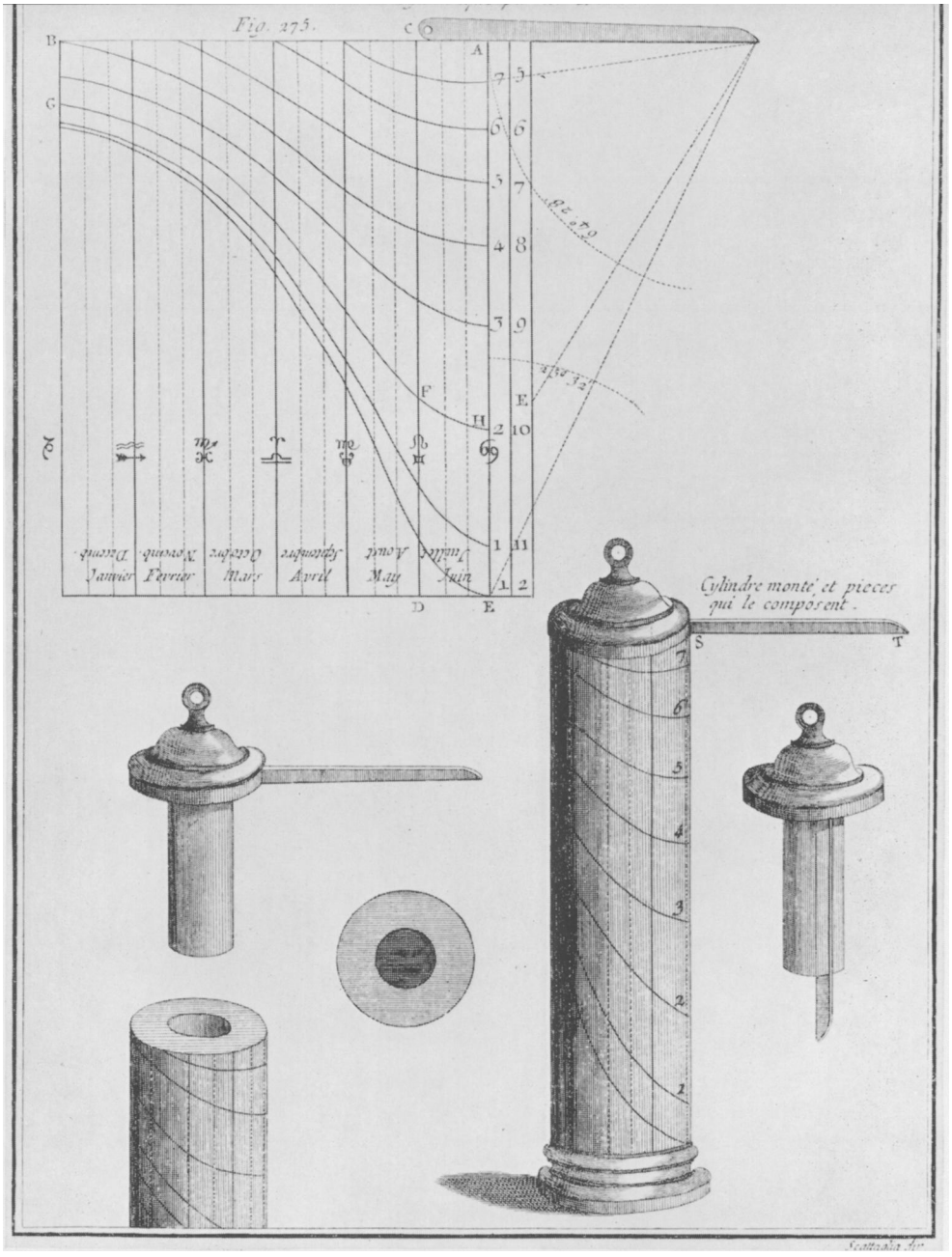
The larger ring is signed "Will. Collier. Londini, Fecit." English, about 1707-1730. Diameter 8½ inches. Acc. no. 03.21.50. The smaller dial, of gilded brass, as illustrated is set for use in mid-December at latitude 41 degrees north. Probably German, first half of the XVIII century. Diameter 2⅝ inches. Acc. no. 03.21.20




**19.** Design for a portable horizontal sundial known as a Butterfield dial (Figure 6 in the diagram) and three diagrams showing the principle and calibration of a local ring dial. Detail of plate 31 from the third edition of Nicolas Bion's *Traité de la Construction et des Principaux Usages des Instruments de Mathématique* (Paris, Michel Brunet, 1725). Bion was instrument maker to Louis XIV. Dimensions of this detail 5 x 7¼ inches. Bequest of W. Gedney Beatty, 41.100.8

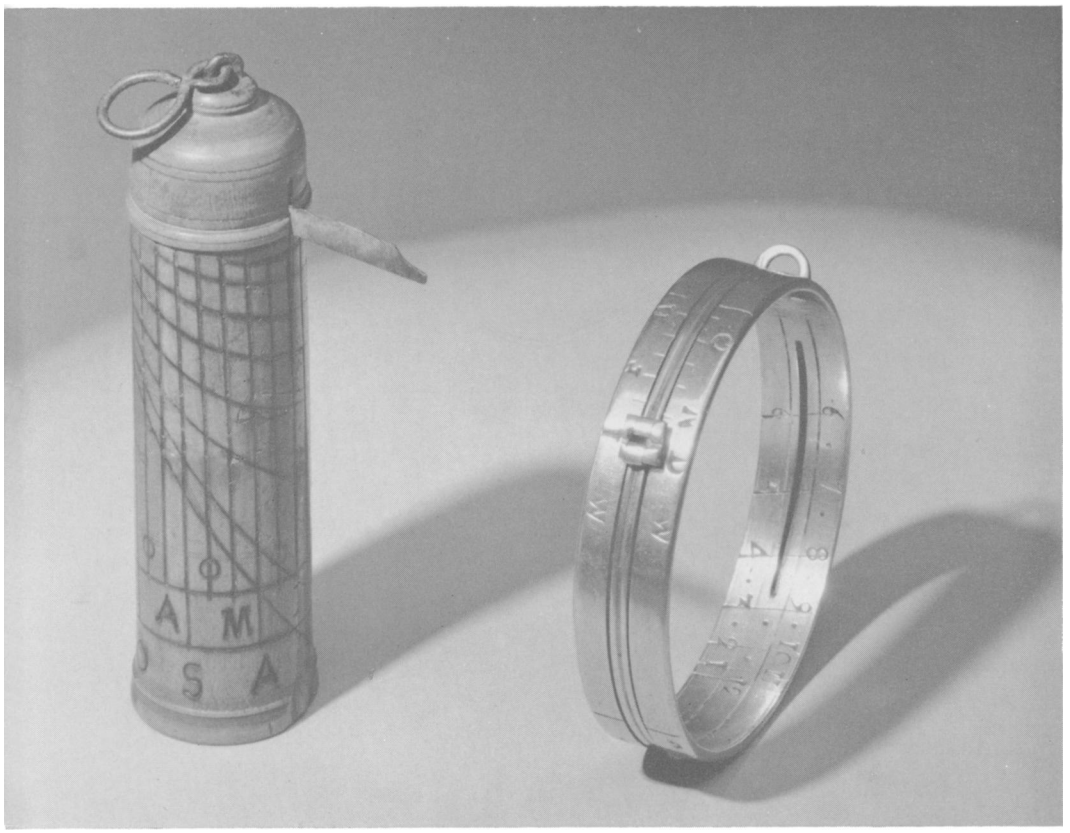
**20.** Brass and silver instrument used for making sundials. The style may be adjusted for use from latitude 40 to 50 degrees. French, late XVII–early XVIII century. 5¼ inches square. Acc. no. 03.21.17






**21.** Diagrams showing the construction of a cylinder dial. The angle formed by a line dropped from the tip of the gnomon to the twelve o'clock line of the longest day (top section) governs the latitude of the instrument's use. Diderot and d'Alembert, *Encyclopédie méthodique: Mathématiques*, III, p. 116. Engraving, 9⅝ x 6⅞ inches. Photo: Taylor & Dull

**22.** The local ring dial, or altitude ring dial (on the right), is set for use in mid-December. The changes in the sun's position in the ecliptic throughout the year are partly compensated for by the collar on the exterior. This contains a pinhole, and slides along two slots in the ring, one for the winter months and one for the summer. But the accuracy of the dial remains rather poor, and it can be used in one latitude only. English, probably about 1730. Diameter 2⅛ inches. Acc. no. 03.21.23. The pillar dial or cylinder was made for use on the latitude circle of 50½ degrees only, or on a line running through Cornwall, south of Brussels, Cologne, and Dresden, and east to Poland. European, XVIII or XIX century. Height 3 inches. Acc. no. 03.21.31



**23.** Portable wooden cube dial with paper facing, consisting of four vertical sundials and one horizontal dial. The multiplicity of dials increases the accuracy of the instrument. All are oriented by the compass on the base and adjusted for latitude by means of a hinge on the supporting post. German (Nuremberg), early XIX century. Height 7⅛ inches. Acc. no. 03.21.8

# *In Gratitude to Chester Dale and Clawson Mills*

HARRY S. PARKER III

*Chairman,*
*Department of Education*

If The Metropolitan Museum of Art is to be the great research institution that its founders wanted and its most responsible supporters today know it can be, then it must be able to avail itself of scholars outside the Museum who will, for a time, devote their full energies to research on the Museum's collections. The casual observer might think that after almost one hundred years of sustained study and with over one hundred art historians on the staff there could be no field of art history that has not yet been explored. On the contrary, the sheer size and diversity of the collections is such that there are any number of fields – Della Bella etchings, double-edged swords, Candace Wheeler fabrics – where lacunae have to be filled. Clawson Mills and Chester Dale fellowships are making it possible for these areas to be investigated.

Chester Dale and Clawson Mills were acutely aware of the Museum's need for a fellowship program and directed in their wills that a sum of money be set aside for this purpose. There have been eighteen Clawson Mills and nine Chester Dale Fellows since 1965, when the program was initiated. Each Fellow spends a minimum of three months and a maximum of two years at the Museum pursuing his research program. The stipend includes funds adequate to cover travel, books, and photography. The research may yield tangible results in the form of an exhibition or publication, but no such end product is stipulated. This kind of freedom encourages experimentation, and fellowship projects have been in such areas as Victorian, Islamic, and pre-Columbian art, which in the past have received little attention.

The Chester Dale grants are limited to American citizens under the age of thirty-five and have accordingly been used to support the research of younger scholars, often still affiliated with a university and working toward an advanced degree. The qualities demanded – exceptional ability, and interest in research within a museum – are the same as those required of the staff member. Several Fellows have made an easy transition into curatorial positions following the expiration of their grants.

The Clawson Mills grants have generally been reserved for mature, and often foreign, scholars. As accepting the fellowship entails a leave of absence from a permanent position elsewhere, these Fellows usually come to the Museum for a shorter period of time and work on rather specialized subjects. Their contribution to the Museum may not be so much in the area of discoveries, but in the application of their knowledge and experience to our collection. The Museum's staff members are also eligible for fellowships, and have been released from the day-to-day demands of departmental work to take leaves of absence pursuing projects in Europe and the Far and Middle East.

Most fellowship programs sponsored by the government or universities are encumbered with elaborate stipulations regarding the applicant's age, experience, and project. The modest scale of the Museum's program allows flexibility. We can support the Tom Chases who have just completed their graduate course in conservation as well as the Norman Brommelles who head the conservation departments of the world's great museums.

It is possible even now to assess the contributions of the Fellows. Old labels have been rewritten; unappreciated material has been rediscovered; new areas of collecting have been pointed out. We owe a continuing debt of gratitude to Mr. Dale and Mr. Mills, for the cumulative contribution of the Fellows will enable us to be more knowing about the things we have.

The fellowship program is not limited to the study of objects; it supports research in other professional aspects of museum work. Educational programing, exhibition techniques, and museum management require close study and research for better methods. George Wanklyn, Canadian-born and a recent graduate of Princeton, has a particular interest in the Museum's role in education, and has been granted a Clawson Mills fellowship in order to study the Museum's present and potential relationship with undergraduate teaching. The project involves an initial assessment of what the Metropolitan and other museums across the country are accomplishing. He will then try to determine what the colleges want and what the Museum might be able to offer.

In much undergraduate art-history teaching, the student seldom gets away from slides and photographs, and his art-historical education fails to include close investigation of the quality, color, texture, or condition of specific art objects. Museums are partly to blame for not encouraging the students to have contact with the real thing. George Wanklyn hopes to produce a report with recommendations regarding services and programs that will result in a closer alliance between museums and universities.

Father Cornelius Chang left his studies at the University of Seoul, Korea, in 1952 in order to come to the United States. As a member of the Benedictine order he participates in the Church's activities, but is assigned to study Far Eastern art. Iconographic problems in Buddhist painting are his special interest, and his Clawson Mills fellowship has made it possible for him to immerse himself in the Museum's largely unshown collection of Chinese, Japanese, and Korean paintings. Much of his work involves the translation of inscriptions, as he can speak and read the major languages of the East. His linguistic ability has also been useful in working with visiting scholars. He is shown here with Mitsuhiro Abe, the Museum's restorer of Oriental paintings, who arrived recently from Japan and who is establishing a thoroughly equipped restoration studio. Mr. Abe spoke not a word of English upon his arrival, and Father Chang helped him in coping with the city.

At the same time that many private collectors came to recognize the virtues of Victorian objects thrown out and destroyed by their parents, the Museum decided to sponsor research into this long-neglected period and to search out and preserve objects of highest quality. Dianne Hauserman and Marilynn Johnson were given fellowships in 1965 to make a survey of extant nineteenth-century American architecture and furniture. Miss Johnson's primary interest is architecture, and Miss Hauserman's,

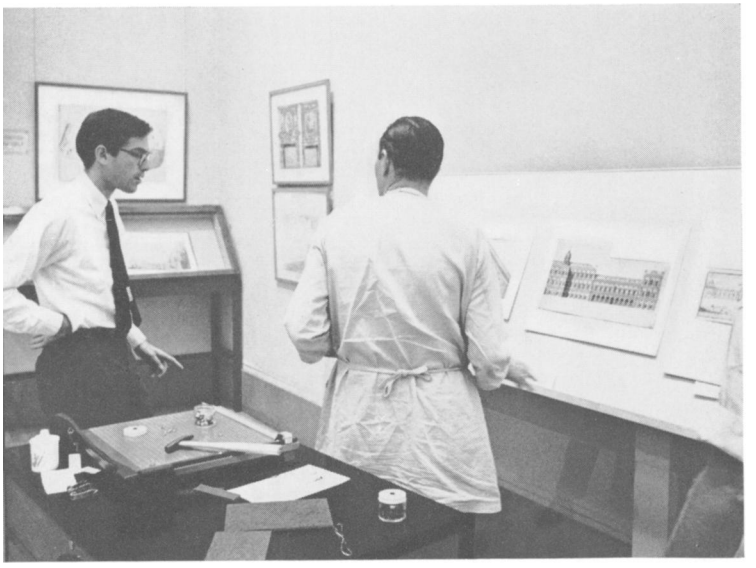
*Photographs by James Romeo*

George Wanklyn

Father Cornelius Chang, Mitsuhiro Abe

Marilynn Johnson, Dianne Hauserman

Malcolm Delacorte, John K. Howat, Don Aanavi



Morrison Heckscher

Janet Byrne

furniture. As material in both categories tends to be found in the same places, the two young scholars have traveled together throughout New England and much of the South and Midwest, looking for the exceptional survivors. They discovered one house near Bar Harbor, Maine, that other historians in the field thought had long been destroyed, and that happens to be one of the key buildings of the period. Contact was established with local preservation societies throughout the country and a network of those who care is gradually being built up. Part of their task has been to photograph previously unknown material, and Marilynn's fellowship provided tuition for a course in photography.

They are shown investigating an Art Nouveau fabric created by Candace Wheeler, the founder of the New York Society of Decorative Artists, who revived and developed the art of needlework. Miss Hauserman and Miss Johnson are preparing an exhibit of her work. Along with scouting and discovery, both Fellows are writing articles – Miss Hauserman on Alexander Roux, a New York cabinetmaker contemporary with the better-known John Henry Belter, and Miss Johnson on an account book for the firm of John Hewett, which she discovered at the New Jersey Historical Society.

The intelligence and ability required for the award of a fellowship are not greatly different from that required of staff members, and one benefit of the fellowship program has been the appointment of Fellows to the permanent staff. The three gentlemen having coffee in the Museum's cafeteria came originally as Clawson Mills or Chester Dale Fellows.

Malcolm Delacorte, on the left, was trained in the field of pre-Columbian art, of which the Museum has a sizable collection but no organized department. His experience had included work in conservation of pre-Columbian textiles at the Institute of Fine Arts of New York University and employment at the Textile Museum in Washington, as well as several years as an art dealer buying and selling pre-Columbian art. For two years he was a Chester Dale Fellow studying the Museum's largely hidden and widely dispersed collection, and this year was made Curatorial Assistant in the Western European Arts Department.

John Howat, in the center, specialized in nineteenth-century American painting and is preparing a dissertation on the painter John Kensett. The Museum has twenty-four paintings by Kensett, and Mr. Howat was able to continue his research toward the Ph.D. while adding to the Museum's knowledge of its possessions. He received his M.A. from Harvard, served for one year as director

of the Hyde Foundation in Glens Falls, New York, and studied at the Institute of Fine Arts before receiving his Chester Dale fellowship. As of July 1967 he was appointed Assistant Curator of the Department of American Paintings and Sculpture.

Don Aanavi is a scholar in Islamic art, an area rarely covered at American universities. The Museum has a strong and comprehensive collection, and the Curator, Ernst J. Grube, is also an adjunct professor at Columbia University. Professor Grube was able to spot Mr. Aanavi as a good candidate to work with Curator Grube, and he was given a Clawson Mills fellowship to do research on the Museum's collection of Persian and Central Asian objects. The fellowship recently led to an appointment as Curatorial Assistant.

Occasionally the research discoveries of a Fellow become immediately available to the public, as, for example, when Morrison Heckscher arranged an exhibition this autumn of English eighteenth- and nineteenth-century architectural books, prints, and drawings. The Museum's holdings in this area are particularly strong and have been given added scope in the last year or so by the acquisition of important Victorian prints and drawings. Mr. Heckscher was able to work closely with John McKendry, Associate Curator in charge of the Print Department, in seeking out relatively little known late nineteenth-century material. When he followed up on the research, he produced attributions for many of his finds. His fellowship provided a trip to England in the summer of 1967 for looking and buying, and for consultation with the expert in the field, John Harris of the Royal Institute of British Architects. The exhibition was the culmination of a research effort yielding both information and a definition of the remaining gaps in the collection.

After graduation from Wesleyan and the Winterthur program in American decorative arts, Mr. Heckscher enrolled at Columbia and is currently preparing his dissertation on the interior architecture of William Kent, under Rudolf Wittkower. Another of his projects is the restoration of an eighteenth-century house on Muscongus Island near Portland, Maine. Rowing the two miles to the island late Friday evenings seems to provide the perfect moment for pondering the qualities of Victorian architecture.

Janet Byrne has been a member of the curatorial staff of the Print Department since 1945 and has published numerous *Bulletin* articles, prepared exhibitions, and given assistance to the users of the public study room of the department. Her schedule of day-to-day activities made it impossible to undertake the intensive research and travel required to prepare a publication on one of the Museum's major acquisitions of recent years, a scrapbook containing hundreds of designs for tombs, discovered and given to the Museum by Janos Scholz. The scrapbook's drawings are a compendium of fifteenth- and sixteenth-century French design. To locate the surviving monuments and to compare the drawings with other known examples of the period required footwork and eyework throughout France and especially in the major repository, the Bibliothèque Nationale in Paris. Sponsored by a Dale fellowship, Miss Byrne took a leave of absence from her regular duties and traveled in France for six months. With time to spend in the right places, solely on her project, she identified the artists and subjects of many of the designs and shortly will publish findings of importance to students of architecture and design.

CHESTER DALE FELLOWSHIPS

Janet S. Byrne
Jay Cantor
W. Thomas Chase III
Malcolm Delacorte
Dianne Hauserman
Morrison Heckscher
John K. Howat
Marilynn Johnson
Colin Streeter

J. CLAWSON MILLS FELLOWSHIPS

Don Aanavi
Mohamed Abdel-Wahab
Isabelle Bessard
Norman S. Brommelle
Father Cornelius Chang
Elizabeth E. Gardner
Tessa Greig
Labib Habachi
Jane Hayward
Madlyn Kahr
Aschwin Lippe
Marie G. Lukens
Phyllis Massar
Abd'el Aziz Marzouk
Merribell Parsons
James Pilgrim
Heribert Seitz
George Wanklyn

# London Silver in a Colonial Household

JESSIE McNAB DENNIS *Assistant Curator of Western European Arts*


*1. The hallmarks punched on all the items of Franks silver discussed in this article. These are actually on the bowl in Figure 3. "27/16" is the weight of the piece in the troy scale, used for weighing silver: 27 troy ounces, 16 pennyweight*

OPPOSITE:

*2. Teakettle by Paul de Lamerie (1688-1751), English (London). 1744-1745. Silver, height, to the top of the finial on the lid, 11½ inches. Gift of George D. Widener and Eleanor W. Dixon (Mrs. Widener Dixon), 58.7.17*

Two pieces from an English silver tea service that at some point in the past was broken up and dispersed by inheritance among a large family have, by separate paths, found their way into the collections of The Metropolitan Museum of Art. They are a teakettle and a bread basket (Figures 2 and 8). The kinship of the two objects becomes unmistakable when one compares certain self-identifying features that occur on both. These are identically engraved armorials and identical sets of four hallmarks struck into the bases (Figure 1). Two of the hallmarks are a leopard's head crowned and a lion passant that, it is no secret, indicate that the objects were made in London and had passed the assay – a test to guarantee that the silver was of the required standard for sterling, which had only seven and a half per cent of copper alloy to ninety-two and a half per cent pure silver. Lower case letter "i"s in identically shaped outlines tell further that the pieces were made between May 1744 and May 1745, for this is the date-letter for that assay year, a period of twelve months that ran from May to May. Last, the maker's mark is the same – script capitals P L with a crown above, a small pellet between the initials and a larger one below, all within a shaped outline. This is the mark of the most famous Huguenot silversmith to work in London, Paul de Lamerie.

At the time the basket and teakettle were made, in 1744 or 1745, Paul de Lamerie was reaching the end of a long and distinguished career, during which he had benefited from the steady patronage of a wealthy clientele that had even included, on occasion, the Czar of Russia. He now occupied the most important office in the Goldsmiths' Company, that of Warden, and he was an Honorary Major in the London Militia. That he was an important figure in London trade will be inferred from the following quotation from the London *Evening Post:* "Paul d'Lamerie, Esq., an eminent goldsmith in Gerard Street, Soho . . . particularly famous in making fine ornamental Plate, and has been very instrumental in bringing that Branch of Trade to the Perfection it is now in. . . ." The pieces of silver under consideration are most certainly arresting examples of Lamerie's "fine ornamental plate."

They are, of course, examples of the rococo style, originally a French importation, which in England was used mainly on silver and furniture. The teakettle rests on a tripod stand from which is suspended a spirit lamp. The stand and its decoration were cast. Lions' masks with characteristically tilted eyes, whiskery noses, and bulging foreheads decorate the outward curve of the legs, and rather less detailed human masks are applied above them in the concave swing of the legs. Three cast feet in the shape of lions' paws with well-defined claws finish the tripod, which supports a ring into which the base of the kettle fits. This ring is decorated with scrolls, cherubs' masks, and sprays of prunus. Cast eagles with outspread wings connect the upper legs of the tripod.

3. *Bowl by Paul de Lamerie. 1744-1745. Silver, diameter 7¾ inches. Collection of Irwin Untermyer, New York*

The teakettle itself is hand-wrought, in an inverted pear-shape with a swing handle. The main decoration is the same on each side – an armorial framed in rather relaxed scrolls, supported on the underside by a demi-cherub and steadied, so to speak, in a lion's muzzle above. Outside the scrolled frame is a spray of prunus, a palm tree, and a graduated shell edging against a background now of scales, now of matte work. Falls of foam, a fully modeled lizard, more scrolls, prunus, and several snails occupy the lid, the spaces round the hinges of the handles, and the spout. Apart from the armorial, only a small amount of engraving appears on this piece, the repeated shells around the opening for the lid.

Other motifs from the natural world – dragonflies, wheat ears, wild strawberries, and prunus – are fixed round the rim of the basket, among long-legged scrolls similar to those on the kettle. Cast deer trophies and masks of Ceres on a larger scale are fixed alternately at the compass points. The sides of the basket are pierced with a hand-sawn design of symmetrically arranged scrolls and flowers with engraved details. The oval foot is made up of cast motifs such as cherubs' heads set against diapered cloths, snails, and shells.

Similar creatures, masks, scrolls, and falls of water – all motifs from the French rococo vocabulary – had occurred in Lamerie's silver designs a decade earlier, usually rationally and even pictorially related to each other. But the palm tree, from the hybrid chinoiserie vocabulary, and the prunus, which was a genuine Chinese decorative motif, are here summarily commingled with the European rococo motifs into a kind of visual telegraphese. In the mid-1740s, at the very period when many London silversmiths were adopting the established rococo style, Lamerie gave signs, by the disjunctive and eclectic nature of his own version of rococo, that he was ready for a new personal style. This he did indeed find, as may be judged in the work of the last eight or so years of his life. He was still a working silversmith at the time of his death.

The two pieces of silver here described belonged undoubtedly with a teapot, a sugar box, and a creamer or milk jug. A waste bowl (Figure 3) is known, and probably a pair of tea caddies and a tray were also en suite.

4. *One of a pair of tea caddies by Paul de Lamerie. 1742-1743. Silver, height about 5½ inches. Private collection, London*

The two pieces in the Museum's collection, as well as the waste bowl, are engraved, as mentioned above, with an identical coat of arms. This is the feature that finally establishes them as parts of the same service. The arms are *impaled*, that is to say, consist of two armorials side by side within the shield, the arrangement in which the arms of a married couple are usually marshaled. On the observer's left-hand side, representing the husband, are "Argent, a bend between six lions rampant sable." These are given in Burke's *General Armoury* as those of Moses Franks of Teddington. An engraving of Misterton Hall (Figure 5), erroneously stated in the inscription to belong to Isaac Franks, but really owned by Moses' brother Naphtali, shows that these arms were also used by him. The arms to the right, indicating the family of the wife, are "Sable, a chevron between three fleur-de-lis argent." In some ancient armorial manuscripts, these arms are noted as those of Collwyn, ap Tango, Lord of Efionydd, founder of one of the noble tribes of North Wales. Numerous later reference works, however, also give them to the Evans family of Wales, which presumably claimed descent from Collwyn and with it the right to use his arms, in accordance with legal heraldic usage.

A search for the bearers of these arms will bring us, of course, to the original owners of the tea service. Moses Franks of Teddington will not do, for he remained unmarried until some twenty years after the pieces were made. Naphtali, his brother, was married in 1742, but he also must be passed over, as his wife had not been a Miss Evans but a Miss Franks, his cousin, in fact. There was, however, another brother who would have used the same paternal arms as Moses Franks, and this brother was indeed married to a woman of the Evans family.

This was David Franks of Philadelphia. All three brothers were born in New York City, David in about 1720. Their father was Jacob Franks, who had come from Germany via London earlier in the century. A sale of family silver by the heirs of one of Jacob's descendants, Dame Isabella Bell Cooper, included a seventeenth-century cup and cover of Hamburg silver. This fact tends to confirm the view of several Jewish historians that the family originally came from Hamburg. Jacob became a merchant of considerable wealth, prominent in his own small Ashkenazic community and also active in civic affairs. Of the three brothers David was the youngest. A portrait said to be he with his sister Phila (Figure 6) shows a rather delicate, thoughtful youth.

In 1740 he went to Philadelphia and started as a general trader in brief partnership with his brother Moses. The two older brothers, however, soon went to London, and became successful merchants and bankers, leaving David in business in Philadelphia. David's fortunes prospered from the start, and in December 1743 he married Margaret Evans, whose father, a lawyer and once a member of the Middle Temple in London, was Sheriff of Philadelphia and Collector of Customs. Since the silver is datemarked for 1744-1745, the tea service may have been ordered in London and sent as a wedding present, very possibly by David's brother Naphtali. (The armorial engraving, however, was probably added in Philadelphia in the 1750s.) Naphtali certainly knew the work of Paul de Lamerie. There exists, interestingly enough, a pair of tea caddies (see Figure 4) by Lamerie, engraved with the


5. *Misterton Hall, Leicestershire, 1792. Plate XLVIII from The New Copper Plate Magazine. The Library of Congress, Washington, D. C.*

6. *David and Phila Franks, by an unknown American artist. About 1735-1740. Oil on canvas, 42½ x 52 inches. The American Jewish Historical Society, Capt. N. Taylor Phillips Collection, L. 61.67.1*


7. *Bookplate showing the arms of Sir William Cooper, Bt., with the arms of his wife Isabella Franks in an escutcheon of pretence. Courtesy of the Trustees of the British Museum*

arms of Franks impaling Franks, almost certainly owned by Naphtali, for his wife, the former Phila Franks, would of course have used the same paternal arms. These caddies remained in the hands of Naphtali's descendants until 1917, when they were sold for the Red Cross.

During the years that followed David's marriage he amassed considerable wealth from a variety of activities, which included land speculation, initiatives in the fur trade, and merchant shipping. It was, in fact, in his ship the "Myrtilla" that the Liberty Bell was carried. It had been specially cast in England to celebrate the fiftieth anniversary of the founding of William Penn's "Charter of Liberties" for Pennsylvania. As an army contractor and victualer, Franks supplied the forces defending Fort Duquesne (the modern Pittsburgh) during the French and Indian Wars, and there exists a letter addressed to him from the young Colonel Washington enclosing receipts for supplies.

David Franks was also prominent in the social life of Philadelphia and belonged to such exclusive groups as the Assembly Ball, the Library Company, and the Mount Royale Fishing Company. He was one of eighty-four persons in Philadelphia who owned a coach and was certainly one of its most affluent citizens. The Franks family was deemed very sociable and hospitable, and Lamerie's silver tea service must have been very much used. One of the houses in which it would have served, the Woodford Mansion, which David Franks bought in 1773, is still standing.

For all this, it was London where David longed to be. He wrote to his brother Naphtali that no one could consider himself to have lived till he had seen London. The circumstances under which he finally went there, however, were not of the happiest. Although he signed the Non-Importation Agreement of 1765 (which called for the repeal of the Stamp Act), his sympathies were Tory when the conflict with the mother country finally broke out into war. Furthermore, he had necessary contacts with British sources, for he supplied food to the colonists' army for the feeding of the captured British troops – a natural enough extension of his earlier position as army victualer. His repeated and unsuccessful efforts to be repaid for these supplies were interpreted as contacts made to pass on secret information, and he was twice imprisoned, although judged "not guilty" when brought to trial. The influence of his brother Moses in London was brought into play, and on a further occasion he was freed in an exchange of prisoners and passed through the lines to New York, then in British hands. In 1780 he removed to London and settled in Isleworth, a country district on the Thames not far upriver from London. He was now almost destitute but was close to the homes of his two brothers, both men of wealth and position in London. Naphtali had been made a member of the Royal Society in 1764, for he was a keen botanist and had often received plants of North American species from his mother in New York. Reynolds was commissioned to paint the portrait of Moses and his wife, and Gainsborough painted their daughter Isabella. When Isabella grew up she married Sir William Cooper, Bt., who for a time was personal chaplain to the King. Isabella, Moses' only child, was, heraldically speaking, his heir, and therefore she placed her paternal arms in an escutcheon of pretence in the center point of her husband's arms (see Figure 7).

David Franks wrote his will in England, but he returned to Philadelphia in an attempt to settle his affairs, and he succumbed to yellow fever in the epidemic of 1793, without ever recovering the wealth or position he had formerly enjoyed. At what point the silver left his possession is not known. A record exists of a notice of the sale by auction of his library in 1780, but no record remains of what happened to his household goods at the time he left Philadelphia. The only certain thing is that the two pieces in the Museum's collection must have passed into the possession of his niece Isabella Cooper, whose heirs sent them to auction with other family silver at

Christie's, February 25, 1913. Whatever its history may have been, both in its original home and at every other location in which it found itself, the silver was surely much noticed and would have carried in its beauty and technical virtuosity the guarantee of its preservation.

NOTE

The bowl illustrated in Figure 3 is catalogued in *English and Other Silver in the Irwin Untermyer Collection*, text by Yvonne Hackenbroch, The Metropolitan Museum of Art, New York, 1963. *American Jewish Colonial Correspondence: Letters of the Franks Family 1733-1748* will be published by the American Jewish Historical Society in 1968.

*8. Breadbasket by Paul de Lamerie. 1744-1745. Silver, width 12½ inches. Bequest of Helen Flynn Conway, from the Helen Flynn Conway Collection, 66.158.1*

# The Making of a Book

ANNE PREUSS *Assistant Editor of Publications*

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*Photographs for this article, and for the catalogue of the Wrightsman collection, by Taylor & Dull*

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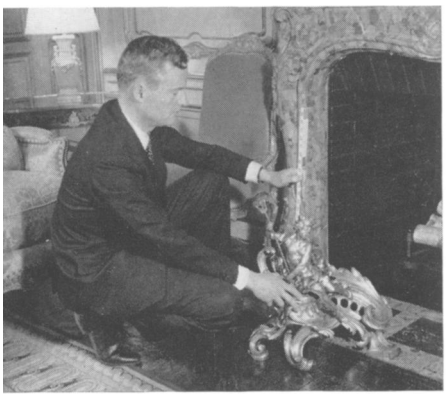


The catalogue of a collection of great works of art should not be produced by following the dictum "the medium is the message." The medium should, as unobtrusively as possible, convey the message, and when the Museum undertook the production of the catalogue of the collection of Mr. and Mrs. Charles B. Wrightsman – the foremost American private collection of French eighteenth-century furniture and *objets d'art* – the intention was to create volumes that would not stand between the reader and the objects saying "Look how beautiful I am," but would instead provide a setting in which the reader could absorb as much information as possible.

The first two volumes, written by F. J. B. Watson, director of the renowned Wallace Collection in London, are catalogues of the furniture, gilt bronze, mounted porcelain, and carpets in the collection. Published in November 1966, these volumes are the result of several years' research by Mr. Watson, and involved trips to New York and much correspondence with members of the Museum staff. The volumes include a long introduction, 287 catalogue entries, an appendix about carpet-making at Savonnerie, biographies of the craftsmen who made the pieces and a map showing their workshops, a glossary of the French technical vocabulary, and four lengthy bibliographies. Each entry is illustrated, and the craftsmen's marks are reproduced in photographic facsimile.

In 1962, Gray Williams, Jr., then Editor of Publications, and I were asked by Mr. and Mrs. Wrightsman to produce books that would not simply be a catalogue of their collection but also be of the greatest possible use to scholars and students. Consequently, we decided not to follow the classic catalogue format of separate volumes for text and plates, but to place the illustration of each object on the same page as the entry describing it, or at least on the facing page. This decision made it necessary to use the same paper throughout the catalogue, one on which the illustrations, both monochrome and color, could be printed without losing fine detail. We did not, however, wish to use the glossy coated paper on which engraved plates are printed most easily, partly because we wanted a more subtle effect, and partly because a good deal of light is reflected from this paper, making extensive reading effortful. We chose, therefore, a "dull-coated" paper with a pleasing matte finish. The mill did not routinely make this paper in the weight we had in mind, so we entered a special order. Something over twenty thousand pounds of the paper were delivered to our printer.

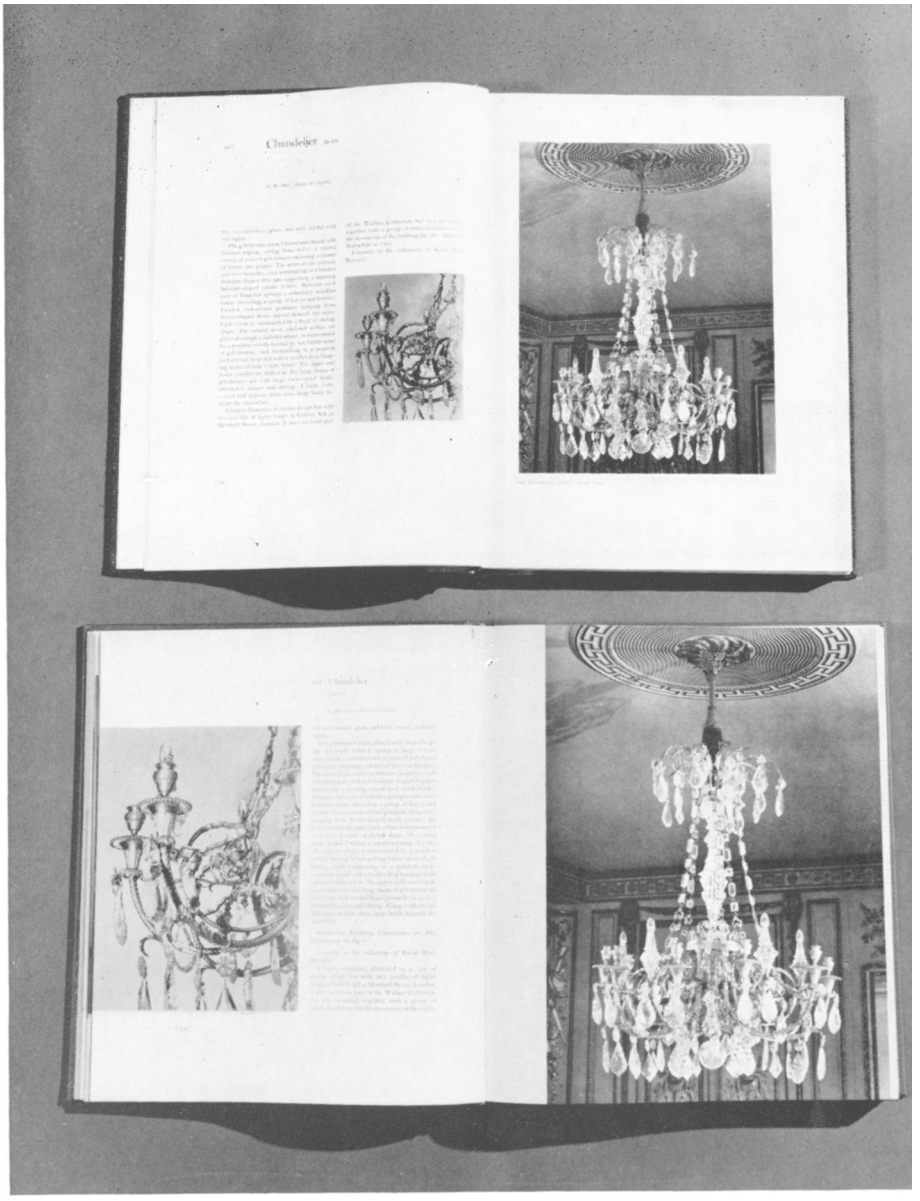
The choice of paper affected the choice of type face. Many of the older faces look best on the paper they were created to be printed on – paper to which no coating has been applied and into which the type presses the ink. On coated paper they look rather spindly. The face we selected, Bembo, derived from a sixteenth-century Venetian design, has enough weight to look firm and vigorous on coated paper.

With paper and type face decided upon, Peter Oldenburg, the designer of the catalogue, made up two possible formats (Figures 1, 3). One showed the traditional rectangular page, with wide margins around both type and illustrations, the latter centered on the

page. The other, close to but not quite a square, was more modern in feeling and allowed the "bleeding" of illustrations – printing them clear to the edge of the paper. This treatment makes possible larger illustrations, and it was this contemporary format that Mr. and Mrs. Wrightsman chose.

After the manuscript had been edited, every reference in it to a book, a sale, or an exhibition was traced to its source by a research assistant, Jean Gallatin Crocker, and corrected if, for instance, a page number had been transposed or a book's title had been inaccurately reproduced. This painstaking search went on in many of New York's institutional libraries—even in Goethe House, where a passage was checked in a specific German edition of one of Thomas Mann's early novels. Mrs. Crocker also verified the author, title, date of publication, and other information for every item that appears in the forty pages of bibliographies, and to assist the author, who compiled the major part of the bibliographies, she went through all the art journals published in the United States since 1900 to pick out appropriate articles. Another kind of checking was undertaken by James Parker, Associate Curator of Western European Arts, who, as the book was set in type, remeasured every object and compared it in detail with the written description (Figure 2).

One of the striking features of the catalogue is a fold-out map of Paris showing precisely where the furniture craftsmen who made the objects in the Wrightsman collection had their workshops. Mr. Watson wanted the reader to be able to see for himself what he stressed in the text – that the *menuisiers* (who made carved furniture, such as chairs) and the *ébénistes* (who made veneered furniture, often elaborately mounted with bronzes, such as *commodes* and *secrétaires*) tended each to congregate with other members of the same craft in a particular neighborhood. The map the author wished to use was a famous mid-eighteenth-century plan of Paris made under M.-E. Turgot, a municipal official, printed in several large sections. We acquired photographs of the sections from a copy in the



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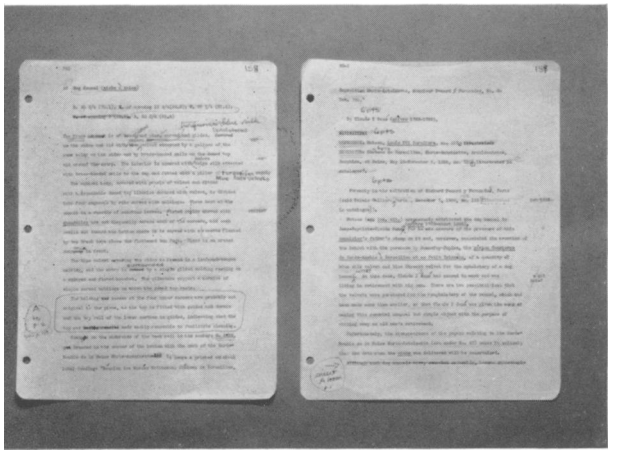
Royal Institute of British Architects. On these, Mrs. Crocker and the author contrived to find the craftsmen's workshops from the listings of their addresses in standard reference works (Figure 9). Next came the problem of pasting the photographs together to make a continuous map. The original map had never been intended to be spliced together in this way, and we were sometimes hard put to make the streets meet with absolute accuracy where the sections joined. Mercifully, the great reduction in scale of the completed map took care of the worst of the joinings.

Making the thirty-five color plates took two years. They were made in New York,



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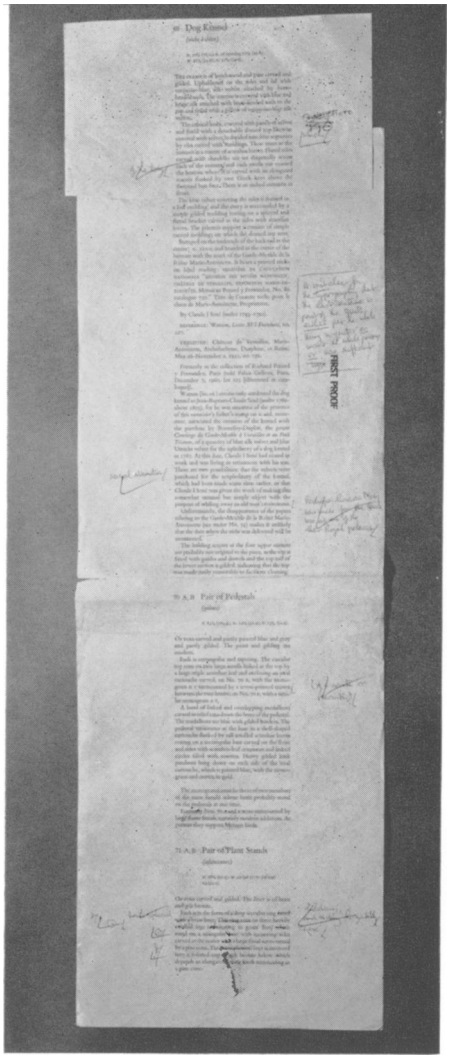


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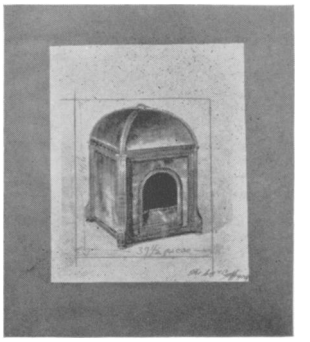

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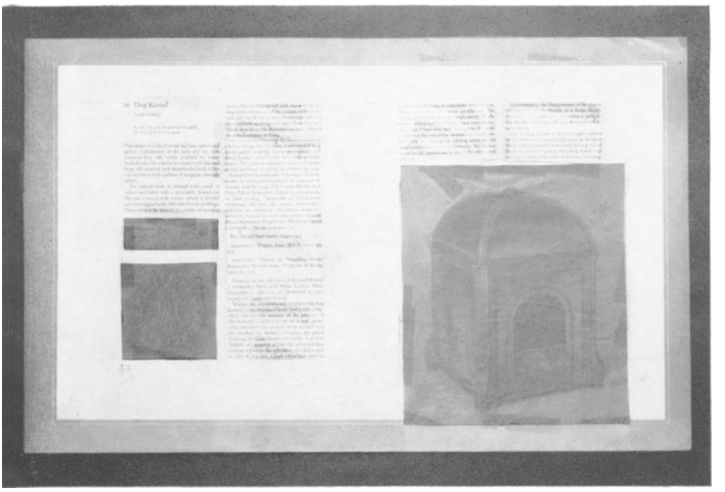
and the engravers were thus able to visit the Wrightsmans' apartment and study the pieces as the work progressed. Making color illustrations that are as faithful as possible to the pieces they represent requires many comparisons. First, the photographic transparency is inspected in front of the object, and any discrepancies noted. Next, the first printed proof is compared with the transparency, to make sure that detail and color have been rendered as well as they can be. Finally, the proofs are considered against the objects themselves. The corrections then made may be as simple as reducing or increasing the amount of ink of one of the four colors – red, blue, yellow, and black – used in full-color reproduction, or it may involve complicated work directly on the metal plate. The trips by the engravers to see the objects themselves were particularly helpful in capturing nuances of color, such as the tone of the gilt bronze with which much of the furniture and porcelain is mounted. The color plates were printed separately from the rest of the book (see Figure 10) and then glued in individually opposite the appropriate entries—again following the principle that the reader shouldn't have to hunt for illustrations.

During the spring and summer of 1963, the main part of the text was set in type by the firm of Clarke & Way, printers accustomed to manufacturing art books of high quality, and the author began the job of reading his proofs. Various corrections and last-minute additions were made, and a corrected set of galley proofs (see Figure 5: proofs taken



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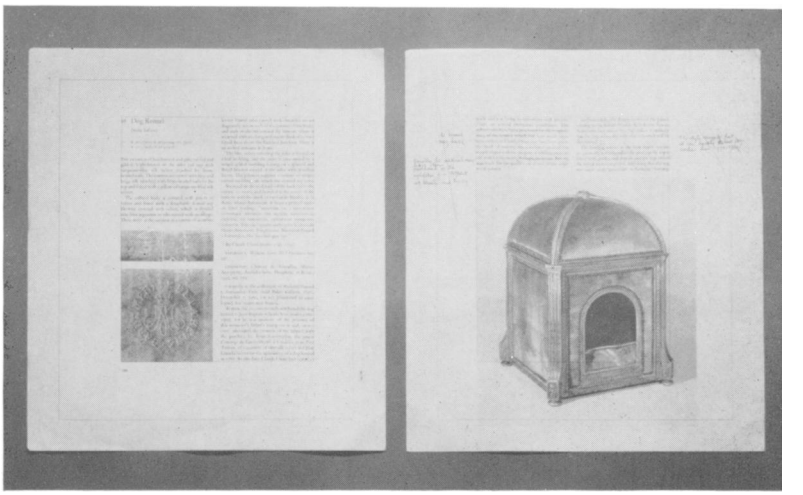

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from the columns of type before they are arranged in pages) was pulled for the laying out of the book.

To make this work of arranging the type and pictures on the 760 pages go more swiftly, we made a template, a model of two facing pages. On this were drawn the measurements for the margins, columns of type, and space between the columns, as well as the position for the page numbers and other details. Hundreds of copies of the template were printed. On these layout sheets (Figure 7), sections of the galley proofs were taped down in the exact position they would be printed in. When the extent of each entry was thus determined, we could decide on the size of the accompanying monochrome illustration, a process repeated for each of the 460 photographs (Figure 6). As hundred-page sections of the layout sheets were completed, they were sent to the printer to guide him in putting together the type and engravings in the correct relationship. On a complicated book such as this, a man will spend at least an hour "making up," as it is called, a spread of two facing pages.

The book was then proofed again, as "page proof" (Figure 8), and sent to the author for correction. The last thing we saw before the book was put between its covers were press sheets – the final printed sheets on which we could check the quality of the reproductions, and which we could fold into a semblance of the finished book.

The binding was the subject of much thought and experiment. We made up many

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sample bindings with cloths of different types in shades of red, with various eighteenth-century designs stamped on them. The design chosen includes the arms of Louis XVI on the front and his cipher, interlaced L's, on the spine – both adapted by Helmut Nickel of the Arms and Armor Department from an old French book of binding dies. After the printed sheets arrived at the bindery, end-leaves (enlarged views of the workshop of an *ébéniste* and a *doreur* from Diderot's *Encyclopédie*) were attached, and the books were encased in their bindings, dust jackets, and slipcases.

The cost of producing these volumes was inevitably higher than the selling price of fifty dollars, an amount decided upon so as not to put the catalogue out of reach of scholars and libraries. Even with this substantial price, three quarters of the edition of two thousand copies has already been sold, indicating that the catalogue fills a gap in book publishing in the United States. This was remarked by a reviewer in the *Times Literary Supplement:* "It is vouchsafed to few collectors to have the catalogue of their treasures establish itself as one of the principal handbooks for the study of the subject concerned, but this is the case with the catalogue of the French eighteenth-century furniture in the Wrightsman Collection. No student of this subject will henceforth be able to move far in this field without reference to this work of deep and extensive scholarship."

While concentrating on the functional aspect of the catalogue, we had hoped to make it pleasant to look at as well. That we succeeded is attested to by the fact that the American Association of University Presses chose this as one of the twenty-five best designed and produced books of 1966.

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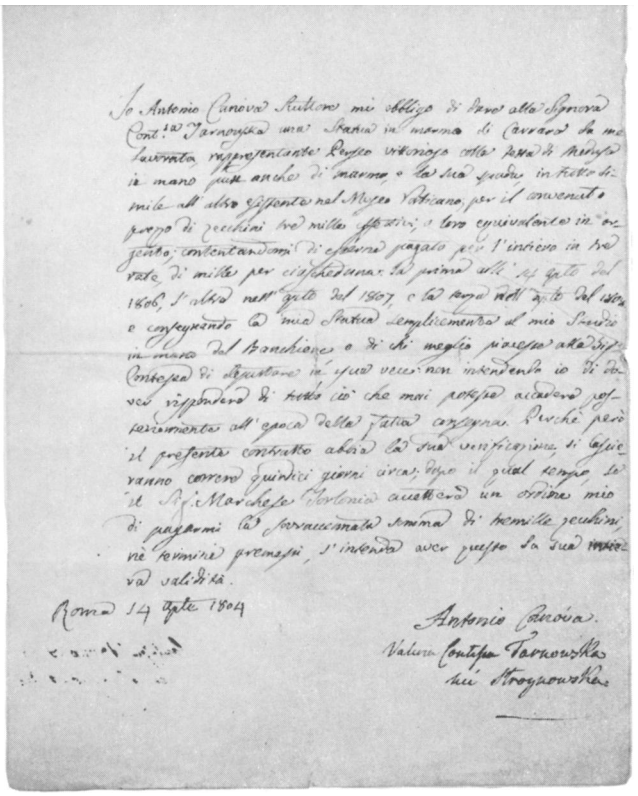
# The Tarnowska Perseus by Canova



*The following pages reproduce the photographic display that accompanied the first public showing of the Tarnowska Perseus in the Great Hall, from September 5 to October 29, 1967, together with the original contract (right) between Canova and Countess Tarnowska.*

*The captions are by Olga Raggio, Associate Curator of Western European Arts.*

## *The Legend of Perseus*

Perseus, son of Jupiter and Danäe, was sent by Polydectes, King of Seriphos, to cut off and bring home the head of the Gorgon Medusa. The king secretly hoped he would perish in the attempt, but to help Perseus in his venture, Pluto provided him with a helmet of invisibility, Mercury gave him sandals and wings, and Vulcan a sword with a diamond hook. The young hero is shown here at the very moment when, radiant with joy, he triumphantly lifts up the severed head of Medusa.

Translation of the contract between Antonio Canova and Valeria Tarnowska, Rogers Fund, 67.169

*I, Antonio Canova, sculptor, undertake to give to Countess Tarnowska a statue of Carrara marble carved by me, representing the triumphant Perseus holding the head of Medusa, also of marble, and his sword, in all similar to the other one now in the Vatican Museum, for the price agreed upon of three thousand sequins, real value, or their equivalent in silver; I will be satisfied to be paid in full in three installments, of a thousand sequins each: the first one on April 14, 1806, the second in April 1807, and the third in April 1808; – and delivering my statue simply in my studio into the hands of the Banker, or whomever the Countess shall please to delegate in her stead: since I do not intend to be held responsible for anything that might happen after the moment of my delivery. In order, however, that the present contract be confirmed, about fifteen days shall elapse; after which time, if Marquis Torlonia will accept my order to pay the aforementioned sum of three thousand sequins, within the aforesaid terms, the present contract will be understood to be wholly valid.*

*Rome, April 14, 1804*

*(Signed) Antonio Canova*
*Valeria Countess Tarnowska*
*née Stroynowska*

## *The Tarnowska Perseus, by Antonio Canova (1757-1822)*

Height 7 feet 6 inches. Fletcher Fund, 67.110

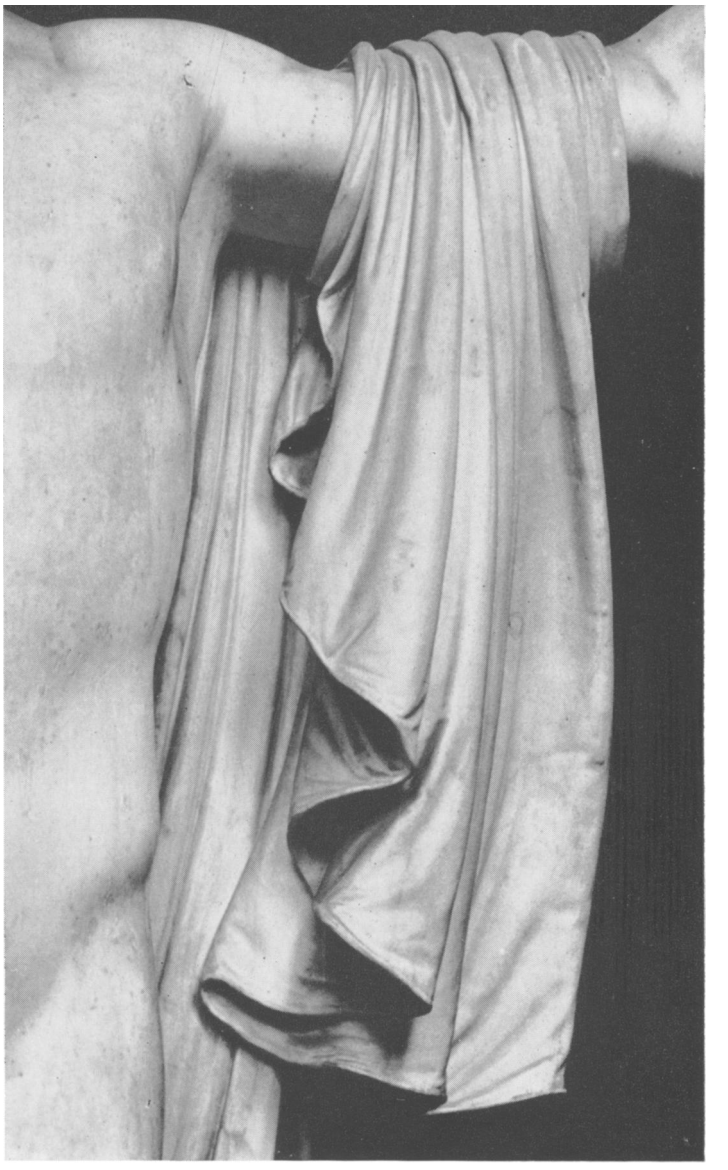
The Metropolitan's Perseus was made by Canova for the Polish countess Valeria Tarnowska, who wished to have a replica by the master's hand of his immensely popular Perseus in the Vatican. The contract for the Tarnowska Perseus was signed by Canova on April 14, 1804. The sculptor must have completed the figure by 1808. It was shipped to Poland shortly thereafter. The Tarnowska Perseus remained in the family of the counts Tarnowski-Stroinowski until 1850, when it was sold to Baron Carl von Schwarz of Vienna. From 1941 to 1967 it was on loan from the heirs of Baron von Schwarz to the city of Salzburg, where it was exhibited in the Schloss Mirabell.

## *The Vatican Perseus, by Antonio Canova*

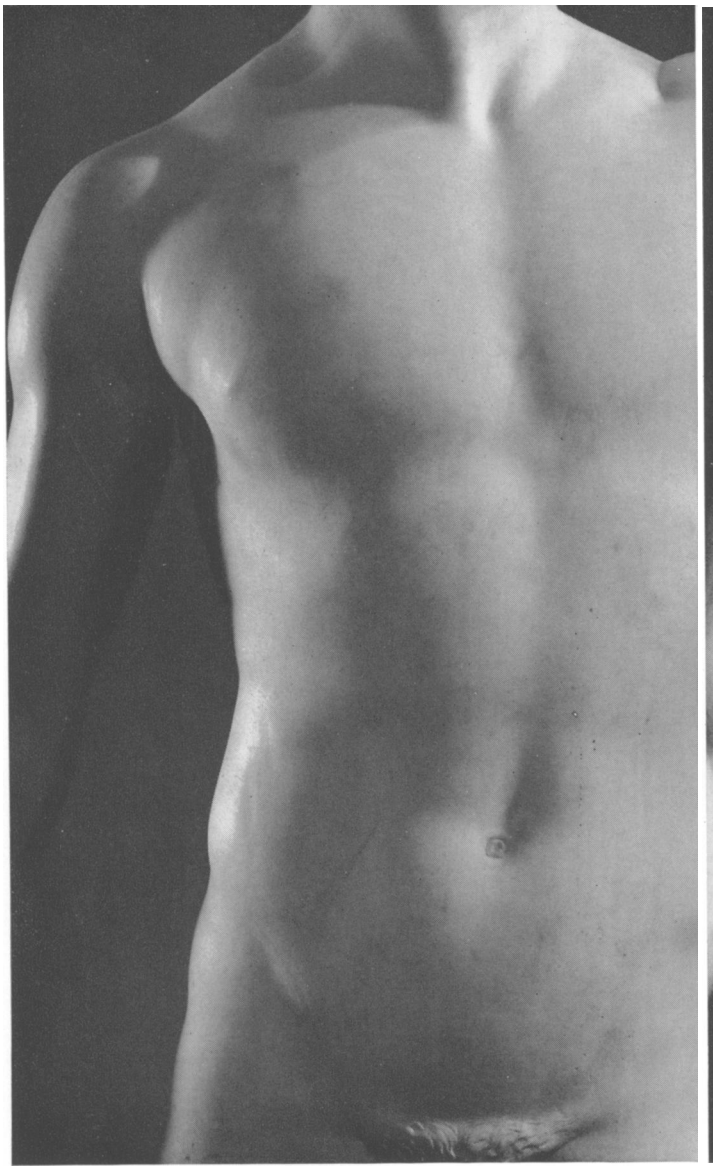
Height 8 feet 1 inch.

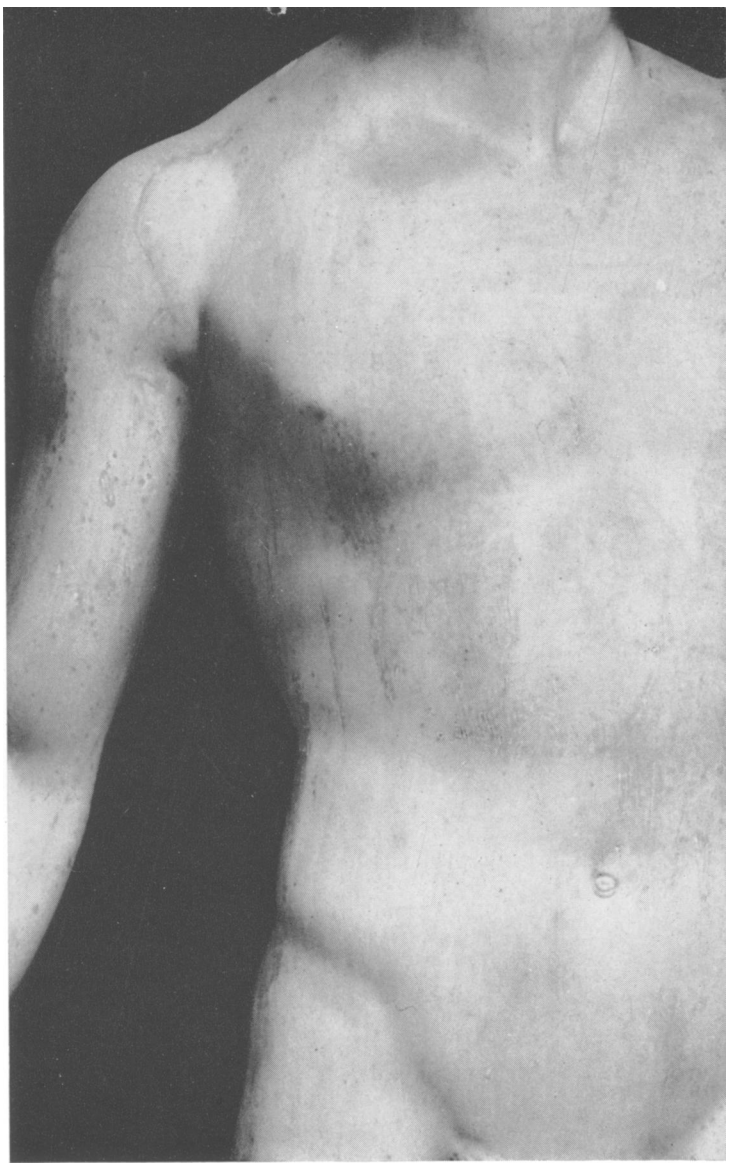
Vatican Museum, Rome. Photo: Anderson

In May 1801, Canova finished this sculpture in his studio in Rome. Although the figure had been promised to a Milanese collector, so great was the admiration aroused in Rome by Canova's work that the sculpture was not granted an export permit by the Roman authorities. Instead, it was acquired by Pope Pius VII, who had it placed in the sculpture court of the Belvedere, in the Vatican Museum – an unprecedented honor for the work of a modern sculptor.



Canova was a reflective and painstaking artist, forever in search of a perfect balance between "an exact and beautiful imitation of nature," and "the fine taste and ideal beauty of the Ancients." Sometimes – as in the case of the Vatican and of the Tarnowska Perseus – he returned to the same subject to produce what actually is not a simple replica, but a perfected version. In his autograph works, changes in the smallest detail represent a further stage of improvement. A list of autograph works dictated by Canova himself in 1816 includes the Tarnowska Perseus, described as: "Another Perseus, replica of the first one with some small changes, sent to Poland to Countess Tarnowska." The details shown here illustrate the small, but significant, changes made by the sculptor.





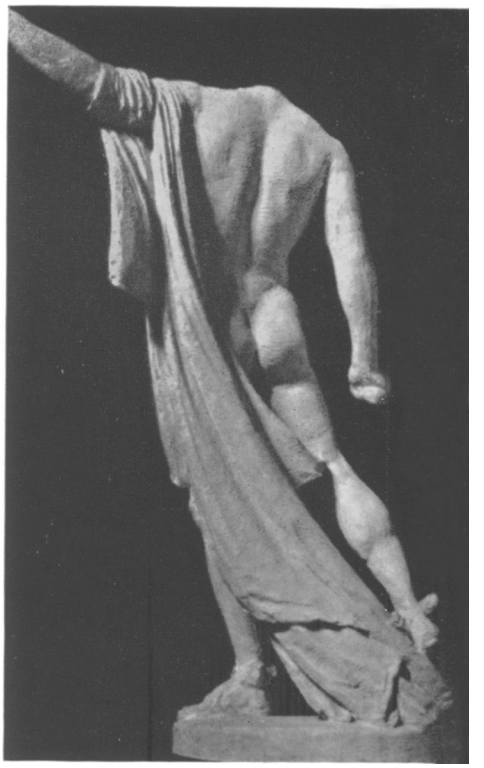
A comparison between the two draperies shows a more pronounced swing in that of the Tarnowska Perseus (opposite, left) and also a greater softness of modeling. These variations would seem to be the result of Canova's ever renewed studies of draperies from the live model.

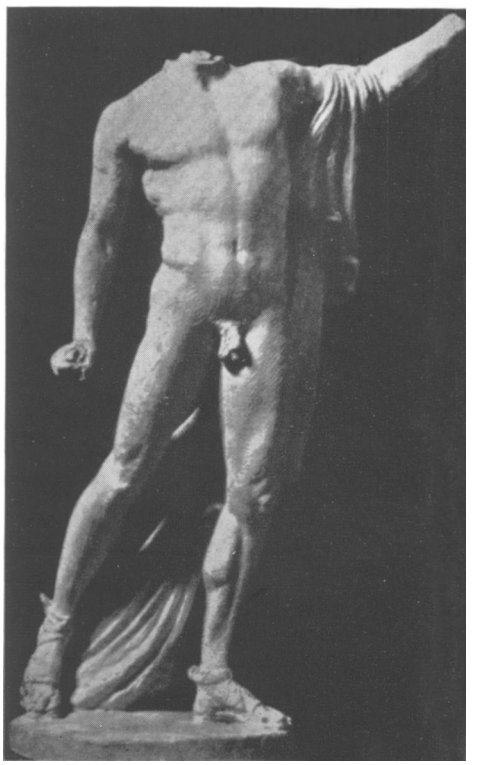
A comparison of the left sides of the Vatican and of the Tarnowska Perseus shows how, in the second version, Canova was able to do away with the marble support between the arm and the hip. In smoothing the line of the groin and the modeling of the nearby muscles he achieved a more subtly flowing contour, and a slimmer and softer figure (above, left).

## *The Apollo Belvedere*

After a Greek original attributed to Leochares. Roman, I century A.D. Vatican Museum, Rome. Photo: Anderson

Canova is said to have been inspired by this celebrated sculpture for the composition of his Perseus. A comparison of the Apollo and the Perseus seems, however, to bring out the differences almost as much as the similarities between the two figures. Canova's own definition of the creative method the sculptor should follow was: "Study nature, consult the works of the great masters of antiquity, and, after careful comparisons, arrive at your own original style."





## *Canova's Creative Method*

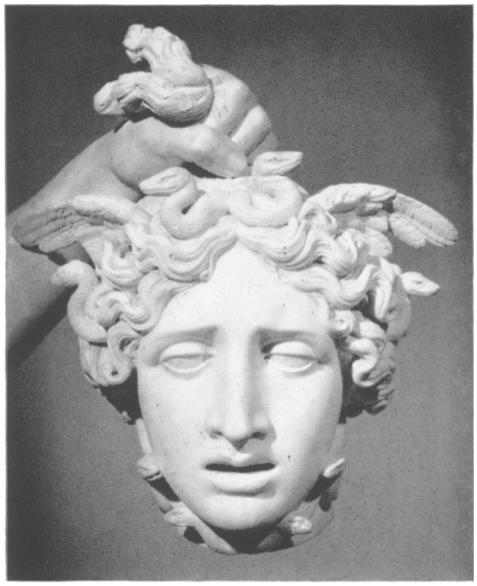
Canova always started with numerous drawings after the living model. He then studied his composition by making wax and clay sketches, and when these were thought to be satisfactory, he made a large clay model. This was normally the full size of the final marble. Once the model was finished, it was cast in plaster. The plaster model was used for pointing off the marble block, a task that was left to the studio assistants.

Once the marble was so prepared, the working up of the modeling and the finishing of the surface was carried on by Canova himself. The sculptor attached the greatest importance to these last stages and spared himself no effort in achieving the perfection he required. At the end, he often finished his work by candlelight, to be able to refine every surface transition ever so softly and so smoothly.

The first preparatory sketches of Canova, in 1799, were for a figure of Mars. In the process of work the sculptor decided to change his subject into that of a Perseus – a legendary figure who could better express the combination of heroic force and youthful grace that fascinated him as a theme.

A small plaster sketch of the Mars (opposite) is still preserved in the Canova Museum at Possagno, near Venice. It has lost its head, but it is interesting to observe the contrast between its modeling – drier and closer to the antique – and the soft, painterly effect to be observed in the Vatican and Tarnowska marbles. As can be seen in the model, the handsome sweep of the drapery that so beautifully underlines the motion of the body was from the start conceived as a support for the figure; yet the direction of the folds over the arm was radically changed in the marbles to suggest the swift, triumphant motion of Perseus, the airborne hero.

The head of Medusa is traditionally represented as a "beauty tinged with horror," her snaky locks surrounding the face that changed into stone whoever cast a glance upon it. A terracotta study for this head (right, below), by Canova, is preserved in the museum at Possagno.



# Note

One of the most admired features connected with the celebration of Christmas at The Cloisters is the traditional Christmas garden arranged in the Saint-Guilhem cloister. In December, when the out-of-door gardens are bare of bloom and foliage, it comes as a pleasant surprise to find a small green indoor garden so fresh that people often believe the plants are growing right out of the earth. The idea of having a special Christmas plant decoration for this cloister, which is covered year-round with a glass skylight, started not long after The Cloisters opened, with a simple arrangement of trees and plants in pots or tubs placed on the pebbled floor. A gift at this time from Mrs. John R. Thomas, Jr., specifically for plants in the Saint-Guilhem cloister helped make this possible, and this yearly gift has been continued by her daughter, Mrs. William B. Neergaard.

For the last ten years, the garden has looked much as it appears below and this Christmas the same basic plan will be used. Four brick-bordered beds will be set up, then filled with peat moss and covered with moss. The live plants in pots will be buried in the peat moss so that only the actual plant shows, and if a plant starts to fade it will be replaced by a new one. The Christmas garden is somewhat different each year, and we can never predict exactly all of the varieties that will be used, but there will be, among others, evergreens, lacy white heather, paper-white narcissus, Roman hyacinths, lilies of the valley, and ferns. The colors emphasized will be green and white, but there will probably be touches of blue and yellow as well.

In the Fuentidueña Chapel adjoining the Saint-Guilhem cloister, the apse will be decorated with a special arrangement of the Three Kings presenting their gifts to the Virgin and Child. The polychromed wood statues are life-size, dating from the fifteenth century. The Three Kings, originally part of an altarpiece made for the convent of Lichtenthal near Baden-Baden, Germany, have appeared in Christmas arrangements for many years, but the majestic standing Madonna and Child from Austria is a fairly recent addition to the Cloisters collection. The figures will stand on a moss-covered platform amid tall pine trees, with a bed of maidenhair fern and lilies of the valley at the feet of the Virgin and Child. Against this background, the New York Pro Musica will present its annual Christmas concert on December 21 and 22 at 2:30. The program, *Music by Fifteenth-Century Masters*, will include works of three generations of Burgundian and Flemish composers such as Guillaume Dufay, Gilles de Binchois, and Josquin des Prés.

Bonnie Young

# THE METROPOLITAN MUSEUM OF ART



## Information

THE MAIN BUILDING: Open weekdays, except Tuesdays, 10-5; Tuesdays 10-10; Sundays and holidays 1-5. Telephone TRafalgar 9-5500. The Restaurant is open weekdays 11:30-2:30; Tuesday evenings 5-9; Sundays 12-3; closed holidays. Coffee hours: Saturdays 3-4:30; Sundays 3:30-4:30.

THE CLOISTERS: Open weekdays, except Mondays, 10-5; Sundays and holidays 1-5 (May-September, Sundays 1-6). Telephone: WAdsworth 3-3700.

MEMBERSHIP: Information will be mailed on request.