

# The weight of plate in early modern inventories and secularization lists

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## Introduction

In April 1529, in response to their community's transition to the Protestant confession, members of the government in Bern, Switzerland, compiled a list of precious metalwork destined for the mint.<sup>1</sup> They were acting on orders from the previous November, when the city council decided that the gold and silver objects that had accumulated in formerly Catholic churches and institutions should be smelted down and precious stones and textiles sold off.<sup>2</sup> The divestiture of treasure, which occurred in other communities during the Reformation, was intended to reverse the root causes of corruption according to Protestant critique, which were the financial abuses and material excesses of the old church. Itemizing objects that are about *not* to exist any longer, the Bernese secularization list stands as a negative inventory that, unlike a treasury or probate inventory, signals definitively that the objects it records have been destroyed. Bearing the heading *Silver Plate Coined 1529*, this list describes accumulated vessels, reliquaries, and implements in extremely restricted terms, with no reference whatsoever to stylistic or ornamental details.<sup>3</sup> It records one attribute of these doomed forms with assiduous precision, however: their weight.

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<sup>1</sup> The secularization list, located in Bern's city archive, is printed in J. Stammeler, 'Ein bernischer Säkularisations-Rodel', *Anzeiger für schweizerische Altertumskunde: Neue Folge*, 5, 1903–4, 56–72, and in Marie Roosen-Runge (née Mollwo), 'Urkunden zur Geschichte der Berner Goldschmiedekunst', *Jahrbuch des Bernischen Historischen Museums in Bern*, 39, 1949, 30–35.

<sup>2</sup> Marie Roosen-Runge (née Mollwo), 'Beiträge zur Geschichte der Berner Goldschmiedekunst, III. Die Reformationszeit', *Jahrbuch des Bernischen Historischen Museums in Bern*, 39, 1949, 26.

<sup>3</sup> 'Silber Gschirr vermüntzet 1529', in Roosen-Runge, 'Urkunden', 30–33.

The present essay engages with the problem of this document's predominant descriptive category—the weight of individual objects—a focus that challenges the prevailing tendency in art history to overlook weight as a significant metric. Dimensions indicating size and volume—height, length, width, and diameter—appear almost as a rule in catalogue entries and image captions, but the weight of an object goes, for the most part, unmentioned. This absence reflects the predominantly visual orientation of the discipline. After all, weight cannot be experienced by purely visual means. An object must be picked up to determine its heft in the bare hand, or placed on a scale for more precise measurement. Such an operation would seem irrelevant in the case of those paintings and sculptures that hang or stand immobile in the museum, their weight mattering only to the expert handlers tasked on occasion with transporting them and the curators and technicians responsible for securing them. But for some categories of object, weight is a dimension that not only corporealizes the modern beholder's engagement with the work, but also helps to recover historical approaches to the object.

Weight has long provided a structuring descriptive system for precious metalwork because a gold or silver object's weight directly correlates to its financial value. Regardless of its current aesthetic value, metalwork can always be smelted down—literally liquidated—to bullion and sold for the current market price. In contexts in which currency was itself made of precious metal, the weight of metalwork indicated even more precisely the amount of cash that could be extracted from it. This metrological information is not, however, 'merely' financial, or beyond aesthetic or hermeneutic concerns. Instead, it concretizes the peculiar transformational qualities of gold and silver.

Recognition of precious metal's value and fluidity can be located in the vigilant systems for tracking its weight in early modern Europe. In mines and smelting works, in the goldsmith's workshop, the assayer's office, and the mint, ore and metals were constantly weighed to prevent loss and theft during processes of transformation. Inventories of households, and of sacred and secular princely treasuries, also functioned as tracking records. Weighing plate, jewelry, or other objects with significant precious metal content was an efficient method of calculating their financial value, a practice underscored by the fact that most entries of weight in inventories appeared in the local unit of account. The weights included in inventories of precious metalwork thus constituted an appraisal as well as a description.<sup>4</sup> In estimating the amount of bullion that could be extracted from a given item, such inventory entries not only identified what currently existed but

<sup>4</sup> For this reason Lorenz Seelig categorizes the appearance of weight in inventories of metalwork as *Wertangaben* (values) rather than *Maßangaben* (measurements). 'Historische Inventare—Geschichte, Formen, Funktionen', in Walter Fuger and Kilian Kreiling, eds, *Sammlungsdokumentation: Geschichte, Wege, Beispiele*, Berlin: Deutscher Kunstverlag, 2001, 27–28.

also implicitly acknowledged those forms as temporary, and thus pointed towards distinct future incarnations.

This essay uses inventories from early modern German-speaking lands to explore the recorded weight of precious metalwork from the perspective of their original contexts and modern art historical scholarship. Attending to weight in these documents, as well as weights recorded on extant objects and in relevant visual sources, helps to recover the attitude that considered precious metalwork to be fluid in its formal and financial potential, rather than stabilized as a historical artifact. The inclusion of weight in an inventory gives clues to the goals and context of the text, as well as the actions performed to produce the descriptions it contains. Liquidation or secularization lists, like the Bernese example, which record massive collections of precious metalwork on their way to the crucible, are a particularly significant subcategory of inventory that witness the drama of metalwork's instability.

In their metrological descriptions even these hastily drawn up accounts offer the historian traction on their ill-fated objects, including the possibility of estimating the size and scope of lost treasures. In closing, the essay elaborates on ways in which weight information aids modern art historical and museological method, as well as the challenges that historical metrology poses. As recorded in inventories, weight represents both an opportunity and a very particular type of epistemological limit. The 523 kilograms of precious metal extracted from Bern's churches and religious institutions represent concrete evidence with which to grapple with the confessional transformation that city experienced. Yet the ontological status of that mass—undifferentiated, extant as recycled precious metal and yet unlocatable in any surviving form—remains extremely slippery.

In recent art historical interventions, weight has emerged as a meaningful dimension in the commissioning, production, installation, and reception of early modern Western European art objects.<sup>5</sup> Weight and methods of weighing constitute an even broader cultural context than these first studies indicate, with implications for artistic practice and art markets, as well as representation. Michael Baxandall famously argued that art in Renaissance Italy responded to the particular cognitive skills of its audience, which included the ability to 'gauge' volumes by sight using principles of geometry and proportion.<sup>6</sup> But weighing, both by hand and by the

<sup>5</sup> See in particular the essays in David Young Kim, ed, *Matters of Weight: Force, Gravity, and Aesthetics in the Early Modern Period*, Emsdetten and Berlin: Edition Imorde, 2013. Further relevant contributions can be found in Mary D. Edwards and Elizabeth Bailey, eds, *Gravity in Art: Essays on Weight and Weightlessness in Painting, Sculpture and Photography*, Jefferson, North Carolina: McFarland, 2012; and Geraldine Johnson, 'In the Hand of the Beholder: Isabella d'Este and the Sensual Allure of Sculpture', in Alice E. Sanger and Siv Tove Kulbrandstad Walker, eds, *Sense and the Senses in Early Modern Art and Cultural Practice*, Farnham, UK: Ashgate, 2012, 192, 197n45.

<sup>6</sup> Michael Baxandall, *Painting and Experience in Fifteenth-Century Italy*, Oxford: Clarendon Press, 1972, 30.

scale, and calculating and converting mass were also important cognitive skills.<sup>7</sup> They structured not only the higher-level transactions of international merchants, but also the purchase of both luxuries and day-to-day provisions at every level of society, as well as the payment of taxes and customs duties.

The turn in recent scholarship to ‘matters of weight’ would benefit from a deepening knowledge of the methods and meanings of weighing in the early modern period, particularly when it came to assessing and tracking gold and silver, materials on which contemporary currencies were based. David Young Kim has recently made note, for example, of inventories that include the weight of some elaborate gowns in late sixteenth-century Florence, arguing that weight was a significant attribute of luxurious clothing, conveying majesty and gravitas and ‘informing . . . the carriage of early modern individuals’.<sup>8</sup> To these assertions could be added the observation that the unusual inclusion of the dresses’ weights in the inventory was surely motivated by their silver and gilt silver embroidery, which made them not only heavy, but intensely valuable, and fungible, financial assets.<sup>9</sup>

The appearance of metrological information in the Florentine inventory is one instance of the broader practice of carefully tracking precious metals in all forms. Gold and silver were crucial, economy-structuring materials, but they were also highly unstable, prone to smelting, alloying, and subtraction. Careful weighing helped ensure that quantity and purity were maintained through transit, whether the physical transportation of goods over land and sea, the circulation of currency, or the transformation of material in the furnace or at the artisan’s workbench.

### **A note on weight**

Approaching extant examples of metalwork, coins, and even raw metal with the cognitive tools of their makers and users entails recovering the systems within which gold and silver were so vigilantly monitored. Metrological systems refer to the set of standards and the methods used to measure everything from length, area, volume, and mass to time itself in a given culture. This section provides an extended

<sup>7</sup> Johnson, ‘In the Hand’, 182.

<sup>8</sup> David Young Kim, ‘Why Weight? The Heaviness of Art and Narrative Force’, in Kim, *Matters of Weight*, 9–10.

<sup>9</sup> Elizabeth Currie, ‘Clothing and a Florentine Style, 1550–1620’, *Renaissance Studies*, 23, 2009, 38n16. On the relative weight and value of gold threads to the price of fifteenth-century brocades, see Rembrandt Duits, ‘Figured Riches: The Value of Gold Brocades in Fifteenth-Century Florentine Painting’, *Journal of the Warburg and Courtauld Institutes*, 62, 1999, 64–65. For the unpicking or burning of textiles to extract their precious metal content see Evelin Wetter, ‘Issues of Negotiation: Church Treasures and Political Claims in the Mark Brandenburg’, in Zoë Opačić and Achim Timmermann, eds, *Image, Memory and Devotion: Liber Amicorum Paul Crossley*, Turnhout: Brepols, 2011, 279–281; and Thomas Campbell, *Tapestry in the Renaissance: Art and Magnificence*, New York: Metropolitan Museum of Art, 2002, 6.

‘Note on Weight’ for early modern inventories of plate, expanding the view beyond mere conversion tables designed to make historical currencies and measurements legible for modern readers to include the practical processes and intellectual frameworks that informed the weighing of gold and silver, as well as the methodological issues involved in resuscitating dead measures.

Much of the world now relies on the metric system, but up until the eighteenth century Europeans employed a wide variety of metrological systems that varied by region and the context of measurement.<sup>10</sup> The standardization of units was also more complex because different measures were used to weigh meat and medicine, wax and metal ores, yarn, lard, and gold, among other commodities. Even units with the same name had different values for different goods: in fourteenth-century Cologne, for example, a hundredweight of yarn weighed 106 pounds, a hundredweight of iron 120 pounds.<sup>11</sup> The goal of historical metrology is to recover and explicate these standards so that they can be used to interpret surviving documents more accurately.<sup>12</sup>

The weight of precious metal objects in much of German-speaking Europe was expressed in terms of the *mark*, a unit of mass used specifically for gold and silver that was also a currency in some regions.<sup>13</sup> A single mark could be subdivided into 16 *lot*. The mark also served as a unit or money *of account*, a term for a measurement of value usually used only for accounting purposes. Actual transactions were made in local currencies, mediums of exchange that had a fluctuating relationship to the standard money of account. For this reason money of account is sometimes described as ‘ghost’ or ‘imaginary’ money, as the units did not correspond to actual coins.<sup>14</sup> Precious metal was often weighed and valued in terms of mark and lot, but was purchased, depending on the period and location, in currencies like guilders, ducats, and kreutzers.

<sup>10</sup> Ronald Edward Zupko, *Revolution in Measurement: Western European Weights and Measures Since the Age of Science*, Philadelphia: American Philosophical Society, 1990, 3–24.

<sup>11</sup> Bruno Kisch, *Gewichte- und Waagemacher im alten Köln*, Cologne: Verlag Der Löwe, 1960, 26.

<sup>12</sup> See the reference books by Ronald Edward Zupko, including, *Italian Weights and Measures from the Middle Ages to the Nineteenth Century*, Philadelphia: American Philosophical Society, 1981; and *A Dictionary of Weights and Measures for the British Isles: The Middle Ages to the Twentieth Century*, Philadelphia: American Philosophical Society, 1985. A representative study of German regional metrology is Harald Witthöft, *Umriss einer historische Metrologie zum Nutzen der wirtschafts- und sozialgeschichtlichen Forschung: Maß und Gewicht in Stadt und Land Lüneberg, im Hanseraum und im Kurfürstentum/Königreich Hannover vom 13. bis zum 19. Jahrhundert*, 2 vols, Göttingen: Vandenhoeck & Ruprecht, 1979.

<sup>13</sup> For an overview of this measurement, see Fabian Stein, ‘Weights on Continental silver’, *The Silver Society Journal*, 9, 1997, 576–578.

<sup>14</sup> This explanation of money of account follows Peter Spufford, *Money and its Use in Medieval Europe*, Cambridge: Cambridge University Press, 1988, 411–414.

‘Translating’ marks, lot, and other units to their modern equivalents may necessitate only simple calculations using established conversions.<sup>15</sup> But the use of historical measures to analyze extant documents still presents challenges. Attempts at conversion can run into philological problems, especially in cases where the standard for a given unit is not satisfactorily recoverable, or when multiple standards existed under the same unit term. The mark, for example, varied greatly by region. The mark of Cologne, a commonly used standard, was 233.856 grams, whereas the mark of Prague was closer to 250 grams.<sup>16</sup> Arriving at an accurate understanding of a recorded weight demands the correct application of these varying standards.

Furthermore, though conversion of one unit into another is possible, the units themselves and the numeric systems in which they operated—duodecimal versus decimal, for example—are never entirely interchangeable. Witold Kula has contrasted ‘representational’ measures, those deriving from the human body and its experience, to abstract, purely conventional measures like the metric system.<sup>17</sup> These two approaches to metrology each have their advantages and remain incommensurable, constituting something akin to Baxandall’s ‘period eye’, a system that shapes the viewer’s perception of and interaction with the world around him.<sup>18</sup> Over time and with changes in technology, representational measures often become abstract for their users. As Peter Spufford has noted of the carat, a measure derived from the carob seed, ‘Modern men and women are normally unaware that the diamonds and gold of their engagement and wedding rings are being measured in terms of ancient East Mediterranean locust beans’.<sup>19</sup>

So, while dry tabulations of mass may be easily glossed over as objective observations requiring little contextualization or interpretation, in fact they reflect the complex culture in which their units of measure were developed and used. Moreover, behind every entry of weight in an inventory lies an act of weighing: a person picking up the object and measuring it using a set of tools.<sup>20</sup> Though subject to standards and regulation, the practice of weighing was influenced at every stage

<sup>15</sup> See for example Hans-Joachim von Alberti, *Mass und Gewicht: Geschichtliche und tabellarische Darstellungen von den Anfängen bis zur Gegenwart*, Berlin: Akademie Verlag, 1957.

<sup>16</sup> von Alberti, *Mass und Gewicht*, 380–381.

<sup>17</sup> For example, the hectare provides an abstract immutable standard for measuring land, but it cannot convey what the older measure did, which was to describe an area by the length of time it took a man to plough it, or the amount of seed required to plant it. These older measurements adjust for soil quality and also allow the swift calculation of production, which the hectare cannot do. Witold Kula, *Measures and Men*, trans. S. Szreter, Princeton: Princeton University Press, 1986, 35.

<sup>18</sup> Baxandall, *Painting and Experience*, 30. Like Baxandall, Kula was arguing for a social history approach, in this case to metrology.

<sup>19</sup> Peter Spufford, *Money and its Use*, 7n1.

<sup>20</sup> Though as some examples below suggest, that act of weighing may have occurred long before the inventory and its results copied from previous records.

by individual human bodies and by the methods and instruments of measurement then current.<sup>21</sup> Examining inventories with recorded weights means attempting to excavate these acts of weighing, to give accounts of numbers and units dimensions of time and movement, as well as the influence of a human actor (Fig. 1).



Figure 1 Adriaen Isenbrant, *Man Weighing Gold*, 1515–1520. Oil on wood, 50.8 x 30.5 cm, with added strips of 4.5 cm at left and right. New York: Metropolitan Museum of Art. The Friedsam Collection, Bequest of Michael Friedsam, 1931 (32.100.36).

Such activities are given further representational significance in contemporaneous depictions, as in the case of a portrait of a man and woman from the 1560s that pictorializes and narrativizes the act of weighing as well as the system by which precious metalwork was valued and tracked in the early modern period

<sup>21</sup> On weight as ‘a phenomenon, derived . . . from bodily relations’, see Mateusz Kapustka, ‘Pictorial Gravities: Objecthood, Authority, and Artistic Invention in Albrecht Dürer’s *Veronicas*’, in Kim, *Matters of Weight*, 89.

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(Fig. 2).<sup>22</sup> Unlike more common scenes in which sitters use a balance to test the correct weight of a coin, here a silver lidded cup is being weighed using a set of Nuremberg nesting weights.<sup>23</sup> The cup's shiny, ornamented form balances carefully across the narrow diameter of the right-hand brass pan, while one of the nested weights placed in the left pan proves slightly heavier. The man holds the balance firmly between thumb and forefinger from its tasseled end; the angle of the beam and the position of the 'tongue' or upright indicator demonstrates the slight discrepancy between the cup and the calibrated weight and implies that a smaller



Figure 2 Nicolas Neufchatel (attr.), *Portrait of an Assay Master and his Wife*, c. 1561–7. Oil on wood, 93.3 x 102.5 cm. Private Collection. Photo © Christie's Images / Bridgeman Images.

weight will be needed to achieve equilibrium. It is unclear, however, with what purpose the male sitter weighs the silver cup. Is he assaying it for purity, as the

<sup>22</sup> Attributed to Nicolas Neufchatel. *Important and Fine Old Master Pictures*, London: Christie's, 7 July 1995, 104–105, no. 64.

<sup>23</sup> On nesting weights, see Ellen Zak Danforth, *Nesting Weights, Einsatzgewichte and Piles a Godets: A Catalog of Nested Cup Weights in the Edward Clark Streeter Collection of Weights and Measures*, Hamden, Connecticut: Archon Books, 1988. On depictions of weighing coins, see Larry Silver, *The Paintings of Quinten Massys*, Montclair, New Jersey: Allanheld & Schram, 1984, 136–138, 211–212, no. 16.

given title of the painting suggests?<sup>24</sup> Or is the cup raw material for a smith to remake? Or is it being put up as pawn or payment? Regardless, the gold and silver coins scattered beneath the left pan suggest the valuation and potential conversion implicit in the weighing of precious metalwork. The beam of the scale forms a bridge between the silver cup and a physical weight, and proposes an eventual translation into currency.

### Tracking metal by weight

A ledger with blank pages appears to the left of the weigher in this sixteenth-century tableau, triangulating the pile of coins and the stack of weights (Fig. 2). Its inclusion within the tight series of depicted objects indicates the importance of written accounting in the weighing of precious metals. Throughout recorded history weight has been used to describe plate in documents that note vulnerable moments of transmission, like donation, exchange, and processing, meaning the creation of new objects or the liquidation of old ones.<sup>25</sup> Recorded weights permitted finished objects to be examined for loss over time, whether through theft, damage, or the more gradual depletion caused by polishing and wear.<sup>26</sup> Weights appear in the logs and account books of those individuals handling precious metal, currency, and plate, as well as in inventories and other documents of possession. These entries demonstrate that weight structured the way early modern beholders understood, interacted with, and valued precious metalwork both financially and symbolically.

Obtaining and documenting the weight of precious metalwork accurately was particularly decisive for rituals of gift giving and competition.<sup>27</sup> Hugo van der Velden has detailed the significance of weighted gifts in the Burgundian Netherlands, where donors occasionally gave their weight in consumptive gifts, including precious metal, or in the form of precious metal votive sculptures.<sup>28</sup> In later secular contexts, broadsheets advertising the prizes for shooting contests and lotteries in the sixteenth and seventeenth centuries illustrated visual inventories of

<sup>24</sup> The male sitter has been described as an 'assay master', but without a firm identification of the coats of arms in the painting that association is speculative. *Important and Fine Old Master Pictures*, 105.

<sup>25</sup> Elizabeth A. Meyer, *Metics and the Athenian Phialai-Inscriptions: A Study in Athenian Epigraphy and Law*, Stuttgart: Franz Steiner Verlag, 2010, 57, 66; and Raymond Davis, *The Book of Pontiffs (Liber pontificalis): The Ancient Biographies of the First Ninety Roman Bishops to AD 715*, Liverpool: Liverpool University Press, 1989, 14 and passim.

<sup>26</sup> Guy MacLean Rogers, *The Sacred Identity of Ephesos: Foundation Myths of a Roman City*, London: Routledge, 1991, 159, 165.

<sup>27</sup> On diplomatic gifts of 'liquid assets' dependent on weight, including precious metalwork, see Valentin Groebner, *Liquid Assets, Dangerous Gifts: Presents and Politics at the End of the Middle Ages*, trans. Pamela E. Selwyn, Philadelphia: University of Pennsylvania Press, 2002.

<sup>28</sup> Hugo van der Velden, *The Donor's Image: Gerard Loyet and the Votive Portraits of Charles the Bold*, Turnhout: Brepols, 2000, 196, 214, 238, 253–261.

the plate and coin to be won (Fig. 3). The depicted rows of cups and *tazze*, spoons and sacks of coins, could not have functioned as financial incentives without the inclusion of their weights, which appeared in separate texts or, as here in a lottery sheet from Hamburg in 1612, directly on each item.<sup>29</sup>



Figure 3 Detail of a broadsheet advertising the Hamburg Lottery of 1612. Engraving. Hamburg: Staatsarchiv.

In some contexts an object's weight was actually engraved across its surface for all to see, a phenomenon that remains merely fictive in this print. Donors of ecclesiastical metalwork sometimes flaunted the weight of their gifts as a way to quantify their munificence and prevent theft through gradual depletion.<sup>30</sup> A late sixteenth-century standing cup and cover given to a church in Worcestershire, England, for example, bears its donor's name and the line 'The Wth of this Cup and Cover is 15oz. 15d. 00g' (Figs. 4a and 4b).<sup>31</sup> The abbreviations refer to standard

<sup>29</sup> On the Hamburg lottery, see Bruno-Heinz Weichert, *350 Jahre Staatslotterie, 1612–1962*, Hamburg: Nordwestdeutsche Klassenlotterie, 1962.

<sup>30</sup> See for example Francisco Stastny, 'Platería Colonial, un Trueque Divino', in Paloma Carcedo and others, *Plata y Plateros del Perú*, Lima: Patronato Plata del Perú, 1997, no. II-179. Such external pronouncements of an object's weight should not be confused with scratch weights, which usually appeared on undersides and, as their name suggests, were not formal inscriptions.

<sup>31</sup> *Catalogue of Silver Treasures from English Churches: An Exhibition of Ecclesiastical Plate of Domestic Origin at Christie's, January 5 to 30, 1955*, London: Claridge, Lewis & Jordan, 1955, no. 54. I thank the Reverend Canon Nick Wright of St. Peter's, Inkberrow, for providing

English units for coin and precious metal, troy ounces, pennyweights, and grains, altogether about 489.9 grams. The inscribed weight not only concretized the value of the donor's gift, it likely served as a primitive tracking device meant to prevent the separable component of the lid from going missing.



Figures 4a and 4b Inscription from the lip of a gilt silver standing cup, 1592. Inkberrow, Worcestershire: St. Peter's. Photos courtesy of the Reverend Canon Nick Wright.

Such advertisement of the weight and implied value of ecclesiastical plate drew criticism in the context of sixteenth-century confessional reform, as Christians reevaluated the ethics of church treasure. Erasmus of Rotterdam satirized precisely this practice in a colloquy written against pilgrimage in 1526. There a character describes a church visit during which a custodian 'shows us gold and silver statues. . . . He adds the weight and worth of each, and the name of the donor', a clear evocation of the worldliness Erasmus found objectionable in the church.<sup>32</sup> Erasmus's enemies used the weight of precious metalwork in turn to publically shame him, identifying him as a hypocrite who preached humility but enjoyed material luxuries. Archbishop Albrecht of Brandenburg sent Erasmus a piece of plate accompanied by a letter from his secretary describing it as 'a silver-gilt bowl of *very great weight* . . . you will hold it as a gift not unworthy of a prince'. The letter was published before Erasmus received the bowl, thus denying him the right of private refusal.<sup>33</sup>

In moments of molten transformation precious metal demanded extra vigilance when it came to tracking weight and purity. Episodes from the *Vita* of Eligius, the patron saint of goldsmiths, exemplify the proper treatment of valuable

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photographs of this inscription, and Anne Callahan for helping to prepare them for publication.

<sup>32</sup> 'A Pilgrimage for Religion's Sake', in *The Colloquies of Erasmus*, trans. Craig R. Thompson, Chicago: The University of Chicago Press, 1965, 303; and van der Velden, *The Donor's Image*, 238.

<sup>33</sup> Emphasis mine. Lothar Schmitt notes that it was unusual to refer to the monetary value of a gift in this way. Lothar Schmitt, 'Der Nachlass des Erasmus von Rotterdam, Grundstock des Amerbach-Kabinetts', in *Die grosse Kunstkammer: Bürgerliche Sammler und Sammlungen in Basel*, Basel: Christoph Merian, 2011, 32.

materials for members of his craft and continued to circulate in text and image through the early modern period.<sup>34</sup> The smith's superior skill allowed him to be both thrifty and scrupulously honest. His first miraculous act involved the production of two thrones with the same amount of gold most artisans would require for one. Eligius explained that he made the second throne 'from the gold which I might have lost through negligence'.<sup>35</sup> The smith's two thrones amazed his patron, the hagiographer explains, because 'he could do it all . . . without any fraud or mixture of siliquae [small silver coins], or any other fraudulence. Not claiming fragments bitten off by the file or using the devouring flame of the furnace for an excuse'.<sup>36</sup> The 'leakage' of precious metal—gold thinned out by alloying, filings lost between the floorboards, or grains consumed in the furnace—were all real perils of the workshop.<sup>37</sup> But they could also be, as the hagiographer implies, excuses for theft.<sup>38</sup>

Eligius's patron demonstrated his high esteem for the smith by 'turn[ing] over to him a huge heap of gold and silver and gems *without even weighing them*'.<sup>39</sup> By contrast, surviving contracts between patrons and smiths from the later middle

<sup>34</sup> Painted portrayals of Eligius were commonly commissioned by goldsmiths' guilds throughout Europe into the seventeenth century. The smith's life, known through an account by his contemporary, Dado, Bishop of Rouen, was included in William Caxton's 1483 version of Jacobus de Voragine's *Golden Legend*, in which Eligius produces two saddles instead of two thrones. F. S. Ellis, ed, *The Golden Legend or Lives of the Saints*, London: Temple Classics, 1900. Archived online at Medieval Sourcebook, The Golden Legend: Volume III, Fordham University, <http://www.fordham.edu/halsall/basis/goldenlegend/GoldenLegend-Volume3.asp>, accessed 9 November 2014. The earlier *Life* is also available online: *Vita S. Eligius*, trans. Jo Ann McNamara, Medieval Sourcebook: The Life of St. Eligius, 588-660, Fordham University, <http://www.fordham.edu/halsall/basis/eligius.asp>, accessed 14 January 2014.

<sup>35</sup> *Vita S. Eligius*, Book I, Chapter 5.

<sup>36</sup> *Vita S. Eligius*, Book I, Chapter 5. Cynthia Hahn has compared this miracle to one in which Jesus lengthens the wood for a bed that had been measured and cut too short. Stretching wood seems to be a much more supernatural act than 'stretching' the very malleable material of gold. Instead Eligius's creation of the second throne emphasizes his honest treatment of a valuable, and easily corrupted, material. Cynthia J. Hahn, *Strange Beauty: Issues in the Making and Meaning of Reliquaries, 400-c. 1204*, University Park: Pennsylvania State University Press, 2012, 33.

<sup>37</sup> For example, a fourteenth-century German merchant lost part of his bullion at the Venetian mint when a crucible exploded and 'molten gold was thrown onto the walls of the hearth'. The gold was cleaned up and recast, to find a loss of 180 grams, which the mint had to repay. Alan Stahl, *Zecca: The Mint of Venice in the Middle Ages*, Baltimore: Johns Hopkins University Press, in Association with the American Numismatic Society, 2000, 129, 256, 327.

<sup>38</sup> Stahl catalogues a number of such abuses at every step in the processing of gold and silver, from the loss of metal in smelting, to the cutting of silver filings with copper and the outright theft of blanks and minted coins. Stahl, *Zecca*, 73, 327, and *passim*.

<sup>39</sup> Emphasis mine. *Vita S. Eligius*, Book I, Chapter 9.

ages usually mention the amount of metal to be devoted to a given commission, and smiths were paid based on weight and the complexity of the final product.<sup>40</sup> Medieval inventories of smiths often recorded the weight of finished pieces at 'about a third more than the weight of the metal, to account for the workmanship', according to Marian Campbell.<sup>41</sup>

To give a smith precious raw materials without first measuring them meant trusting him to track and use the correct amount. Extant workshop documents show how weight informed the design and production of metalwork. A sixteenth-century drawing of a secular vessel from the former Amerbach Cabinet in Basel exemplifies the circulation of metrological information among craftsmen (Fig. 5). The drawing, in two pieces, shows the design for a cup that the goldsmith was meant to follow.

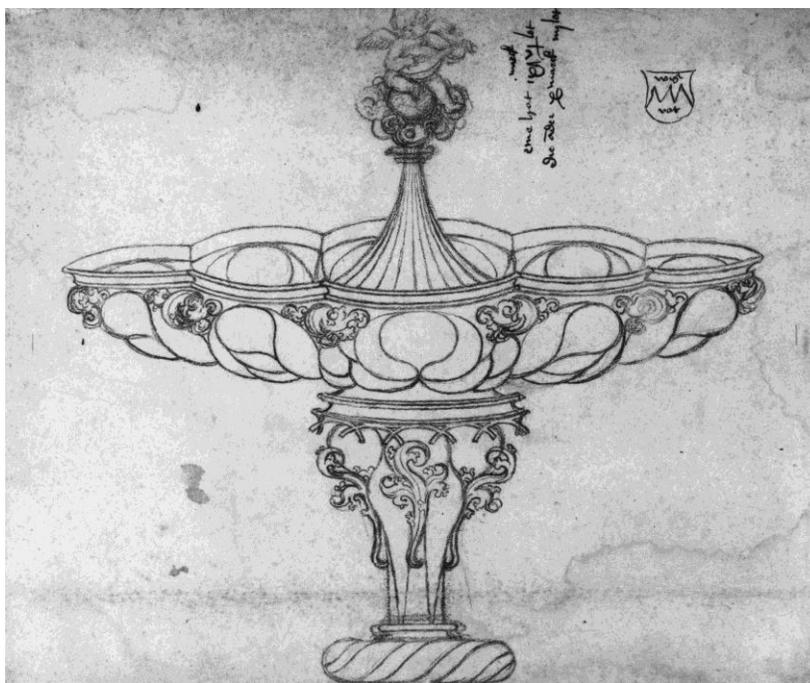


Figure 5 Open standing cup on high foot, sixteenth century. Drawing in two parts (showing upper part only), black chalk on paper, 26.6 x 31 cm. Basel: Kunstmuseum, Kupferstichkabinett (U.XII.34). Photo: Martin P. Bühler.

<sup>40</sup> See Marian Campbell, 'Goldsmiths' Tools and Workshops: The English Documentary and Archaeological Evidence: AD 1100 to 1500', in Christiane Élèure, ed, *Outils et ateliers d'orfèvres des temps anciens*, Saint-Germain-en-Laye: Société des amis du Musée des antiquités nationales et du château de Saint-Germain-en-Laye, 1993, 220. For a discussion of contracts and remuneration for goldsmiths' labor in later medieval Germany and France, along with further bibliography, see Heather C. McCune Bruhn, 'Late Gothic Architectural Monstrances in the Rhineland, c. 1380–1480: Objects in Context', PhD Diss., Pennsylvania State University, 2006, 55–71.

<sup>41</sup> Marian Campbell, 'Metalwork in England, c. 1200-1400', in Jonathan Alexander and Paul Binski, eds, *Age of Chivalry: Art in Plantagenet England, 1200-1400*, London: Royal Academy of Arts, 1987, 167.

An inscription gives the weight of each section, thus indicating the cup's eventual size: 'one has nine marks six lot, the other ten marks 4 lot'.<sup>42</sup> In cases in which a patron had given raw material to the smith, the completed object would be weighed to verify that the full amount, minus a reasonable loss for processing, remained.

Ensuring that the actual weight of precious metal matched its stated weight was a serious moral issue related to anxieties about devalued currency. A fourteenth-century treatise on money by the philosopher and theologian Nicholas Oresme responded to contemporary debasement scandals using arguments based in Aristotle and other ancient sources. His text, *De moneta*, which circulated in manuscript copies and appeared in print in 1484 and 1511, remains a standard source for understanding pre-modern monetary theory and political economy.<sup>43</sup> Oresme described the practice of devaluing coinage, i.e. decreasing its weight without the user's knowledge, as not only corrupt and unjust, but also a semiotic transgression. Debasement creates a situation in which, he wrote, 'it is necessary to call something which in truth is not a penny, a penny, and which is not a pound, a pound . . . this is no less than to disturb the order of nature and of reason'. He continued, quoting a late antique source:

You cannot by any means use the names of whole units and yet make fraudulent deductions. Is not such a violation . . . plainly a cruel and disgraceful wound to truth itself? Weight and measure are the first things to prove, for all is chaos where there is deceit in the unit of measurement.<sup>44</sup>

Careful weighing was the only way to ensure the unassailability of the monetary unit on which the entire economy depended.

Coinage allows precious metal to circulate 'by tale' (number) rather than by weight, but depends on widespread confidence that coins really contain the material value they purport to. In practice, however, gold and silver coins were weighed to test their conformity; in transactions involving large amounts of coins, weighing also saved the trouble of counting. The boundaries between bullion, which circulated by weight, and coinage, which circulated by tale, were thus fluid, a situation that troubled some medieval legal debates. According to contract law, the

<sup>42</sup> 'eine hat ix marck vi lot—die äder x marck iiij lot'. Tilman Falk, *Katalog der Zeichnungen des 15. und 16. Jahrhunderts im Kupferstichkabinett Basel: Teil I, Das 15. Jahrhundert, Hans Holbein der Ältere und Jörg Schweiger, Die Basler Goldschmiederrisse*, Basel and Stuttgart: Schwabe, 1979, 145, no. 588.

<sup>43</sup> *The De moneta of Nicholas Oresme, and English Mint Documents*, trans. Charles Johnson, London and New York: Nelson, 1956, xvi.

<sup>44</sup> *The De moneta of Nicholas Oresme*, 26.

repayment of loans ordinarily had to be in kind, so a borrower of wine had to be repaid with wine of the same quality. The question arose as to whether coins could be used to repay a loan of bullion. Was not bullion a different *genus* than coin? In the mid-twelfth century one scholar made a lexical case for their convertibility, arguing that

wool and cypress-wood and similar things lose their name when they are given form. But metals even when they are shaped can return to their raw mass and do not lose their name. For a ring is no less called 'gold' than 'golden'; but clothes are never called 'wool', but 'woollen', and a ship is called 'wooden', not 'wood'.<sup>45</sup>

This understanding, that 'gold' and 'silver' equally described the full spectrum of precious metal objects, from coins to cups to ingots, and that objects of the same purity were interchangeable by weight, undergirded the evaluation of precious metals in many contexts, from mining to paying a ransom, or putting up goods for pawn.

### **The weight of plate in inventories and secularization lists**

Precious metals have left, as Philippa Glanville put it, 'a richer paper-trail than any other material, since owners, corporate or private, took the precaution of weighing and recording every piece'.<sup>46</sup> Inventories form a prime component of this rich paper trail, evidencing the valuation of metalwork for present accounting purposes and possible future liquidation. Yet despite the high value of gold and silver and the care with which it was often tracked in Western Europe, early modern inventories did not always record weight measurements for plate. Some inventories identify various precious metal wares with simple verbal descriptions. Others include weights inconsistently, for certain objects but not others. The inclusion or exclusion of weight as a significant descriptor can elucidate the circumstances in which an inventory was compiled.<sup>47</sup>

The process of weighing was time-consuming, requiring tools and expertise that were not always available on short notice. Goldsmiths, craftsmen intimately familiar with measuring the mass and value of their materials, were sometimes

<sup>45</sup> This passage by Rogerius quoted in Thomas J. Sargent and François R. Velde, *The Big Problem of Small Change*, Princeton, Princeton University Press, 2003, 78.

<sup>46</sup> Philippa Glanville, 'Introduction', in Philippa Glanville, ed, *Silver*, London: Victoria and Albert Museum, 1996, 7.

<sup>47</sup> Mariah Proctor-Tiffany, 'Portrait of a Medieval Patron: The Inventory and Gift Giving of Clémence of Hungary', PhD diss., Brown University, 2007, 46.

involved in producing inventories outside of their workshops.<sup>48</sup> Their own workshop inventories often include scales, an essential device that was regulated by law and sometimes forbidden for citizens to have in their homes.<sup>49</sup> In rare cases treasury inventories mention weighing instruments, perhaps indicating their use in determining the weight of plate.<sup>50</sup> Without specific identification of the person responsible for weighing, it is not always clear how the weights in inventories were arrived at, whether they were achieved using a balance like that employed in the portrait discussed above (Fig. 2), or copied from other documents, like the slips of paper that accompanied some objects in early modern *Wunderkammern*.<sup>51</sup> The Bernese secularization list includes a note in a later hand that a man ‘brought four gilded and three white (silver) chalices that, with their patens, came to 13 marks, 6 lot *hand-weighed*’.<sup>52</sup> This designation appears only one other time in the list; it might have indicated that he had weighed the plate himself, or that it was otherwise estimated.

Inventories that do not mention the weight of precious metalwork suggest either that the process of weighing was too burdensome for the particular compiler, or that the threat of alienation of such objects seemed distant. In certain cases metrological information was added at a later date, perhaps in response to financial pressure on owners who suddenly needed to quantify the available ‘liquidity’ their collections of plate represented. The late Gothic and Renaissance plate owned by the Lobkowitz princes of Schloss Raudnitz near Prague was destroyed over the course of the centuries, but a visual inventory produced between 1650 and 1660 offers a great amount of detail about the once rich collection, enough even for attribution in

<sup>48</sup> Bruhn, ‘Late Gothic Architectural Monstrances’, 61n19.

<sup>49</sup> See Campbell, ‘Goldsmiths’ Tools and Workshops’, 219–220; and Kisch, *Gewichte- und Waagemacher*, 30.

<sup>50</sup> A fourteenth-century papal inventory included a calibrated copper weight (*Item 1 pondus de cupro ad ponderandum*), whose presence therein remains unexplained. Lucas Burkart, ‘Das Verzeichnis als Schatz: Überlegungen zu einem *Inventarium Thesauri Romane Ecclesie* der Biblioteca Apostolica Vaticana’, *Quellen und Forschungen aus Italienischen Archiven und Bibliotheken*, 86, 2006, 151, 205. Later princely wonder cabinets contained a variety of weighing instruments, as prescribed in *The First Treatise on Museums: Samuel Quiccheberg’s Inscriptiones 1565*, trans. Mark A. Meadow and Bruce Robertson, Los Angeles: The Getty Research Institute, 2013, 64. For some actual examples, see Dirk Syndram and Martina Minning, eds, *Die kurfürstlich-sächsische Kunstkammer in Dresden: Das Inventar von 1619*, Dresden: Sandstein Verlag, 2010, fol. 465v–467v.

<sup>51</sup> Peter and Dorothea Diemer, ‘Johann Baptist Fickler und die Entstehung des Münchner Kunstkammerinventars’, in Johann Baptist Fickler, *Das Inventar der Münchner herzoglichen Kunstkammer von 1598*, ed. Peter Diemer, Munich: Verlag der Bayerischen Akademie der Wissenschaften, 2004, 14–15.

<sup>52</sup> ‘bracht IIIJ vergült vnd IIIJ wiß kelch sampt iren patenē hand gewegen XIII marck VJ lod’, Roosen-Runge, ‘Urkunden’, 33.

some cases.<sup>53</sup> This inventory's gold-highlighted ink drawings appear to have been amended after their original composition in a later hand that assigned a number above the depicted vessel and recorded a weight below. Scribbled beneath the image of a tabletop mechanical drinking vessel in the shape of the huntress Diana atop a stag, for example, was the weight 9 marks, ½ lot (Fig. 6).<sup>54</sup>



Figure 6 Drinking vessel in the shape of Diana atop a stag, c. 1650–1660. Pen and ink drawing from the Lobkowitz inventory, folio 241, no. 412, plate XXXI from Edmund Wilhelm Braun, *Die Silberkammer eines Reichsfürsten, Das Lobkowitz'sche Inventar*, Leipzig: Klinkhardt and Biermann, 1923.

Church treasury inventories were written by custodians and revised similarly by successive hands, sometimes over centuries; they thus reflect changing vocabularies and protocols in the description of plate and relics, including the identification of objects by weight.<sup>55</sup> Like many earlier medieval examples, the

<sup>53</sup> In a historical irony, the inventory was itself destroyed in the 1939–45 war, but was reproduced and discussed in Edmund Wilhelm Braun, *Die Silberkammer eines Reichsfürsten, Das Lobkowitz'sche Inventar*, Leipzig: Klinkhardt and Biermann, 1923.

<sup>54</sup> Folio 241, no. 412. Braun, *Die Silberkammer*, 28–29, Plate XXXI.

<sup>55</sup> The majority of treasury inventories from before 1250 do not include weights for metalwork; verbal descriptions suffice for the purpose of *Bestandskontrolle* (auditing of holdings). On this function, see Lucas Burkart, 'Das Verzeichnis', 144. For a historiography of medieval treasury inventories and discussion of new approaches, see Joseph Salvatore

Allison Stielau      The weight of plate in early modern inventories and secularization lists

treasury inventory of the Freiburg cathedral, begun in 1483 and maintained until 1748, has simple line items without weights or values:

Item two small silver monstrances, with relics inside  
Item two monstrances, one copper and the other silver  
with a copper foot.<sup>56</sup>

But fifteenth-century entries also include longer descriptions that record the precious metal value by weight of individual pieces as well as their year and cost of production:

Item a silver arm with the relic of St. Bartholomew, made in 1479, has in silver 5 marks 3 ½ lot ½ grain and the foot in copper 2 ½ marks; cost to make: 28 guilder, and to gild: 8 ducats, except for a place on the stone and the gold ring on it.<sup>57</sup>

The inclusion of such details, elsewhere absent, intimates that the inventory's author had records pertaining to the creation of those pieces that received more detailed descriptions—perhaps a contract with a goldsmith outlining details of materials and labor, or the receipt of a donation—on hand during the writing of the inventory. The inconsistency in records implies, in other words, that the contents of the Freiburg cathedral treasury were not weighed on site, or in the process of producing the inventory, but that weights and other details were compiled from separate documents.

The appearance of metrological information in a church inventory draws vectors out to the secular world, either to the recent past or the predicted future. The Freiburg *Schatzverzeichnisse*, for example, often recognize the value of donated objects or coins and records those sums along with the donor's name, a way of logging both spiritual and social capital.<sup>58</sup> Marking down the weight and metal-

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Ackley, 'Re-approaching the Western medieval church treasury inventory, c. 800-1250', in this special section of the *Journal of Art Historiography*.

<sup>56</sup> 'Item zwei cleni monstrenzli silbri, darinne heltum ist. / Item zwo monstranzen, eine kupfre und die ander silbre mit eim kupfre fuß'. Printed in Hermann Flamm, 'Die Schatzverzeichnisse des Münsters, 1483–1748', *Freiburger Münsterblätter*, 2, 1906, 75.

<sup>57</sup> 'Item ein silbrer arm [originally: hand] mit sant Bartholomus heiltum, hat an silber 5 mark 3 ½ lot ½ quinsit und der fuß an kupfer 2 ½ mark, kost zu machen 28 gulden und zu vergulden 8 ducaten minus ein ort an die stein und der gulde rink [later: zwei gulden rink] der daran ist, ist gemacht worden do man zalt 1479 iar'. Flamm, 'Die Schatzverzeichnisse', 76.

<sup>58</sup> On the increased status of church donors and the conversion of their gifts from secular to sacred goods, see Philippe Buc, 'Conversion of Objects: Suger of Saint-Denis and Meinwerk of Paderborn', *Viator*, 28, 1997, 99–143.

type, and thus the potential market value, of plate was one strategy of preparing for an uncertain future in which church treasure might need to be liquidated to feed the poor, pay a ransom, or fund a war.<sup>59</sup> The fact that some treasury inventories include weights in descriptions of plate has provided evidence for the argument that such collections were understood as bank accounts, whose articles could be smelted down without compunction.<sup>60</sup>

In so-called secularization lists—inventories recording expropriated church property—weight is often one of the few factors used to describe and value metalwork. At the time of the Dissolution in England, and during the Reformation in German-speaking lands, as well as in later campaigns of secularization, these inventories were made with the express goal of recording and extracting value from religious institutions that had accumulated stores of plate. In some cases they tracked metalwork through the process of liquidation, from church storage to the crucible, recording the metal by weight at every step. The term ‘secularization list’ also describes a type of document used to record the liquidation of church plate to fund military campaigns or to prepare for sieges.<sup>61</sup> These objects were also ‘secularized’ in the sense that they were transformed into currency. For secular treasures perhaps the better term is ‘liquidation list’.

The metamorphosis from made to unmade object is a physical transformation that responds to a significant perceptual shift in the social context in which it occurs. In order for a made object to be unmade, its value as artifact must have decreased. Such an object can be said to have altered its position on the conceptual spectrum of alienability on which all possessions exist.<sup>62</sup> Secularization lists vividly document the swift transit down this gradient, witnessing the moment at which objects that had had significant cultural value as implements used in the central rituals of Christian worship were grouped and tallied before smelting.

The decision to melt down Bern’s ecclesiastical metalwork followed the thorough disposal of cult sculptures and other church decorations that accompanied

<sup>59</sup> See for example the treasury inventory that Lucas Burkart argues was drawn up in order to document precious metal that could be mobilized to pay papal creditors. Burkart, ‘Das Verzeichnis’, 151, 175–176, 184, 187–189.

<sup>60</sup> For these arguments and a riposte, see Cynthia Hahn, ‘The Meaning of Early Medieval Treasuries’, in Bruno Reudenbach and Gia Toussaint, eds, *Reliquiare im Mittelalter*, Hamburg: Akademie Verlag, 2011, 1–20.

<sup>61</sup> See for example the list of church goods liquidated during the war of succession in Guelders in 1543. Printed in Günter Aders, ‘Die Beschlagnahme der Kirchenschätze im rechtsrheinischen Kleve im gelderschen Erbfolgekriege 1543’, *Düsseldorfer Jahrbuch*, 45, 1951, 269–279.

<sup>62</sup> Carina L. Johnson uses this conceptual model, based on the work of Annette Weiner, in exploring the fate of pre-Columbian artifacts in early modern European collections. Carina L. Johnson, ‘Aztec Regalia and the Reformation of Display’, in Daniela Bleichmar and Peter C. Mancall, eds, *Collecting Across Cultures: Material Exchanges in the Early Modern Atlantic*, Philadelphia: University of Pennsylvania Press, 2011, 87.

the city's confessional transformation to Protestantism in January 1528.<sup>63</sup> While sculptures were beheaded, dismembered and thrown in a mass grave behind the cathedral, precious metal objects took on new lives as currency.<sup>64</sup> Chronicles mention the targets of iconoclasts in the context of larger narratives, but no systematic lists were made of such objects during the Reformation.<sup>65</sup> Because of the high value of church plate and the way secular authorities were stepping in to handle sacred property, it was treated with transparency and careful documentation. Thus, despite their total liquidation in the furnace, these objects ironically have a greater, fuller presence in the documentary archive than objects that were only partially destroyed or perhaps survived only to be carted off as unfashionable in a later period.

Like inventories of church treasuries, the secularization list focuses on precious objects used at the altar or in other spaces and activities of the church. But it lacks some significant features of late medieval treasury records, such as the mention of custodians, donors, and sometimes makers, and condensed histories of repair, theft, renovation, and accretion. Rather than producing a small-scale material history that reflects the social history of the church itself, the secularization list reduces long-treasured objects to their essential facts: most recent location, object-type, and weight.<sup>66</sup> Whereas the relics contained in busts and small chests were once the sacred engine of the reliquary, here they go entirely unmentioned, the saint's name appearing only if he or she was recognizable from a sculpted or otherwise represented figure.

The Bernese secularization list includes the expected array of liturgical utensils and other church ornaments: chalices and patens, monstrances, processional crosses, miscellaneous cups and bowls, censers, croziers, and candleholders. Figural representations are mentioned only in the case of large three-

<sup>63</sup> On the iconoclasm in Bern and rediscovery of mutilated sculpture, see Franz-Josef Sladeczek, *Der Berner Skulpturenfund: die Ergebnisse der kunsthistorischen Auswertung*, Bern: Benteli Verlag, 1999.

<sup>64</sup> In reform contexts, liquidation could be viewed as a liberating, rather than destructive, force that allowed silver to 'live' beyond the stored capital of the church. A similar perspective existed in the context of medieval Islam. See Finbarr Barry Flood, *Objects of Translation: Material Culture and Medieval 'Hindu-Muslim' Encounter*, Princeton: Princeton University Press, 2009, 36.

<sup>65</sup> Though a few highly detailed chronicles by recusants almost achieved the comprehensiveness of inventories. See Christopher S. Wood, 'In Defense of Images: Two Local Rejoinders to the Zwinglian Iconoclasm', *Sixteenth Century Journal*, 29: 1, 1988, 25–44, especially 27, 41.

<sup>66</sup> Eamon Duffy argues that a similar practice of 'dissociating goods from their histories' in inventories and sales lists during the English Reformation was a deliberate strategy to eliminate the cult of the dead, which depended on remembrance through parish documents that listed donations. Eamon Duffy, *The Stripping of the Altars: Traditional Religion in England 1400-1580*, 2<sup>nd</sup> edition, New Haven: Yale University Press, 2005, 495–496.

dimensional pieces, like those of St. Vincent and Mary, and what was presumably a head reliquary or bust of St. John.<sup>67</sup> Other 'heads' remain unidentified.<sup>68</sup> The document's entries are organized by the original locations of the objects, whether church or cloister. Absent the need to differentiate between objects in a series, as some treasury inventories do, articles in this context are grouped simply by type: 'two big crosses and 2 small ones'; 'three chalices from the property of the provost of Wangen'.<sup>69</sup>

The heading *Silver Plate Coined 1529* endowed a general description to everything gathered under it.<sup>70</sup> Phrases indicating deviance from that description, either because the object was gilt, or had copper components or a wooden interior, appear intermittently.<sup>71</sup> Non-precious parts were excluded in the accounting of this document, whose focus was not visual or material description, but the weight of the collected articles. To this end, some similar objects were weighed and recorded jointly: 'a big monstrance and a small monstrance weighing together 25 marks, 2 lot'; 'from Königsfelden 17 marks and 8 lot from 8 chalices'.<sup>72</sup> The total weight of all the pieces together was calculated to be over 882 marks, or almost 220 kilograms, a portion of it reckoned separately as gilt silver.<sup>73</sup> The 523 kilograms extracted by 1530 included gilt silver, refined silver, unrefined silver, and fine gold, as well as surviving, stored plate and a quantity of uncoined silver reserved as remuneration.<sup>74</sup>

Like Bern, the city of Constance experienced iconoclasm and the liquidation of church treasuries. Lists of precious metalwork melted down under the direction of the city government between 1528 and 1546 survive, but they reveal a slightly different method.<sup>75</sup> The manuscript in which they are collected carefully tracks the process by which the metalwork became bullion, but rather than just include the weight of plate, it also notes different standards of purity. To take just the very first example, a list of precious metalwork that mentions chalices, beakers, and head reliquaries concludes with a summation of its weight given according to the

<sup>67</sup> 'sant Vinzēñ bild'; 'ein gantz Mariabild'; 'S. Johans houpt'. Roosen-Runge, 'Urkunden', 31, 32.

<sup>68</sup> 'Aber zwen silbrin köpf'. Roosen-Runge, 'Urkunden', 31.

<sup>69</sup> 'zwey grosse krütz vnd II kleins'; 'try kellch komend vss der propsty von Wangen'. Roosen-Runge, 'Urkunden', 31.

<sup>70</sup> 'Silberr Gschirr vermüntzet 1529', in Roosen-Runge, 'Urkunden', 30–33.

<sup>71</sup> 'vergültten'; 'ein holzinn kreutz mit silber vberzogen; ein grosse monstranz mit einē kupfrin füß'. Roosen-Runge, 'Urkunden', 31, 32.

<sup>72</sup> 'Denē ein grosse monstranz vnd ein cleins monstrenzly wigt alls XXV M II lod'; 'von Kungsfelden XVIIJ marck vnd VIII lod an VIIJ kelchen'. Roosen-Runge, 'Urkunden', 31, 33.

<sup>73</sup> Roosen-Runge, 'Beiträge zur Geschichte', 27.

<sup>74</sup> Roosen-Runge, 'Beiträge zur Geschichte', 27–28.

<sup>75</sup> See the recent volume by Melanie Prange that transcribes this and other inventories from Constance cathedral, with extremely useful notes and documentation. *Der Konstanzer Domschatz: Quellentexte zu einem verlorenen Schatzensemble des Mittelalters and der Frühen Neuzeit*, Stuttgart: W. Kohlhammer Verlag, 2012.

Constance standard. Once melted down, the accumulation no longer weighed 214 marks 15 lot; it had become 205 marks, 9 lot (Constance) or 199 marks, 10 lot (Nuremberg). The missing 9 marks, 6 lot were, the document notes, lost in the crucible.<sup>76</sup> Of the original collection of plate, two castings were made, one for a finer and one for a lesser standard. Altogether the silver was sold for 9 guilders per mark for a profit of 648 guilders, 14 shillings, and 2 pennies, a small portion of which was given over to the man responsible for assaying and refining the metal.

A much later example of a secularization list provides an illuminating contrast to Reformation documents. When three monastic institutions in Mainz were dissolved in 1781 and their property allocated to the local university, the appraisal of metalwork and other precious objects proceeded with more precise methods.<sup>77</sup> The secularization inventory made use of a system in which a local standard of purity was authenticated by a city's mark. Entries noted the appropriate assay, when one was available, and gave the resulting value by weight:

a silver gilt chalice with paten and small spoon of the Mainz assay and is worth per lot 1 guilder 20 kreutzers weighs together with paten and spoon . . . 2 marks, 10 lot, 12 sixteenths of a lot / 57 guilders 15 kreutzers.<sup>78</sup>

The Mainz *Taxation*, or appraisal, document does not follow this collection of plate to the crucible, as the Constance list did. Instead the weights and values it gives are produced wholly outside the context of the metal refinery, relying on the system of city marks rather than fire assaying to determine purity.

These lists carefully note the deduction of non-precious metal elements from the recorded weight, including textiles, copper and wood foundations, brass and enamel applications, precious and artificial stones, crystal and glass, iron supporting rods, and relics.<sup>79</sup> The appraisers even accounted for the soot created by oil and incense in lamps and thuribles:

<sup>76</sup> 'Das ubrig, namlich 9 marck 6 lot, sind abgangen'. Prange, *Der Konstanzer Domschatz*, 44.

<sup>77</sup> These secularization lists are printed in Friedrich Schneider, *Die Schatzverzeichnisse der drei Mainzer Klöster Karthause, Reichen Klaren und Altenmünster bei ihrer Aufhebung im Jahre 1781*, Mainz: Verlag von L. Wilckens, 1901.

<sup>78</sup> 'Ein silber und vergolder Kelch sammt Paten und Löffelchen Mayntzer Probe und ist werth per Loth 1 fl. 20 Kr. wieget sammt Paten und Löffelchen . . . 2 Mark, 10 Loth, 15 Sechzehntel / 57 fl. 15 Kr.'. Manuscript page 1, no. 39. Schneider, *Die Schatzverzeichnisse*, 14.

<sup>79</sup> A gilt silver hand reliquary of St. Bilhildis, founder of the Altmünster convent, was weighed minus its relics and stones. The enamels and precious stones of all three foundations were appraised in separate inventories by two local goldsmiths, who produced different summary valuations. Schneider, *Die Schatzverzeichnisse*, 53, 56–67.

a silver censer, with incense boat and small spoon of the Trier assay . . . weighs after subtracting roughly for the grime in the censer . . . 5 marks, 8 lot / 93 guilders 52 kreutzers.<sup>80</sup>

In certain cases the inventories offer an additional valuation above that produced by the simple calculation of assay multiplied by weight. For example, a 'monstrance of silver and gilt elements' of the Augsburg assay, with 'Bohemian' stones and garnets was estimated to be worth 305 guilders 40 kreutzers, its gold lunula with 'good jewels' valued at a further 151 guilders. But 'for a connoisseur (*Liebhaber*)', the appraiser claimed, it would be worth 'in silver and craftsmanship' 556 guilders.<sup>81</sup> The appeal for sale to a *Liebhaber* was, according to the early twentieth-century editor of this inventory, a cry for mercy on the part of experts trying to divert especially fine metalwork from its almost inevitable path to the crucible.<sup>82</sup> It is impossible to know if that cry proved successful, but, if it was indeed saved from the crucible by a *Liebhaber*, the monstrance would have experienced a functional, rather than a physical, transformation, transitioning from ritual object to aesthetic artifact.

Secularization lists, which survive from both continental and English contexts, prove useful for estimating both the size and content of previous treasuries, as well as the losses of plate that resulted from reform and dissolution. Their original purpose, drastically reduced descriptions, and emphasis on the compiled weight of precious metal connect them to other 'negative inventories' made just before or in the wake of liquidation. One such example is the inventory drawn up in 1628 by Jesuit novitiates in Trier who stumbled across a hoard of fourth-century Roman silver in their garden.<sup>83</sup> They recorded the ancient objects as best they could with respect to form and ornament, noting down the weights of individual pieces as well as sets. For example:

<sup>80</sup> 'Ein silbernes Rauchfaß, sammt Schiffchen und Löffelchen Trierischer Probe, ist werth per Loth 1 fl. 4 Kr. und wieget nach beiläufigem Abzug des Schmutzes im Rauchfaß . . . 5 Mark, 8 Loth / 93 fl. 52 Kr.'. Manuscript page 8, no. 65. Schneider, *Die Schatzverzeichnisse*, 16.

<sup>81</sup> 'Ein Monstranz von Silber und ziervergold, die befindliche Steinen sind böhmische, die kleine aber sind Granaten, Augsburger Probe, per Loth 1 fl. 10 Kr. wieget nach beiläufigem Abzug deren Steinen . . . 16 Mark 6 Loth / 305 fl. 40 Kr. / Die Lunula aber ist von Gold mit guten Jewelen besetzt, ist geschätzt . . . 151 fl. / Wäre für einen Liebhaber werth an Silber und Arbeit sammt der Lunula 556 fl.'. Manuscript page 83, no. Vc33. Schneider, *Die Schatzverzeichnisse*, 42.

<sup>82</sup> Schneider, *Die Schatzverzeichnisse*, 84.

<sup>83</sup> This summary of the episode is drawn from Wolfgang Binsfeld, 'Der 1628 in Trier gefundene römische Silberschatz', *Trierer Zeitschrift für Geschichte und Kunst des Trierer Landes und seiner Nachbargebiete*, 42, 1979, 113–127.

15-22: 8 silver cups for drinking wine engraved with various wild animal forms, weighing 20 pounds.<sup>84</sup>

The total came to almost 114.5 kilograms, one of the largest hoards of Roman silver ever found.<sup>85</sup> Flouting the law that required such finds to be reported to the local ruler, the Jesuits cut up and smelted down the Roman silver and sold the resulting bullion in Cologne. This liquidation occurred in two stages, the first about a month after the discovery, the second one year later. The sum produced was 4093 Reichstaler, which the novitiates apparently used to fund their kitchen. The succinct descriptions in the inventory of the Trier hoard provide historians of Roman silver with an important set of comparanda, although not a single object from the find survives.<sup>86</sup>

In certain circumstances the weight of total recycled metal stands in for objects that were never properly recorded. While European Christians were extracting precious metal from their church treasuries during the sixteenth century, motivated by confessional change or financial crises brought by war, native peoples in the Americas saw masses of their own ornaments and cult objects liquidated by conquistadors and Spanish settlers. The New World would become the major source of precious metal in this period, changing the economic landscape of Western Europe and the wider world, and increasing the availability of the materials for, and thus the forms and functions of, metalwork.

Mines produced much of this influx, but in the early years of conquest and colonization, significant quantities of metal were derived through smelting down extant artifacts. As Susan Elizabeth Ramírez has shown, metalwork 'mined' from Chimu tombs was liquidated almost immediately after being unearthed, and appears in contemporary documents simply as weighed ingots of solid metal.<sup>87</sup> The scale of liquidation of extant objects in the New World recalls industrial production, best conveyed not in the units of daily life, but in tons.<sup>88</sup> Such quantities of metal become difficult to imagine as having once been collections of individual objects.

The recorded weights of metalwork in inventories, particularly the 'negative' documentation provided by liquidation lists, serve as something akin to a fossil record for the student of early modern metalwork. Details of surface ornament,

<sup>84</sup> '8 silberen Schalen ad bibendum vinum habentes insculptas diversas formas ferarum. pond. 20 lib.'. Quoted in Binsfeld, 'Der 1628 in Trier', 117.

<sup>85</sup> Binsfeld derives this weight from the manuscript inventory, as opposed to later printed versions. Binsfeld, 'Der 1628 in Trier', 119.

<sup>86</sup> Donald Strong, *Greek and Roman Gold and Silver Plate*, London: Methuen, 1966, 19, 211.

<sup>87</sup> See Chapter 5, 'Huaca Looting on the Peruvian North Coast', in Susan Elizabeth Ramírez, *The World Upside Down: Cross-Cultural Contact in Sixteenth-Century Peru*, Stanford: Stanford University Press, 1996.

<sup>88</sup> On these statistics, see Carlo M. Cipolla, *Die Odyssee des Spanischen Silbers*, Berlin: Klaus Wagenbach, 1998.

form, and three-dimensional volume may have melted away in the crucible, but something essential and significant remains, which is the mass of precious material once incorporated in objects. In fact there is no truly apt material metaphor for what this category of evidence constitutes. Indexical traces preserve volume and profile, and, in the case of fossils, interior structures like bones. But weight lies beyond visual representation and indexical preservation. Philip Grierson alluded to the ambiguous status of deformed metal in a discussion of numismatic condition: 'How does one classify a penny which a child has put on a railway line for a train to run over? From the collector's point of view it is ruined, but its weight is unimpaired'.<sup>89</sup> Liquidated metalwork is yet more nebulous. Its material remains unimpaired, but scattered into forms and locations that are impossible to trace. But by using the methodological tools that weight offers, it can become meaningful again.

### **Art historical approaches to weighing and recorded weights**

For centuries a highly significant descriptive category, weight continues to be critical to the historical study of precious metalwork. Some modern scholarship depends on this dimension to better understand the biographies of precious metal objects, from the moment of formation through subsequent trajectories of possession and even burial. Weight-conscious methodologies deserve standardization and wider application in subfields dealing with gold and silver artifacts. Furthermore, the scale, like the measuring tape, has a central role to play not only in the metalwork specialist's toolkit, but also in those of art historians more generally.

Weighing extant plate serves as a check for authenticity, as under- or overweight pieces can indicate counterfeit materials or patina, or formal alterations made to increase an object's attractiveness to collectors.<sup>90</sup> Comparing the current weight of precious metals and metalwork to historical records has allowed scholars to verify or challenge the identity of specific artifacts.<sup>91</sup> Scratch weights, which physically record an object's weight on its surface,<sup>92</sup> can connect surviving vessels to smiths and patrons when workshop account books survive or to larger sets of

<sup>89</sup> Philip Grierson, *Numismatics*, Oxford: Oxford University Press, 1975, 90.

<sup>90</sup> In the field of numismatics, weighing coins remains a significant method for detecting forgeries, and for the study of coinage more generally. Grierson, *Numismatics*, 89, 96, 142.

<sup>91</sup> *Gold and Silver of the Atocha and Santa Margarita*, New York: Christie's, 14–15 June 1988, 141. Elisabeth Landolt and Felix Ackermann, eds, *Das Amerbach-Kabinett: Die Objekte im Historischen Museum Basel*, Basel: Historisches Museum, 1991, 82, no. 64.

<sup>92</sup> Scratch weights have been employed for precious metalwork in several different historical contexts, from ancient Greece and Rome, to sixteenth-century Europe and beyond. See 'Chapter 3: Inscriptions, Weights, and Dimensions', in Marlia Mundell Mango and Anna G. Bennett, *The Sevso Treasure*, Ann Arbor, MI: Journal of Roman Archaeology, 1994; Meyer, *Metics and the Athenian Phialai-Inscriptions*, 66n193; and Beth Carver Wees, *Early American Silver in the Metropolitan Museum of Art*, New York: Metropolitan Museum of Art, 2013, 301.

objects.<sup>93</sup> When contrasted against current weight, scratch weights and other records of weight quantify loss of metal over time, and thus convey something of the life of the object.<sup>94</sup> Even when described articles are no longer extant, recorded weights allow for comparisons between entries within and even across inventories, which may contain no other indication of size or value.<sup>95</sup> Recorded weights can also be used for approximate reconstruction in terms of size and heft, as well as comparisons against surviving examples.<sup>96</sup> Such reconstructions depend, of course, on the ability to convert measurements like pound, mark, and lot into modern units of mass and must recognize the challenges of arriving at an exact reckoning of extant object and recorded weight. Variation between scratch weight and current weight can signal damage and oxidation, additions in the form of modern solder, inexact weighing of the original object, or purposeful dissimulation on the part of maker or owner.<sup>97</sup>

Responding to such methodological applications of weight information, modern catalogues can include the weight of metalwork in addition to dimensions of length, hallmarks, and inscriptions.<sup>98</sup> However, while weighing extant objects and analyzing recorded weights are standard practice for some scholars and institutions, this approach is by no means consistent.<sup>99</sup> Even when weight receives mention by

<sup>93</sup> Wees, *Early American Silver*, 91, 193.

<sup>94</sup> I thank Beth Carver Wees for this phrase and for discussing issues of the weight of silver with me. On the comparison of original and current weights, see van der Velden, *The Donor's Image*, 112.

<sup>95</sup> Proctor-Tiffany, 'Portrait of a Medieval Patron', 219n96.

<sup>96</sup> The tabletop Diana illustrated in the Lobkowitz inventory could be compared, for example, to surviving versions of this popular *Kunstammer* object. A recently-published Diana in Basel weighs 3528.3 grams. Using conversions based on the mark of Prague (c. 250 grams), the Lobkowitz version would have weighed almost 2258 grams. The discrepancy of more than 1000 grams might suggest either a different standard for mark and lot, or that the Lobkowitz vessel was smaller than its surviving counterpart. It is also likely, however, that the inventory roughly subtracted the object's interior mechanics, which allowed it to move independently across a table surface, and calculated only precious metal content instead, a hypothesis that, in turn, contributes further to our understanding of inventorying practices. On the reduction of base components by weight in inventories, see comments on the Mainz secularization lists, above. *Die grosse Kunstammer*, 283–285, no. 72. Calculations in this note based on conversions given in von Alberti, *Mass und Gewicht*, 380–381.

<sup>97</sup> See comments by Herbert A. Cahn in Elisabeth Alföldi-Rosenbaum and others, *Der Spätrömische Silberschatz von Kaiseraugst*, vol. I, Derendingen: Habegger, 1984, 329.

<sup>98</sup> Recent catalogues employing this method include Wees, *Early American Silver*; Timothy Schroder, *British and Continental Gold and Silver in the Ashmolean Museum*, Oxford: Ashmolean Museum, 2009; and István Heller, *Europäische Goldschmiedekunst*, Munich: Hirmer, 2003.

<sup>99</sup> Test searches for 'silver chalice' in several online museum collections found different approaches to the cataloguing of metalwork with respect to weight. The Victoria and Albert Museum, London, and the Germanisches Nationalmuseum, Nuremberg, record height and diameter, but not weight; the Metropolitan Museum of Art, New York, and the British

way of a traditional archaeological catalogue of physical descriptions, it may not be incorporated satisfactorily into interpretation.<sup>100</sup> Dimensions of height and width remain predominant in art historical methodologies, arguably reflecting the discipline's roots in modernity and its characteristic focus on epistemologies of vision. According to Witold Kula, before the invention of conventional metrological systems, people 'conceived of objects in a synthetic-qualitative manner', which understood all the properties of the object as producing an indivisible whole. In this mode, 'there is nothing in common between a piece of linen cloth and a stretch of road, or the height of a tree, or the boundary strip dividing two fields, different measures have to be applied to such different objects'.<sup>101</sup> The imposition of narrower sets of standards across geographic regions, culminating with the invention and spread of the metric system beginning in the eighteenth century, granted a 'commensurability' to objects through the measurement of length.<sup>102</sup>

This equalizing sweep, apparent in scholarly publications and internal museum databases that use measures of length to describe objects of great diversity, from paintings and sculpture to prints and furniture, has been normalized. But description-by-length was once extremely rare in documents that catalogued collections of art and household goods and seems to have been used specifically for those objects that resided in storage, and thus whose size was not immediately evident.<sup>103</sup> The appearance of such dimensions in modern image captions and catalogue entries also responds to a lack of physical access, a concession to a system in which objects are analyzed and discussed by way of images that may distort them. They allow the viewer to reconstruct approximately the size of the absent work using abstract but familiar standard units of inches or centimeters.

Weight is also a compelling form of surrogacy for absent objects, both those that have been lost in the crucible, and those that are only inaccessible, physically distant or sequestered from the observer's touch by the vitrine. Information about

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Museum, London, also catalogue height and diameter, but include weight and the volume of the cup less often. Printed catalogues that cover a variety of object-types are less likely to include weights for precious metalwork, perhaps due to a desire for consistency across entries.

<sup>100</sup> The lack of data and discussion regarding weight seems a particularly missed opportunity for objects with scratch weights, like the sixteenth-century basin and ewer in the collection of the J. Paul Getty Museum, Los Angeles (85.DG.33), whose current weight has never been published. See 'Ewer and Basin: Weight Marks', *Decorative Objects*, Getty Guide, <http://www.getty.edu/art/gettyguide>, accessed 30 October 2013.

<sup>101</sup> Kula, *Measures and Men*, 87.

<sup>102</sup> Kula, *Measures and Men*, 87.

<sup>103</sup> The 1524 inventory of archduchess Margaret of Austria, for instance, gives measurements for tapestries and textiles, but not for paintings. Lorenz Seelig argues that while paintings would have remained visible on the wall, their dimensions immediately identifiable, textiles were often placed in storage. So the inventory conveyed the size of stored textiles, obviating the need to unpack and unfurl them. Seelig, 'Historische Inventare', 27.

an object's weight can cultivate an engagement with the artifact that is non-visual, or exceeds the visual. Reviewing a study on late antique silver, Anthony Cutler observed that 'the sentient, palpable aspects of [the] experience [of this plate] can be restored—and then only feebly—only when it is handled'. Few readers will enjoy the privilege of handling objects as experts do, which is why weight remains relevant for reconstructing such tactile aspects.<sup>104</sup> Weight highlights what must have been the unmistakable difference in holding and swinging two silver censers of different sizes from the Basel Cathedral treasury, for example. The late Gothic thurible weighs 2,146 grams, whereas its Romanesque counterpart is much lighter at 350 grams, a consequence not only of its larger size, but the fact that it had thick walls and cast components (Fig. 7).<sup>105</sup>

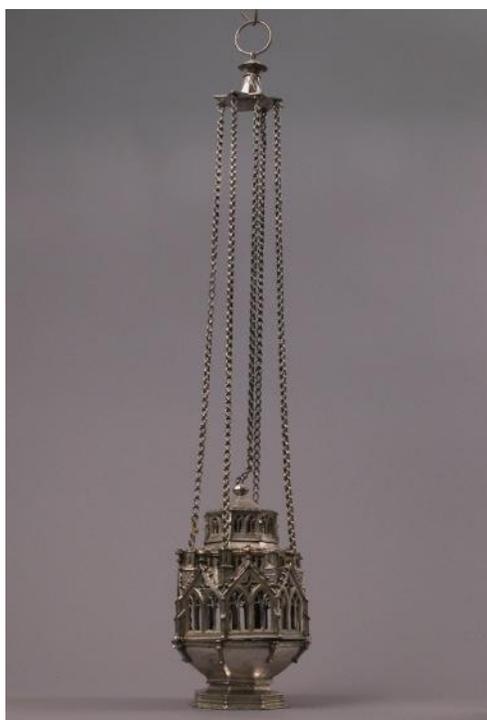


Figure 7 Censer, Basel, Switzerland, before 1477. Silver, raised and cast, 81 x 14.6 cm without chain, 2,146 g. New York: Metropolitan Museum of Art. Gift of J. Pierpont Morgan, 1917 (17.190.260).

In addition to its sensual impact, the heft of metalwork had meaning for handlers and beholders that is also a part of its historical context. For believers it

<sup>104</sup> Anthony Cutler, review of *Silver and Society in Late Antiquity: Functions and Meanings of Silver Plate in the Fourth to Seventh Centuries*, by Ruth E. Leader-Newby, *American Journal of Archaeology*, 109: 4, 2005, 820.

<sup>105</sup> Brigitte Meles, ed, *Der Basler Münsterschatz*, Basel: Historisches Museum, 2001, 147, no. 44, 149–50, no. 45; and Timothy Husband, *The Treasury of Basel Cathedral*, New York: The Metropolitan Museum of Art, 2001, 51, no. 7, 72, no. 16. The Basel catalogue gives the censers' weights, while the New York catalogue does not.

represented concentrated value that reified a donor's generosity and glorified church ritual. For reformers in Basel the weight of ecclesiastical metalwork offered an opportunity to dematerialize the concept of church treasure by sending centuries worth of accumulated value out to work productively in the world as currency. There, as in Bern, the gold and silver objects in local churches were liquidated; over 2,700 kilograms were converted into alms in 1532.<sup>106</sup>

A single mass of raw material that size can be difficult to parse, but here again the weight of individual objects helps to gain traction on what might otherwise seem abstract, amorphous measurements. Using the weights of the surviving local censers, the material liquidated at Basel can be reimagined not as mere mass, but as single forms of the types that received line entries in contemporary secularization lists. Calculated this way, the bulk of 2,700 kilograms of precious metal is equivalent to 1,258 of the extant late Gothic censer or 7,714 of the smaller Romanesque one. Those numbers vividly illustrate not only the amount of plate—in individual artifacts—that was liquidated, but also how fractional the surviving corpus of medieval metalwork truly is. The vulnerability—or amenability—of precious metalwork to formal change is perhaps its most salient characteristic and the one demanding greatest emphasis.

### **Conclusion: weight, museology, and art historiography**

Recording the weight of a silver cup is akin to affixing a market value to it, or at least a market value to it as bullion. Thus, despite the clear scholarly benefits of including weight in descriptions of metalwork, this information may be seen to threaten both the object's security and its status as an aesthetic entity, particularly in the context of the museum.<sup>107</sup> Unlike early modern treasuries that could be liquidated in crisis, the museum is considered to be a safe haven in which artworks are presented and discussed according to their aesthetic and historical, rather than financial, significance.<sup>108</sup> As Joseph Ackley's essay on medieval church inventories in this issue demonstrates, art historians have become attuned to non-monetary systems of value at work in the creation, use, and preservation of precious

<sup>106</sup> Husband, *The Treasury of Basel Cathedral*, 26.

<sup>107</sup> Omissions of weight information may be a way of deterring undue attention by thieves, especially in contexts without adequate security, like churches, provincial museums, and private collections. On recent thefts of plate for bullion value, see Joe Drape, 'A Trophy Thief Goes for the Gold,' *New York Times*, 28 October 2013, <http://www.nytimes.com/2013/10/29/sports/a-trophy-thief-goes-for-the-gold.html>.

<sup>108</sup> Purchasing and cataloging metalwork by weight, as some German museums did under National Socialism, elides precisely the categories ordinarily emphasized in the museum— aesthetic interest and provenance. Having lost most information regarding the origins of its individual articles, so-called 'Raubsilber' is now described with respect to its collective mass. See the statement 'Jüdisches Silber', Historisches Museum, Frankfurt, downloadable at [http://historisches-museum-frankfurt.de/files/jewish\\_silver.pdf](http://historisches-museum-frankfurt.de/files/jewish_silver.pdf), accessed 19 January 2014.

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metalwork. These methodological developments strive to push beyond the mere financial evaluation of plate, one reason why weight may remain neglected. But as examples in this essay have shown, the weight of plate informed the ways gold and silver objects were looked at and handled, and what they meant, to contemporary beholders. Respecting and endeavoring to convey the conditions of that 'period eye' is one motivation for making the inclusion of weight information standard in modern museum catalogues and art historical scholarship. Rather than discarding the weight-centric methods for inventorying metalwork from the early modern period, modern cataloguing practice might incorporate them more consistently in order to produce dimensionally rich representations of precious metalwork's rare survivors.

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