Calculating the Goldsmith's Pay in the Late Fourteenth and Fifteenth Centuries

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It is sometimes said that medieval goldsmiths, even the ones working at the highest level on the most expensive projects, received little pay for their work. Such statements contradict references to expertise, skill, and excellent work, including Abbot Suger's twelfth century statement that the chased decoration on the high altar at Saint-Denis was "equally remarkable for its form as for its material, so that certain people might be able to say: The workmanship surpassed the material."[1] If the goldsmith's skill was so laudable, it is reasonable to assume that goldsmiths were well compensated. Determining their rate of pay, however, can be a complex task, and it is crucial to understand what information can be gleaned from the archival sources. Inventories, so valuable for many inquiries, lack crucial information about purchase prices and can therefore be misleading. Contracts are few and far between, and the information provided in account books can be frustratingly vague. These accounts, after all, reflect the interest of those who wrote them, not the scholars who investigate them today! Only beginning in the late fourteenth century do we find more detailed descriptions of the goldsmith's pay rate, but these can be scarce and incomplete. Weights, measures and currencies varied from city to city, further complicating this task. Each record, however, can provide a glimpse of the overall picture, and I have been able to identify patterns that suggest a general pay scale based upon materials, complexity and skill. My goal is to demonstrate my method for determining the goldsmith's wage as a portion of the overall price for a given work

1 Suger, De administratione, XXXII, in: Erwin Panofsky (Ed.), Abbot Suger on the Abbey Church of St. Denis and its Art Treasures, 2nd ed., Princeton 1979, pp. 61–63.

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while also identifying potential problems and their solutions. I will also outline a suggested pay scale for late fourteenth and fifteenth century goldsmithwork based upon my findings. I first began this inquiry as a Fulbright Dissertation Scholar during the academic year 2002–2003 under the mentorship of Prof. Dr. Johann Michael Fritz, and I am privileged to present it in an expanded and updated version in this Festschrift.

Monetary systems and measurement

An inquiry into payment must involve money, and medieval currencies varied from city to city. William Arthur Shaw, commenting on silver coinage in Germany between 1300 and 1500, remarks, "The various denominations of silver coins which arose in Germany, in those years, make it a work of extreme difficulty even to attempt averages."[2] Francs, Gulden, grossos, livres and silver marks are among the many that coins can appear in a document (fig. 1).[3] Even coins of the same denomination from different cities could have very different values. The Lübeck silver mark coin, for example, was divided into 16 solidi (shillings) with 12 denarii (pennies) to the solidus. The Xanten silver mark, however, was divided into 12 solidi, again at 12 denarii to the solidus.[4] In some cases, when rates of exchange can be documented, it is possible to compare prices between two cities.[5] Generally, however, I have attempted to work only within the currency system of each document, which sometimes involves calculating the value of smaller coins and their relation to coins of higher value. I avoid calculating modern equivalents to

2 William Arthur Shaw, The History of Currency, 1252 to 1894, 2nd ed. London 1896, reprint New York 1960, p. 28.

3 For an excellent introduction to medieval gold coinage: Joachim Weschke and Ursula Hagen-Jahnke, Gold Coins of the Middle Ages from the Deutsche Bundesbank Collection, trans. Edward Besly, Frankfurt am Main 1983.

4 For Lübeck: Hans Nirrnheim (Ed.), Das Handlungsbuch Vickos von Geldersen, Hamburg/Leipzig 1895, pp. lxx–lxxvi. For Xanten: Dieter Lück, Das Viktorstift zu Xanten in der ersten Hälfte des 15. Jahrhunderts: Beobachtungen anhand der Bursenrechnungen, in: Annalen des Historischen Vereins für den Niederrhein 178, 1976, pp. 77–90, here 78, note 13.

5 Several rates of exchange between currencies can be documented using account books like those of the Runtinger family of Regensburg. Eikenberg has published a list of currencies from the Runtinger account books with rates of exchange for certain years (Wiltrud Eikenberg, Das Handelshaus der Runtinger zu Regensburg: Ein Spiegel süddeutschen Rechts-, Handels und Wirtschaftsleben im ausgehenden 14. Jahrhundert, Göttingen 1976 [Veröffentlichungen des Max-Planck-Instituts für Geschichte, 43], pp. 275–284).

Fig. 1 Gold Gulden of Archbishop Johann II of Nassau from Mainz, minted c. 1399–1400 in Höchst. Image source: German Wikipedia, user: Saharadesertfox, 2003. Public domain: https://commons.wikimedia.org/wiki/File:Fr_1617-Schlegel_19var.jpg

prices because it is a difficult undertaking with results that will be inaccurate within a decade.[6]

Materials are the next key ingredient in this inquiry, and most medieval goldsmiths worked in silver and gilded silver. Precious metals like silver and gold were measured using the mark, a unit of mass roughly equivalent to half a pound. A silver mark could be divided into four fertos, eight ounces or sixteen lots. The lot was divisible into four quentis, with sixty-four quentis in a mark.[7] For gold, the mark was divisible into twenty-

6 When the prices for food, wine, livestock or other commodities can be found for a given year, it is possible to convert medieval prices to more tangible items like loaves of bread or chickens. See, for example, the well-documented prices for bread and its ingredients in: Dietrich Ebeling and Franz Irsigler, Getreideumsatz, Getreide- und Brotpreise in Köln: 1368–1797, Teil I, Cologne/Vienna 1979 (Mitteilungen aus dem Stadtarchiv von Köln, 57).

7 A "ferto" could also be called a "vierdung", and the "quent" (pl. quentis) could also be called a "quetschen". When the term ferto is applied to another measure or currency, it generally means that it is one quarter of the whole. Thus, a ferto of a pound is ¼ pound, a ferto of a denarius is ¼ denarius. I have chosen to use the more Latinized term for each measure. For documentation of the term ferto, see Deutsches Rechtswörterbuch (online version: http://wwww.rzuser.uni-heidelberg.de/~cd2/drw/a/F26.htm). Most measurements are clearly ex-

four karats with twelve grains in each karat.[8] For a number of major late gothic trade centers, economic historians have calculated the mass, in grams, for a standard mark, making it possible to determine the amount of silver or gold in a particular object.[9] In the absence of an exact measurement for the mark in a given city, I have applied the metric value of the mark for major trade centers, including Cologne and Regensburg, alongside the widely used "marc de Troyes".[10] Most cities had strict regulations concerning the purity of their gold and silver, mandating the use of a hallmark as proof of this purity.[11] For some cities like Cologne, the price of these materials can be documented from year to year. In general, the price of gold was between ten and eleven times that of silver.[12] Most objects of goldsmithwork were therefore made of silver and then gilded with a microscopic layer of gold using the fire-gilding technique described in the "schedula diversarum artium".[13] Nearly all cities prohibited the production of gilded copper and bronze except in the case of church plate. An area of the vessel in question would be left bare to reveal the non-gilded metal, allowing even a layperson to

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plained in Eikenberg 1979 (note 5), p. 288. For the value of the pound (Pfund): Günter Aders, Die Beschlagnahme der Kirchenschätze im rechtsrheinischen Kleve im gelderschen Erbfolgekriege 1543, in: Düsseldorfer Jahrbuch. Beiträge zur Geschichte des Niederrheins 45, 1951, pp. 269–279, here 271.

8 Marc Rosenberg, Der Goldschmiede Merkzeichen, 3d. ed., vol. 1, Frankfurt a. M. 1922, p. xvi.

9 See, for example, the tables of comparative value in Ebeling/Irsigler 1979 (note 6), pp. xxxiv–xlii.

10 The weight of the mark differed by city. The "marc de Troyes" had a metric equivalent of 244.7529g. It was widely used in Flanders and in Paris. In Cologne, however, the mark was 233.856g (a standard used in much of the Rhineland), and in Regensburg 246g. For the "marc de Troyes" and the Cologne mark, see John H. Munro, The Maze of Medieval Mint Metrology in Flanders, France and England: Determining the Weight of the Marc de Troyes and the Tower Pound from the Economics of Counterfeiting, 1388–1469, working paper, Toronto 1998, pp. 1–30, here 3–5. For Regensburg, see Eikenberg 1979 (note 5), p. 288.

11 For a historical introduction to the use of hallmarks as proof of metal purity, see: Rosenberg 1922 (note 8), pp. xiii–xix. Rosenburg also documents the earliest known hallmarks both for purity and for individual artists in cities throughout Germany and the rest of Europe. For an explanation of the use of hallmarks in England, see: Marian Campbell, Goldsmiths' tools and workshops: the English documentary and archaeological evidence: AD 1100 to 1500, in: Christiane Eluère (Ed.), Outils et ateliers d'orfevres des temps anciens, Saint-Germain-en-Laye 1993, pp. 213–222, here 213–216.

12 A summary of these prices can be found in: Ebeling/Irsigler 1979 (note 6), p. xxiv.

13 De diversis artibus III, 32–38, 45: John G. Hawthorne and Cyril Stanley Smith, On divers arts, the treatise of Theophilus, Chicago 1963, pp. 108–113, 118. For more on fire gilding, see: William Andrew Oddy, Gilding: an outline of the technological history of the plating of

determine that the piece was made of copper or bronze.[14] In this study, I will limit my inquiry to silver and gilded silver.

Inventories

The most familiar documents for the historian of medieval goldsmithwork are probably inventories. These are lists of the possessions of churches, institutions and individuals, with descriptions that can vary from extremely simple, single-word entries to complex accounts of size, material, decoration and use. Most inventory entries consist of a brief description of an object and a statement of its value based upon its metal content and weight. Here are two examples from the 1460 inventory of the Collegiate Church of St. Bartholomew in Frankfurt: "Item, a silver censer, having 4 marks and 3 ½ lot," and "Item, the new large chalice, having 5 marks 3 lot with its paten, [and] having at its center six stones, red, green [and] blue."[15] In some cases, a description might be more elaborate, like this entry from the same inventory: "Item a silver arm, not gilded, with a long crystal, [and] within its length relics of St. James, all together weighing 5 ½ marks and 1 lot."[16] Given the details in the description, it might be possible to associate this entry with a surviving arm reliquary.

The information contained within an inventory was entirely dependent upon what its author or authors considered to be most important. The author of the earliest in-

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gold on to silver or copper in the Old World, in: Endeavour N.S. 15, no. 1, 1991, pp. 29–33; Killian Anheuser, The practice and characterization of historic fire gilding techniques, in: The Journal of The Minerals, Metals & Materials Society 49, 1997, pp. 58–62.

14 Johann Michael Fritz, Goldschmiedekunst der Gotik in Mitteleuropa, München 1982, pp. 40, 42–43, 123, 144, 151, 152. For Cologne, where this prohibition against copper work could be found as early as the mid fourteenth century: Heinrich von Loesch (Ed.), Die Kölner Zunfturkunden nebst anderen Kölner Gewerbeurkunden bis zum Jahre 1500, vol. 1, Bonn 1906, nos. 26B and 27, pp. 75, 81 and vol. 2, nos. 465-6, pp. 244–245. For Frankfurt am Main: Benno Schmidt (Ed.), Frankfurter Zunfturkunden bis zum Jahre 1612, vol. 1, Frankfurt a. M. 1914, reprint Wiesbaden 1968, p. 232.

15 "Item thuribilum argenteum habet 4 marcas et 3 ½ loit"; "Item calix novus magnus, tenet 5 marcas 3 loit cum pathena, habens in medio sex lapides, roit, grün, bla". Both entries come from the 1460 inventory of the Collegiate Church of St. Bartholomew, Frankfurt, fol. 28v and 29r (Karen Stolleis, Der Frankfurter Domschatz, Bd. III, Frankfurt a M, 1994, pp. 47 and 48).

16 "Item brachium argenteum, non deauratum, cum longo cristallo, in quo longa pars reliquarum sancti Jacobi, similiter in toto ponderans 5 ½ marcas et 1 loit." (1460 inventory, fol. 27v: Stolleis 1994 [note 15], pp. 46–47).

ventory of the Guelph Treasure (Welfenschatz), from 1482, grouped works by category (e.g. shrines, other reliquaries, monstrances, etc.) and detailed the contents of every reliquary, but provided few indications of size or material. This entry provides a glimpse of how the so-called Corpus Christi monstrance from the Guelph Treasury was used: "Item: a monstrance in which is carried the Sacrament in the octave of Corpus Christi. In the same are contained the following relics: Item Albina, Leothardis and Katherine, virgins; item of St. Peter apostle; relics of Cosmas and Damian; item a silver-covered finger with Greek script; item of St. Bernard; item Apostle Matthew."[17] This monstrance had an unusual dual role: it was used to hold and display the consecrated Host during the Octave of Corpus Christi, but its primary role was as a reliquary. I examined this work in 2003 and learned that the relics could be enclosed within its unusually wide spire to keep them separate from the Host.[18] Although the entry contains valuable information about contents and function, it provides no details about the materials or value, and no description of its size or shape.

In some inventories, particularly those that record the property of an individual after their death, the monetary value of these materials is calculated based upon contemporary market prices.[19] It can be tempting to interpret an inventory value as the price of an object, but it is important to note that, in general, inventories treated the treasury as an emergency cash reserve, consisting of objects that could be melted down or otherwise liquidated.[20] Lorenzo Ghiberti, in his account of Master Gusmin,

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17 "Item una monstrancia in qua portatur sacramentum octava corporis Christi. In eadem habentur reliquie subscripte; Item Albine et Leothardis et Katharine virginum; item de sancto Petro apostolo; reliquie Cosme et Damiani; item eyn ruggeknoke in sulver gewercht cum scriptura greca; item de sancto Bemhardo; item Mathei apostoli," (1482 Inventory of the Guelph Treasure, no. 69, in: Andrea Boockmann, Die verlorenen Teile des 'Welfenschatzes': Eine Übersicht anhand des Reliquienverzeichnisses von 1482 der Stiftskirche St. Blasius in Braunschweig, Göttingen 1997, p. 141).

18 Relics were kept separate from the consecrated Host due to fears of contamination of the Body of Christ.

19 See, for example, the 1477 inventory of the silver and ornaments of Simon Savary (Amaury Louys de la Grange and Louis Cloquet, Études sur l'art à Tournai et sur les anciens artistes de cette ville, pt. 2, in: Mémoires de la Société Historique et Littéraire de Tournai 21, 1888, pp. 320–324, here 320–322).

20 To this end, goldsmith Pierre le Nef was paid 4s 6d by the church of St. Brice in Tournai for weighing all the ornaments of the church for an inventory in 1421 (Eugène Soil de Moriamé, L'église Saint-Brice à Tournai, in: Annales de la société historique et archéologique de Tournai, N. S. XIII, 1908, p. 162). For more on the inventory as a fiscal reserve: Louise van den Bergh-Hoogterp, The Treasury of the Utrecht Cathedral. Review of the Treasures from extant Sacristy Inventories, in: Elisabeth de Bièvre (Ed.), Britain and the Continent: Archae-

writes that this Cologne goldsmith, "saw his oeuvre destroyed, which he had made with so much love and art, for the public needs of the duke."[21] Many archives possess lengthy lists of church vessels that were, in the words of an early sixteenth century document from Salzburg, "all melted down and made into coin [...] in the war emergency."[22] Such inventories report values solely in terms of materials and weight. A silver chalice weighing 1 mark would therefore have an inventory value equivalent to a 1-mark silver ingot, with no consideration of its original price or artistic value. Barring alterations that affected its weight and materials, the inventory value of a given object remained constant, since it was based entirely on liquid value.

Payment Records

Unlike the liquid value in an inventory, the purchase price of an object included not just its materials, but the goldsmith's salary and sometimes other fees, including delivery. It is sometimes possible to find the exact specifications for salary in a payment record, for example as recorded by the Constance goldsmith Steffan Maignow before 1484: "Further, I made for his honor [Count Allweg von Sulcz] 12 spoons, weighing 30 lot, the lot cost at 1 mark silver for 7 Gulden; 3 Gulden salary for 1 mark, 1 ducat for gilding the 12 spoons."[23] (fig. 2). In this case, we know the price for the silver (7 Gulden per

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ology, Art and Architecture, London 1996, pp. 246–252; Manfred Groten, Schatzverzeichnisse des Mittelalters, in: Ornamenta Ecclesiae: Kunst und Künstler der Romanik in Köln, Exhibition Catalogue Cologne 1985, p. 149; Fritz 1982 (note 14), pp. 25–26; Franz Wagner, Goldschmiedekunst, in: Spätgotik in Salzburg: Skulptur und Kunstgewerbe, 1400–1530, Exhibition Catalogue Salzburg 1976, pp. 75–76; Werner Fleischhauer, Der Kleinodien- und Silberschatz der Württembergischen Grafen im frühen 15. Jahrhundert, in: Zeitschrift für bayerische Landesgeschichte 35, 1972, pp. 54–68, here 64–65.

21 Richard Krautheimer, Ghiberti and Master Gusmin, in: The Art Bulletin 29, 1947, no. 1, pp. 25–35, here 26.

22 "[...] in den kriegsnöten [...] alles verschmelczt und zu geld gemacht [...]" (Parish record from August 31, 1525. Konsistorialarchiv Salzburg, Archivalien Franziskanerkirche, Oeconomica 5/69, Pfarrkirchenrechnung von 1525, fol. 26–27, in: Wagner 1976 [note 20], p. 76).

23 "Mer han jch gemacht minem gnädigen herren xij löffeln wegen xxx lot, j lot kost j marck silber vij Gulden; iij Gulden lon von ainr marck j dogatten zu Gulden von den xxj löffel". This transaction is part of a longer entry with multiple items that were made for Count Allweg von Sulcz. Each transaction is separate from the others, but salary is only reported as a separate item in this particular transaction (Steffan Maignow, Account Book, Stadtarchiv Konstanz, Signatur D I, Band 207, fol. 2r: Gabriela Signori and Marc Müntz [Ed.], Das Geschäftsbuch des Konstanzer Goldschmiedes Steffan Maignow, Ostfildern 2012, pp. xviii, 12).

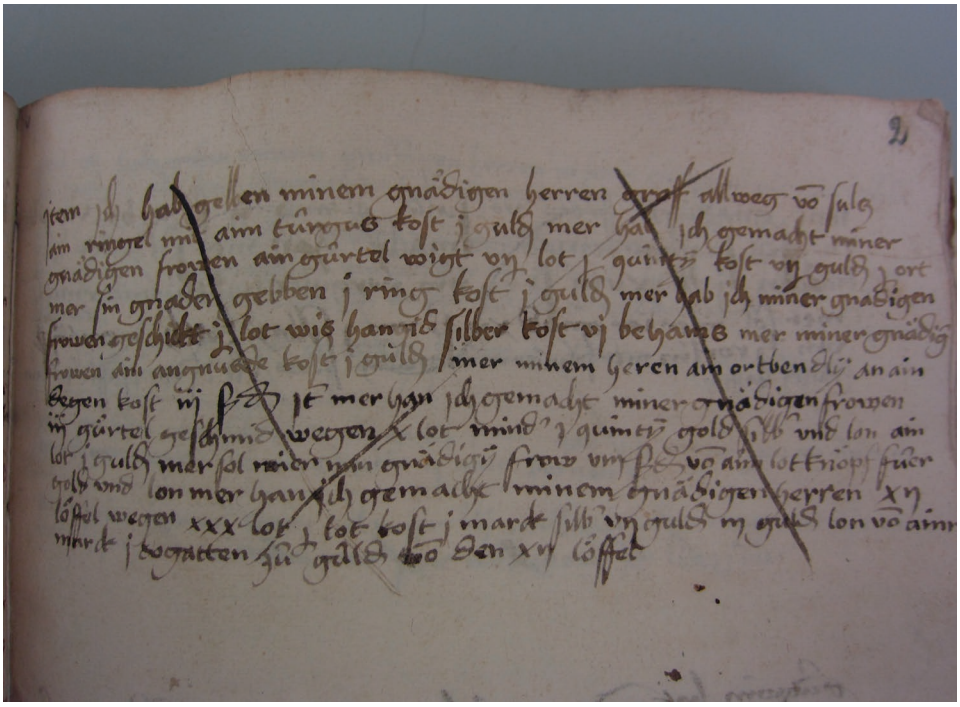

Fig. 2 Entry from the Account Book of Steffan Maignow recording purchases made by Count Allweg von Sulz, including 12 gilded spoons (the payment for the spoons is described in the last 3 lines of this entry). Steffan Maignow, Account Book, Stadtarchiv Konstanz, Signatur D I, Band 207, fol. 2r. Photo: Heather McCune Bruhn, 2011.

mark weight) and Steffan Maignow's salary for working it (3 Gulden per mark weight). If we consider just the silver, Maignow received 30% of the total price for his labor. We can use additional information from the record, including the silver weight of the spoons (30 lot = 1.875 marks) and the ducat (approximately 1 Gulden) for gilding to determine the overall price of the spoons (19.75 Gulden after gilding). Steffan Maignow's salary was 5.625 Gulden, 28.48% of the price paid for the gilded spoons. The determining factors in his payment reflect policies that had first been recorded over a century earlier, as I will discuss below.

By the mid fourteenth century, goldsmiths' salaries were clearly dependent upon both metal weight and difficulty of execution. On July 22, 1372, the city of Cologne officially stated that their goldsmiths did not have set labor prices. Rather, wages for silver gilt and silver were negotiable based upon the weight and complexity of the object in

Fig. 3 Mouton d'Or of King Jean le Bon of France, 1350–1364. Cleveland Museum of Art, The Mr. and Mrs. Lewis B. Williams Collection 1964.372. Public domain: https://www.clevelandart.org/art/1964.372

question.[24] The Cologne statement was in response to an attempt by the city of Breslau to standardize prices with Cologne and Brussels. In the fourteenth century, Brussels was the only city with a documented price scale for goldsmithwork. That price scale, however, depended on the same factors: metal weight and difficulty of execution. There were established salary bands in Brussels, for example a payment of 1 mouton d'or per mark silver for simple tankards and cups and nearly 2 moutons d'or for smaller, more intricate vessels containing approximately 1 ½ marks silver (fig. 3). The highest rate paid in Brussels was for a complex lady's girdle, for which the goldsmith received a sum equal to the cost of the materials.[25] Even without calculating the price of silver in mouton d'or, it is clear that in Brussels, as in Cologne and Breslau, the goldsmith's pay increased with the complexity of the work.

24 It should be noted here that the silver could be gilded or ungilded, and that gilding did not affect salary. "Determinationem vero salarii certam non habent, sive fuerit operas deaurati sive non deaurati, sed illud attendunt et ponderant circa difficultatem et laboris quantitatem" (July 22, 1372: von Loesch 1906 [note 14], vol. 2, p. 212, no. 426). Another copy of this letter is printed in: Georg Korn (Ed.), Schlesische Urkunden zur Geschichte des Gewerberechts inbesondere des Innungswesens aus der Zeit vor 1400, Bratislava 1867 (Codex Diplomaticus Silesiae, 8), no. 44, pp. 69–70.

25 A summary of these negotiations and the content of the Brussels letter can be found in Karcher, and Korn prints the text of the Brussels letter (Richard Karcher, Das deutsche Goldschmiedehandwerk bis ins 15. Jahrhundert, Leipzig, 1911, p. 88; Korn 1867 [note 24], no. 45, pp. 70–71).

Determining the Goldsmith's Salary

Based on the above correspondence, I calculate the goldsmith's salary as a percentage of the overall purchase price for a given object. If a record contains all the needed information, namely the amount of silver, its value, and the goldsmith's share of the overall price, I calculate the overall price of the object and then divide the salary by the price to determine what percentage went to the goldsmith. The equations can be expressed as: total price (tp) equals materials price (mp) plus the goldsmith's salary (gs):

$$[tp = mp + gs]$$

where materials price (mp) equals silver value per unit (vu) multiplied by units of silver (su)

$$[mp = vu \times su]$$

and goldsmiths' salary (gs) equals salary rate per unit of silver (ru) multiplied by units of silver (su):

$$[gs = ru \times su]$$

In certain cases, the materials price for silver (mp) can only be determined using metric equivalents of the medieval measurements, for example converting a weight of 1 mark 5 lot into grams and then dividing by the silver value of a coin (for example the Gulden). Thus, the materials cost for silver (mp) equals the units of silver (su) multiplied by the mark conversion rate, for example for the Cologne mark or the marc de Troyes (mc), and that total is divided by the silver value of the Gulden or another coin in grams (sc).

$$[mp = (su \times mc) \div sc]$$

It is not uncommon to encounter payments for works made entirely of gold. For example, in 1449, Jehan Peutin was paid for making a covered gold cup weighing 3 marks and 1 ounce at the price of 75 livres for each mark, for a total of 234 livres, 7 sous and 3 denier.[26] This record only provides information on the weight of the gold and Master Jehan's salary. The total price and salary cannot be identified without the value of the

26 "Audit Jehan Peutin, pour une couppe d'or couverte, pesant III marcs une once, au pris de LXXV Iivres monnoie dicte chacune marc, valent de ii^{c} xxxiiii livres vii solz iii deniers." (Lille, Archives Departementales du Nord, B 2002, in: Hugo van der Velden, Defrocking St. Eloy: Petrus Christus's 'Vocational Portrait of a Goldsmith,' in: Simiolus: Netherlands Quarterly for the History of Art 26, 1998, no. 4, pp. 242–276, here 268, doc. 3).

gold, a variable that requires additional investigation.[27] Although the salary rates for gold objects are worthy of further study, I will limit this investigation to objects of silver and gilded silver.

Although it is sometimes possible to find the exact specifications for salary, like the payment to Steffan Maignow above, more often each source provides just a glimpse of the overall picture. For example, the account book of the parish church of St. Nicolai of Kalkar records payment in 1493 for a silver image engraved with St. Nicholas weighing 4 vierdeel at a total of 20 stuivers, plus its delivery and installation in the parish church for an additional 50 kreutzer.[28] The entry thus contains a weight of silver (4 vierdeel, or 1 mark), and payment in two types of coin, stuiver and kreutzer. The entry implies that the 20 stuivers are payment for both the silver for the figure and the maeckloen (salary) for the goldsmith, but it does not differentiate between the silver price and the salary. In order for this entry to provide useful data about the pay rate, it must be augmented with additional information. I approximate the material missing from this record by consulting other reliable resources. One such resource is the well-documented yearly price of silver in Gulden for medieval Cologne that I have already used above.[29] This can be used to estimate the goldsmith's salary. Although strict accuracy should be the goal of any such endeavor, currency debasement and the variability of currency values, weights and measures by region and city make it impossible to calculate exact results. The situation was confusing even for those who lived through it. Gilles Li Muisis, a poet and chronicler in early 14th century Tournai, wrote: "Coins are the most obscure things.

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27 It is possible to estimate the total price of the cup, based on a conversion of the gold weight to metric. Using the marc de Troyes results in 764.853g gold in the covered cup, and this can be converted to livres using coin values from Cologne (the Gulden was roughly equivalent to the livre). Using this conversion, the gold price would have been 278.027 livres, and the total price for the covered cup (with the salary of 234.3625 livres) thus 512.3895 livres. Master Jehan's salary would therefore be 45.74 % of the overall price of the covered cup. Given the salary, it must have been a very impressive cup! It might be possible that high prestige items like this would have their own, higher rates of pay, but I have not yet studied enough payment records for gold objects to be able to draw any firm conclusions. The gold value of minted coins in 1449 has not been recorded, so I used the average between 1437 and 1454 to make this calculation and consulted Ebeling/Irsigler 1979 (note 6), p. xxxiv.

28 "Item [...] eyn beeldt van sunter Nycolaus doin maecken van sylueren, dat hy op Couell druech ind wegget 4 vierdeel ind kosten mytten syluer ind maeckloen 20 stuuer [...]" (Fritz Witte, Quellen zur Rheinischen Kunstgeschichte, vol. 1, Tausend Jahre deutscher Kunst am Rhein, vol. 5, Berlin 1932, p. 18).

29 Ebeling/Irsigler 1979 (note 6), especially pp. xxxiv–xxxvii. See also note 21.

Their value rises and falls, and one does not know what to do. When one thinks that he has gained, he finds the contrary [that he has lost]."[30]

Problems of Interpretation

Each payment record comes with its own pitfalls. The terminology for weight, currency and payment could be unfamiliar, for example. It is also crucial to check the accuracy of the account and make sure that all the needed variables can be determined. A seemingly simple entry might prove difficult, which is why it is important to always apply mathematical analysis to a record before drawing conclusions. Consider this example from Weil der Stadt: "In the year 1484 the goldsmith charged for a corporal weighing [wigt] in silver 4 marks and 4 ¼ lot, for its making was paid [zu machen zalt] 23 florins and a gratuity [trinckgelt] of 7 solidi."[31] This record provides three distinct numbers. First, the weight of silver used in creating the corporal: 4 marks, 4 ¼ lot. Next, a payment of 43 florins, and finally, the addition of (trinckgelt) of 7 solidi.[32] As indicated above, the mark was a standard measurement for silver and gold, and the metric equivalent in grams has been documented for the Cologne and Regensburg marks as well as the marc de Troyes.[33] The lot was 1/16 of a mark, and the ¼ lot was a quentis. The metric weight of silver would be 1008.504g using the Cologne mark, 1055.497g using the

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30 "En monnoies est li cose moult obscure, Elles vont haut et bas, se ne set-on que faire, Quand on guide wagnier, on troeve le contraire." (Money and Coinage in Late Medieval and Early Modern Europe: https://www.economics.utoronto.ca/munro5/MONEYLEC.htm [19.11.2025])

31 "Anno 1484 hat man dem goldschmidt von einer corporal laden, welche an silber 4 mark und 4¼ lot wigt, zu machen zalt 43 fl und trinckgelt 7 ß." Weil der Stadt, Pfarrarchiv St. Peter, Inventar und Stiftungsbuch, 1484, in: Hans Rott, Quellen und Forschungen zur südwestdeutschen und schweizerischen Kunstgeschichte im 15. und 16. Jahrhundert, vol. 2, Stuttgart 1934, p. 232. This so-called silver corporal may actually be a silver container to hold the corporal, since the liturgical corporal was generally made of finely embroidered linen. For more on the corporal, its use and containers for the corporal, see Josef Braun, Die liturgischen Paramente in Gegenwart und Vergangenheit: Ein Handbuch der Paramentik, vol. 1, Freiburg i. B. 1924, pp. 205–209, especially 208 for containers.

32 Trinckgelt, or Weinkauf, is the term given to the wine or beer consumed during negotiations between the goldsmith (or another artisan) and the person who commissioned a work – it was the responsibility of the patron to pay this fee. Leopold Schütte, Wörter und Sachen aus Westfalen 800 bis 1800, Münster 2007, p. 691. My thanks to Dr. Gerd Dethlefs, who helped me to find the correct interpretation of this word.

33 See above, note 10.

marc de Troyes, and 1060.875g using Regensburg marks. The price of silver in Gulden is well-documented in Cologne (29g silver to 1 Gulden in 1484), and Gulden were considered equivalent to florins.[34] Multiplying the payment in florins (43) by the metric value of silver (29 g) yields a payment equivalent to 1247g silver, which is approximately 238.5 g (or 8.22 fl.) greater than their value based on the Cologne mark, and 191.5g (or 6.6 fl.) and 186g (or 6.41 fl.) based on the marc de Troyes and the Regensburg mark respectively. These numbers reflect the goldsmith's pay, to which the trinckgelt added an additional 7 solidi. Without the trinckgelt, the goldsmith's share of the overall price ranged between 14.9% and 19.11% of the entire purchase price of the silver corporal. Assuming the standard rate of 20 solidi to a florin, the extra payment added 0.35 fl to the goldsmith's pay. The goldsmith's share of the price was negotiated in advance, and the trinckgelt was added following additional negotiations (it was the patron's responsibility to pay for any wine or beer consumed during negotiations).[35] Without these calculations, it would be easy to imagine that the goldsmith received only the 7 solidi for labor, which would make their wage very meager indeed.

Here is another example in which mathematical analysis is crucial. In 1472, the Marienkirche in Lübeck recorded a series of payments to the goldsmith Jurien Drewkin to make a head of St. Paul, presumably a reliquary. Most of the silver was provided by the church, first 8 marks of silver, then 27 lot (1 mark 11 lot), and finally 9 marks of silver (for a total of 18 marks 11 lot). The finished silver head was made of 14 marks 1 lot of silver, with 4 marks 10 lot remaining. For his work, Master Jurien had negotiated a "maecklon" of 5 marks silver coin for each mark of silver that he worked. He was paid in two installments, first in 30 marks silver coin, and then in 50, for a total of 80 marks silver coin.[36] Master Jurien's overall payment of 80 marks reflects a higher rate than

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34 For gold prices, see Ebeling/Irsigler 1979 (note 6), pp. xxxiv–xxxvii. For coinage, see: Weschke/Jahnke 1983 (note 3), pp. xxi–xxiv; For difficulties with late medieval monetary systems, see: "Money and Coinage," https://www.economics.utoronto.ca/munro5/MONEYLEC.htm (20.11.2025).

35 See note 32.

36 "Item anno LXXII des donerdages na Mathie don antwordeden wy Jurien Drewken, dem goltsmede, sunte Pauwels kovet, dat woch 8 mark lodich. Item noch dede wy ein dosulves darto an sulver 27 loet. Item noch hefft de werkmester Cristoffer Jurien dan an sulver 9 mark lodich. Item noch heft de werkmester dan Jurien uppe id makelon, wente em lovet is vor de mark lodich to makende 5M, 30M lubesch. Item uppe dyt vorscrevene sulver, dat wy vorstender Jurien dan hebben, entfenge wy wedder sunte Pavels hovet, dat hefft wogen 13 mark 13 loet, noch 4 loet, de to den voten to lodende quemen. Des antwordeden wy em noch, do wy dat hovet entfengen, 4 mark 5 loet, darto geve wy em vor sin makelon 80M." (Carl Friedrich Wehrmann, Auszüge aus dem ältesten Memorialbuche der Marienkirche, 1448–

was negotiated: it is closer to 5.69 marks coin for each mark of silver, 13.8% higher than reported in the payment record. It is possible to estimate the overall price of this work by converting the Lübeck silver mark coin into Cologne Gulden. This calculation uses the metric equivalent of the Lübeck coin in silver (recorded as 20g in 1461), and the Cologne metric silver value of the Gulden in 1472.[37] Using this conversion, the "maecklon" for Master Jurien was 53.78 Gulden. The amount of the silver used for the head of St. Paul was between 3,330.788 g (using the Cologne mark weight) and 3,459.375 (using the Regensburg mark), for total of 111.96 to 116.28 Gulden, making the overall price of the work 165.74 to 170.06 Gulden.[38] Master Jurien was thus paid a salary between 31.6 and 32.4% of the total price of the work.

Determining a Pay Scale

Even when a payment record eludes one's efforts to determine an overall price and the goldsmith's salary, it might still contain clues to a hierarchy of objects and pay rates. For example, the account books of Philip the Bold of Burgundy indicate that Jehan de Braban of Bruges will be paid 7 ¼ francs per mark silver for two "quartes" (footed and covered wine jugs containing one quart), 7 francs per mark for an "aiguiere" (a ewer with a spout and handle) and 6 francs per mark for twelve "hanaps" (broad drinking bowls) in 1386.[39] No price is provided for the silver, and huge fluctuations in fourteenth century currency values make it difficult to calculate the cost of silver in francs. How-

1529, in: Zeitschrift des Vereins für Lübeckische Geschichte und Altertumskunde 5, 1888, pp. 160–165, here 163). It is possible, given the narrative of payments, that 4 marks 5 lot of the remaining silver provided to Master Jurien was accounted in his salary of 80 Lübeck marks, but that still leaves 5 lot silver unaccounted for.

37 For the Lübeck silver mark metric equivalent in silver, see: Rodney Edvinsson, Bo Franzén and Johan Söderberg, The Swedish System of Payment, 995–1534, Stockholm Papers in Economic History 9, Stockholm 2009, p. 21; for Cologne Gulden see Ebeling/Irsigler 1979 (note 6), p. xxxiv.

38 For the conversion rates, see above, note 10.

39 This payment from the accounts of Duke Philip the Bold of Burgundy was made on November 6, 1386. Bernard Prost and Henri Prost, Inventaires mobiliers et extraits des comptes des ducs de Bourgogne de la maison de Valois (1363–1477), vol. 2, Paris, 1913, no. 1477. For terms and descriptions of secular plate, see: Glossary page at the Musée de Louvre, Paris (www.louvre.fr/llv/glossaire); Ronald W. Lightbown, Secular Goldsmiths' Work in Medieval France: A History, London 1978, particularly pp. 20–22 and 27.

ever, the hierarchy of objects (and the salaries paid for them) is clear.[40] Simpler items of plate resulted in a lower wage than more complex ones.

In order to better understand the hierarchy of objects and the salaries paid for them, we should begin with the most common objects produced by medieval goldsmiths: simple objects of plate and jewelry. In most, but not all cities, the three pieces that a goldsmith had to produce to gain the status of master (masterpieces) fell into categories that represented the goldsmith's usual stock in trade: a ring set with a precious stone, an engraved seal and either a beaker or chalice.[41] In other cities, there was greater emphasis on jewelry and other small decorative items, as in Stade, Lüneberg and Lübeck, where the masterworks were rings, brooches and decorative knife fittings, some decorated with niello.[42] A poem in Hans Sachs' 1568 book of trades begins: "I, the goldsmith, make valuable things, seals and golden signet rings," and ends with a listing of jewelry and vessels like beakers, goblets, dishes and bowls.[43] Representations of gold-

40 Records with payments that reflect a similar hierarchy of goldsmith work can be found in: Bernard Prost, Inventaires mobiliers et extraits des comptes des ducs de Bourgogne de la maison de Valois, vol. 1, Paris 1902; Prost 1913 (note 37); Louis Ausseil, L'orfevrerie en Roussillon: Les orfèvres de la juridiction de Perpignan, Perpignan 1994.

41 The Regensburg goldsmiths' ordinance from 1396 is the earliest example of this requirement (Otto Hupp, Das Rathaus zu Regensburg, Regensburg 1910, pp. 174–175). For more general information on masterpieces, see: Fritz 1982 (note 14), pp. 61–62. Johann Michael Fritz, Martin Schongauer und die Goldschmiede, in: Le beau Martin: études et mises au point, Exhibition Catalogue Colmar 1994, p. 176. Scheffler often includes masterpieces in his summary of guild ordinances for each city in his regional series on goldsmiths and hallmarks. See, for example, the masterpieces required for Memmingen in: Wolfgang Scheffler, Goldschmiede des Ostallgäus (zwischen Iller und Lech): Daten, Werke, Zeichen, Hannover 1981, p. 39.

42 "Item eene igelick goltsmyt willende werden zyn eeghene heere, de schal maken eenen guldenen Rinck, Eene Engelssche braetzeme, braetzeme der Hant trouwe gheblakmalet, vnd eenen Ringh eneme messe vmme ghedaen, gheheten byworp, oock gheblakmalet," Masterworks for Stade, 1371 in: Fritz, Goldschmiedekunst der Gotik (note 14), pp. 61–2; For explanations and descriptions of the Engelssche braetzeme, see: Susanne Mosler-Christoph, Materielle Kultur in den Lüneburger Testamenten 1323 bis 1500, dissertation, Georg-August-Universität zu Göttingen, 1998, p. 57; for byworp and other masterworks required for Riga (and other cities), see: Wilhelm Stieda, Aus dem Leben des rigaer Goldschmiedeamtes I, in: Baltische Monatsschrift XXXV, 1888, pp. 20–38, here 30–32.

43 "Ich Goldtschmid mach köstliche ding / Sigel und gülden petschafft Ring / Köstlich geheng und Kleinot rein Versetzt mit Edlem gestein/Güldin Ketten / Halß imd Arm band / Scheuren und Becher mancher hand / Auch von Silber Schüssel und Schaln / Wer mirs gutwillig thut bezaln." (Manfred Lemmer [Ed.], Jost Amman: Das Ständebuch, 133 Holzschnitte mit Versen von Hans Sachs und Hartmann Schopper, Leipzig 1934, reprint 1975, p. 26). The translation above is my own.

smiths in their workshops display familiar objects that could have been produced speculatively for the market, including rings, drinking vessels, seals, secular silver plate of varying degrees of complexity, and unset pearls and gems[44] (fig. 4). Similar items can be found in the property inventories of deceased goldsmiths, for example four beakers and five kettles made by a Cologne goldsmith in the mid-fifteenth century, and several silver spoons in the York workshop of a Cologne goldsmith.[45] The objects most commonly listed in fifteenth century testaments from 's-Hertogenbosch are drinking vessels, spoons and dishes.[46]

Steffan Maignow's account book, written between December 1, 1477 and his death in 1501, contains multiple entries for the uncomplicated items of jewelry and secular plate that represent the lowest tier of the goldsmith's salary. As each payment was completed, it was crossed out in the account book (fig. 5). Maignow routinely charged 7 Gulden per mark as the material price for silver, but his rate of pay was variable.[47] In many cases, he simply reports the price of a work in terms of the materials price (reported as wigt) followed by the total cost (kost) without indicating the weight in marks. His salary is the difference between the numbers (wigt subtracted from kost). For example, he was paid for a series of chains that varied greatly in value. For one with a price of 74 Gulden, he received a salary of 4 Gulden (5.4% of the total), for another, priced at 64 Gulden, 4 Gulden (6.25% of the total), and for a third chain, his share was 1 Gulden of a total price of 11 Gulden (9.1% of the total).[48] For a gold chain valued at 25 Gulden, Steffan Maignow received just 1 Gulden salary (4%). In 1449, Jehan Peutin was paid just

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44 Examples include Petrus Christus, A Goldsmith in his Shop, oil on panel, 1449 (New York, The Metropolitan Museum of Art, Robert Lehman Collection, Inv. nr. 1975.1.110), The Master of Balaam, St. Eligius in his Workshop, engraving, c. 1450, (Amsterdam, Rijksmuseum, RP-P-OB-963) and Nikolas Manuel (Deutsch), St. Eligius in his Workshop, oil on panel, c. 1515 (Bern, Kunstmuseum, Burgergemeinde Bern, Inv. nr. G 2020b).

45 Loesch 1906 (note 14), vol. 2, no. 474, pp. 249–250; Testamenta Eboracensia: A Selection of Wills from the Registry at York, vol. 4, Durham etc. 1869, no. XXVI, pp. 58–59.

46 R. Wolf, Zilver in bezit van Bossche particulieren, met name gedurende de fijftiende eeuw, in: Zilver uit 's-Hertogenbosch, van bourgundisch tot biedermeier, Exhibition Catalogue 's-Hertogenbosch 1985, pp. 145–147, here 146.

47 This pay rate can be found in several of the payment records listed here, and Nuglisch reports this as a constant price for silver in Maignow's account book (Steffan Maignow, Account Book, fol 2r, 13v and 20r; Anton Nuglisch, Das Geschäftsbuch des Konstanzer Goldschmiedes Steffan Maignow [1480–1500], in: Zeitschrift für die Geschichte des Oberrheins 22, 1907, pp. 456–470, here 470; Signori/Müntz 2012 [note 23], pp. xviii, 12, 21 and 29).

48 Steffan Maignow, Account Book, fol. 2r, in: Signori/Müntz 2012 (note 23), p. 12.

Fig. 4 Petrus Christus, A Goldsmith in his Shop, oil on panel, 1449. The Metropolitan Museum of Art, New York, Robert Lehman Collection, 1975.1.110. Public domain: https://www.metmuseum.org/art/collection/search/459052

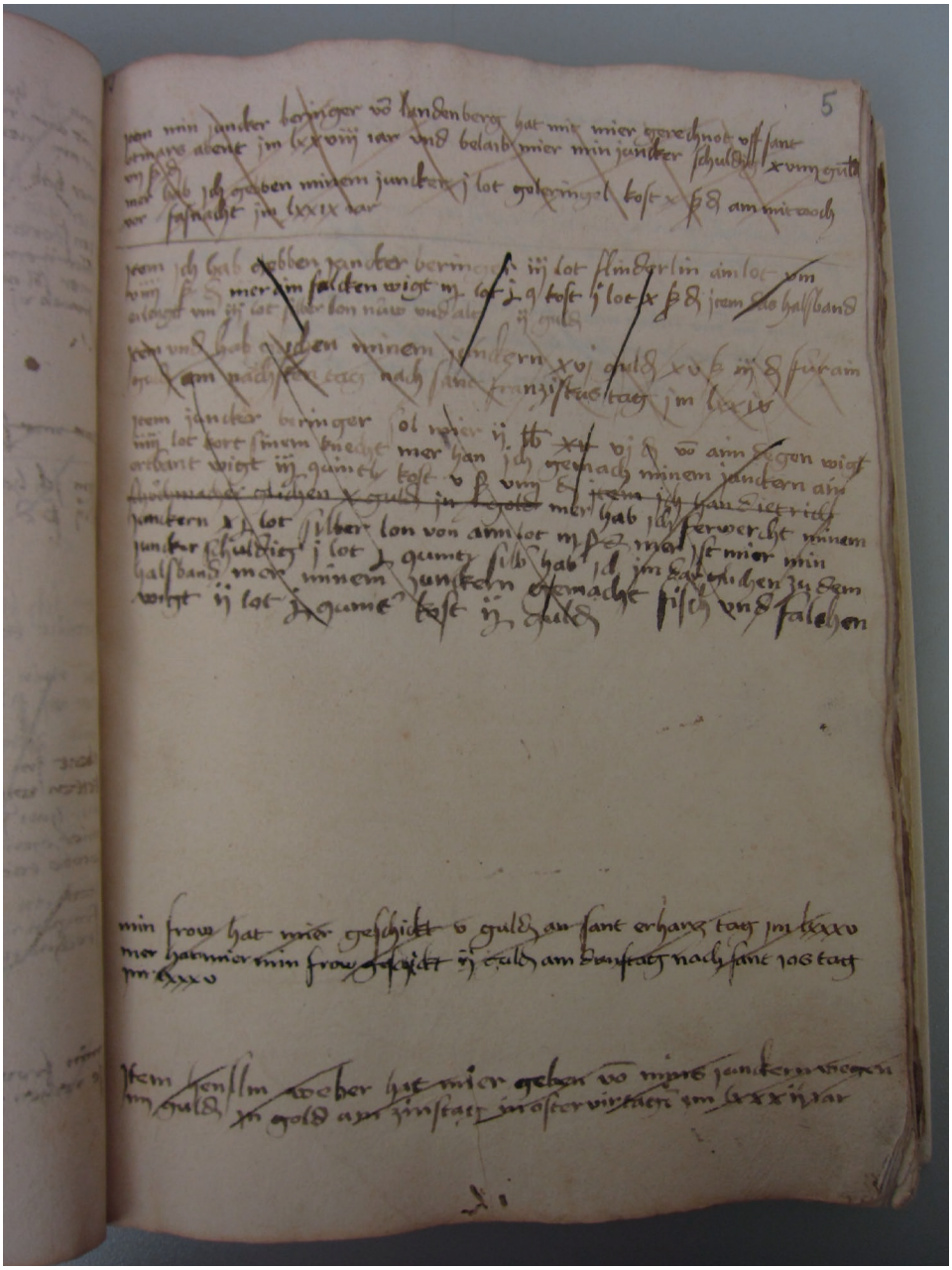

Fig. 5 page from the Account Book of Steffan Maignow. Steffan Maignow, Account Book, Stadtarchiv Konstanz, Signatur D I, Band 207, fol. 5r. Photo: Heather McCune Bruhn, 2011.

2.7% of the price for 6 silver cups (tasses) made for Philip the Good of Burgundy to be presented to Mary, Queen of Scots as a wedding gift.[49] Low salaries like these were not isolated to secular works: a gilded chalice made in 1499 for the Church of St. Nicholas Opper Mathena in Wesel cost a total of 30 Gulden, of which 3 Gulden were paid to the goldsmith, a salary of 10%.[50] Chalices, like beakers, were simple drinking vessels that were commonly made by most goldsmiths, and lightweight chalices were frequently donated to churches for memorial masses.[51] I therefore suggest that the lowest rate of pay for goldsmiths was between approximately 2.5 and 12% of the total price for these relatively uncomplicated works.

The second level of payment was for slightly more complex objects like tankards, crosses, candlesticks, small censers, and small but intricate jewelry. For these items, the goldsmith was paid between 13 and 29% of an object's total price. One such example, a silver corporal made for the church of St. Nicholas Opper Mathena in Wesel in 1484, for which the goldsmith received between 14.9 and 19.11% of the overall price, was described in detail above.[52] The account books from the same church report that Master Jan aan der Steynporten made a silver cross for the church choir in 1455, for which he received 13.8% of the total price.[53] Further, an unnamed goldsmith received a salary of 22.6% for a silver censer in 1480.[54] Rates like these were not unique to Wesel: Master Johann de

49 Archives Departementales du Nord, Lille, B 2002: van der Velden 1998 (note 26), p. 268, doc. 3.

50 Witte 1932 (note 28), p. 72.

51 Charlotte Stanford's analysis of the Strasbourg Book of Donors indicates that, of the 38 donated objects that can be identified as church plate, 13 were chalices and 13 were reliquaries. The remaining 12 objects included a censer, a crozier, two patens, six crosses, one crucifix and one unidentified vessel (Charlotte A. Stanford, Commemorating the Dead in Late Medieval Strasbourg: The Cathedral's Book of Donors and Its Use [1320–1521], Church, Faith and Culture in the Medieval West, London/New York 2016, table 1.10, pp. 48–49). For the average size of a chalice, there are two helpful examples from inventories: the 24 silver chalices listed in the 1360 inventory of the treasury of St. Bartholomew in Frankfurt had an average weight of 1.998 marks, or nearly one pound, and the average weight of 60 chalices inventoried together in the 1525 for the Münster in Ulm was similar, at 1.823 marks. For Frankfurt am Main: Stolleis 1994 (note 15), p. 28–29; for Ulm: Inventory of "Aller Gaistlicher Klainater" siezed in 1525 in the city of Ulm (Rudolf Weser, Der Kirchenschatz von Ulm bei Beginn der Reformation, in: Archiv für Christliche Kunst 36, 1918, pp. 70–82 and 86–101, here 89).

52 See above, note 21.

53 Witte 1932 (note 28), p. 65.

54 Witte 1932 (note 28), pp. 65, 67.

Hem was paid 16% of the total price of a candelabra for the Cathedral of Cambrai in 1361.[55] Salaries for secular works were similar: in 1488, Steffan Maignow was paid 16.8% of the total price for a button and a ring, both of gilded silver.[56] He also made a small silver lock in 1480, for which he received 28.9% of the overall price.[57] In 1447, Willem van Vleuten of Bruges was paid 22.55% of the price for a silver ewer (aighier) and six goblets that were commissioned by Duke Philip the Bold to be presented to Gautier de la Mandre. In the same year, he made two tankards that would be presented to Jehan Arnolfini for a salary of 28.25%[58] Eight years later, he received nearly 27% for a gold cloak clasp that he fashioned for Duke Philip the Bold.[59]

Salaries between 30 and 40% of an object's total price were paid for increasingly elaborate objects like small reliquaries, elaborately fashioned girdles, and drinking vessels that were meant for display and use on ceremonial occasions. For example, Master Otte van Toven made a small monstrance (likely a reliquary) for the church of St. Nicholas Opper Mathena in Wesel in 1451. He was paid 3 Gulden per mark of silver used. One year earlier, an unidentified goldsmith was paid the same wage for work on a small silver monstrance for relics of St. Anthony.[60] Although the price of silver is not reported for these two records, an earlier record from the same church in 1442 gives a price per mark silver of 7 Gulden and the same salary rate of 3 Gulden per mark. This was paid to Otte van Toven for producing a Eucharistic monstrance, and this same rate can be found in multiple entries from Steffan Maignow's account book.[61] Assuming a silver value of 7 Gulden per mark, then, the salaries for the two reliquary monstrances and the Eucharistic monstrance were 30% of the total price. The 1491 payment for a small silver cross weighing just 6 lot (.375 mark or approximately 3 oz.) for the Church of St. Willibrord

55 Labor is recorded as 10lb. 2s, and materials as 49lb. 19s, with a total price of 59lb. 21s. A separate payment is recorded for gilding a portion of the candelabra. The second payment is just for the gold florins that were melted down and does not include labor. Jules Houdoy, Histoire artistique de la cathédrale de Cambrai, ancienne église métropolitaine Notre-Dame: comptes, inventaires et documents inédits, Lille 1880, reprint Geneva 1972, p. 160.

56 Steffan Maignow, Account Book, fol. 44r (Signori/Müntz 2012 [note 23], p. 44).

57 Steffan Maignow, Account Book, fol 45r (Signori/Müntz 2012 [note 23], p. 45).

58 Archives Departmentales du Nord, Lille, B 1998 (van der Velden 1998 [note 26], p. 269). This is the same Arnolfini whose portrait was painted by Jan van Eyck.

59 Archives Departmentales du Nord, Lille, B 2021, no. 61599 (van der Velden 1998 [note 26], p. 272).

60 Witte 1932 (note 28), p. 65.

61 Witte 1932 (note 28), p. 64. See also note 41, above.

in Wesel included a salary of 36.84% for the goldsmith.[62] This must have been a very intricate cross, and rather time-consuming to produce, given the pay rate.

Intricacy appears to be the key to the objects that commanded the highest wages (between 40 and over 50% of the total price). Some of these were quite small, for example a delicate ladies' girdle weighing just 2.1 lot (slightly more than an ounce) made by Steffan Maignow for Verena von Brandis, brought him a salary of 54.67%.[63] He engraved a seal for Ludwig Egly before December 1486 and was paid 50.43% of the total price. Although the actual payment for these examples was rather low (just 1.26 Gulden for the girdle and 1.45 Gulden for the seal), Steffan Maignow produced works like these rather quickly and in fairly large quantities. Much larger but still intricate works like repoussé figures and body-part reliquaries, elaborate jewelry, and large host monstrances commanded similar salary rates, but they required more time and resulted in a larger payoff.[64] Hans Rutenzwig, for example, was paid 52.05% the overall price of a gilded silver monstrance with elaborate figures that he made for the Parish Church of Porrentruy in 1477.[65] The contract between Georg Seld and the church of Ss. Ulrich and Afra in Augsburg (1486) for a monstrance included a salary for the goldsmith of 40% of its total price.[66] These larger works could sometimes require years of labor, and the resulting pay could surpass 100 Gulden (Hans Rutenzwig received over 163 Gulden for the Porrentruy monstrance). It is difficult to calculate the modern equivalent of a Gulden, but it can be related to other commodities with carefully controlled prices. In 1480, the midpoint in several of the examples of high-salary objects, 1 Gulden would

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62 Witte 1932 (note 28), p. 87.

63 Steffan Maignow, Account Book, fol 2r (Signori/Müntz 2012 [note 23], p. 12).

64 See, for example, the payment to Willem van Vlueten for a pair of jeweled E initials for Philip the Good in 1461, payments to Johannes Swartemolen for making a silver figure of the Virgin for the Collegiate Church in Kleve in 1426, payment to Hugo the Goldsmith for making a silver gilt arm of St. George for the Cathedral of Cambrai in 1377 and the contracts that I will discuss below (full bibliographic information in note 1). Archives Departmentales du Nord, Lille, B 2041, no. 62924 (van der Velden 1998 [note 26]; Witte 1932 [note 28], p. 54).

65 The contract between Hans Rutenzwig and the parish church of Porrentruy (1477) is summarized in: François-Joseph-Dominique Trouillat, Monuments de l'histoire de l'ancien Êveche de Bâle V, 1867, p. 522, no. 179. For commentary on the contract, see: André Rais, L'histoire du grand ostensoir gothique de Porrentruy oeuvre de Georges Schongauer, in: Zeitschrift für schweizerische Archäologie und Kunstgeschichte 22, 1962, pp. 73–80, here 73–75.

66 Ingrid Szeiklies-Weber, Drei Aufrisse spätgotischer Monstranzen im Stadtarchiv Ulm, in: Pantheon 36, 1978, no. 1, pp. 16–31, here note 36, pp. 29–30.

purchase 32 ⅔ loaves of rye bread weighing 7.5 lbs. each from any member of the Cologne baker's guild.[67] Thus Hans Rutenzwig could have purchased 5,326.5 loaves of rye bread from Cologne with his salary from the Porrentruy monstrance!

Conclusion

The method I present here for calculating the goldsmith's pay is a logical one, based on a great deal of documentary evidence. My proposed salary scale, however, is still a work in progress. I have expanded and refined it since the days of my dissertation, but I may not perfect it within my lifetime. It is my hope, however, that the variables, equations and pay rates that I provide here might inspire further research, for example comparing rates of pay for a variety of artists and craftsmen in the fourteenth and fifteenth centuries. Many artists and craftsmen can appear in a single record book from a church or governmental body, and from this archival material we can begin telling richer, more nuanced stories about these institutions and the works of art that were made for them. For example, when a large Eucharistic monstrance was made for the Church of St. Nicholas Opper Mathena in Wesel in 1442, the account book writer made a mathematical error and underpaid the goldsmith, Otte van Toven.[68] A year later, Master Otte made a new ciborium for the church.[69] The same year that the monstrance was finished, Henrich Veren made a protective cloth covering for it, and 1450 saw the creation of what I would consider a new lunula (described as "an ornament in which one sets up the Holy Sacrament").[70] Certainly we can see an 8-year period of expenditures focused on the consecrated Host. It is possible that the Corpus Christi celebrations were becoming more elaborate at the church of St. Nicholas, because in 1444 they acquired a new altar cloth from Henrich Veren, and in 1448 and 1450, purchased two censers from goldsmith Bernt van Willen.

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67 Formulas and tables for determining the price of bread from the mid-14th century through the 18th century can be found in: Ebeling/Irsigler 1979 (note 6), pp. xxxiv–xlii.

68 The error is a simple one: the record keeper forgot to "carry the one" and underpaid Master Otte by 10 Gulden (Witte 1932 [note 28], p. 64).

69 Witte 1932 (note 28), p. 64.

70 "Item ghegheven voir eyn kleyneyt dair men dat heylghe sacrament up set 4 m. 4 s. 6 d." (Witte 1932 [note 28], p. 64). Witte classifies this entry as church furniture, but I am convinced it refers to goldsmithwork.

Other stories might be revealed about relation between artists, both within the same guild and between guilds, and the socio-economic and political status of goldsmiths in relation to their fellow artists and craftsmen. Franz Kirchweger has recently published on the goldsmiths of Vienna, noting that although their place within the city's Corpus Christi procession was closer to the monstrance than any other guild, they were neither the wealthiest nor the most politically influential guild in Vienna.[71] His deep investigation into the goldsmiths of Vienna provides an exemplary model for future scholarship. Charlotte A. Stanford, in her work on the memorial book of Strasbourg Cathedral, the Savoy Hospital in London and more recently on Hampton Court Palace, provides excellent examples for the use of financial documents to identify patterns of giving by individuals and groups, the financing of construction projects, division of labor, hierarchy within groups of laborers, relations between local and itinerant workers, and supply chains.[72] A recently published volume addresses a range of art historical primary sources and what can be learned from them.[73] With the increasing availability of high-resolution scans of early publications and archival material alongside improvements to transcription software, entire databases are being opened for scholarly use. One of the most noteworthy is a collection of previously published contracts now available online.[74] The database includes hundreds of examples from the fifteenth and sixteenth centuries, and it continues to grow, providing instant availability of these materials for scholars around the world. Such databases make broad keyword searches easier to perform and allow faster statistical and network analysis. With the increasing availability of new resources and tools, scholars can tell more complex and richer stories about the works that we study, but we must also proceed with caution, checking our data and ensuring the accuracy of what we publish. Especially in this time of AI, it is crucial that we avoid overconfidence in tools that can be unintentionally flawed and biased. In the words of every elementary mathematics teacher, we must always check our work.

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71 Franz Kirchweger, Goldsmiths in Medieval Vienna (1150–1527): Their Trade and Their Art, in: Susana Zapke and Elisabeth Gruber (Eds.), A Companion to Medieval Vienna, Leiden 2021, pp. 469–496.

72 See, for example: Stanford 2016 (note 48); Charlotte A. Stanford, The Building Accounts of the Savoy Hospital, 1512–1520, Critical edition, with introduction and notes, of Westminster Abbey MS 63509, London 2015, and a forthcoming volume (2027) on Hampton Court Palace.

73 Wolfgang Augustyn and Felix Billeter (Eds.), Quellen edieren für die Kunstgeschichte: Beispiele vom Mittelalter bis zur Gegenwart, Passau 2024, especially the first 5 essays.

74 https://www.rdklabor.de/wiki/RDK_Labor:Quellen_und_Materialien (19.11.2025).