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Cover illustrations (from left to right): Kathrina Rudolph, *Titelbild der Süddeutschen Zeitung vom 3.12.2001*, 2002 (detail); Painting over the linear contours of an original icon with a mixture of powdered charcoal in garlic juice; Detail from a portrait miniature of Elizabeth 1 by Nicholas Hilliard, V&A 622-1882; Reconstruction of rose madder

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Munich *Taxae* project: the Kolberg inventory list of 1589

Andreas Burmester, Ursula Haller and Christoph Krekel

ABSTRACT During the late Middle Ages, German pharmacies provided not only drugs but also a broad range of articles for daily life including artists' materials. The prices of these products were published in the form of pharmacy price lists (*Taxae*). Although the pharmacy was not legally required to stock all the items listed, especially not those of non-pharmaceutical relevance, contemporary inventory lists allow conclusions to be drawn about the materials *de facto* either stocked (or not available) – and the quantities and value at the precise date of the inventory. This paper concerns an inventory list of a pharmacy in Kolberg (Kołobrzeg, Poland) from 1589, summarizing in two tables the cost and quantities in stock of items from this *Inventarium*. The relevance of the Kolberg inventory is discussed in the context of the Munich *Taxae* project.

Introduction

Documentary sources from mediaeval times to the 19th century occasionally refer to the fact that pharmacies also traded in pigments, binding media and related materials (Fig. 1). Medical statutes imposed by Frederick II in the first half of the 13th century required local authorities to publish the prices for all materials traded in a pharmacy in the form of pharmacy price lists (*Taxae*). The range of materials offered included not only drugs but also products used in daily life, e.g. herbs, paper, soap and candles, confectionary and liquors, as well as artists' materials.

The goals of the Munich *Taxae* project include researching, recording, evaluating and editing printed pharmacy price

lists from around 1450 to 1800. The authors' project intends to publish the recovered information on approximately 170 artists' materials in the coming years. To date, 300 *Taxae* have been processed and about 180 more known *Taxae* are still to be processed. The project database currently has about 26,000 entries relating to artists' materials. More information about the Munich *Taxae* project (Krekel and Burmester 2003) including details of all publications about the *Taxae* or specific artists' materials is available on the Internet.¹

The Kolberg *Inventarium* of 1589

Our research raised a number of questions about the function of the *Taxae*. Most of the *Taxae* list hundreds of different raw materials (*Simplicia*) and pharmaceuticals (*Composita*). Among the *Simplicia* are about 170 different materials used in artists' studios or craftsmen's workshops. The answer to the important question of whether all these materials were *de facto* stocked or were simply listed and priced for ordering on demand can only be found from inventories. Usually, stocktaking was carried out and inventory lists recorded once a year by the local *Collegium pharmaceuticum*. These inventories are handwritten and in most cases include pharmaceuticals only, being of main relevance to the pharmacy and the controlling committee. The Kolberg inventory list of 7 April 1589, drawn up on the occasion of the sale of the *Ratsapotheke* (council pharmacy) to Caspar Gobel, provided a complete list of all materials, goods and furniture present at that time in this pharmacy. Unfortunately, the Kolberg inventory list is only available through a secondary source (Meißner 1908).² A related Kolberg *Taxa* before 1589 is so far unknown.

Today, Kołobrzeg (Kolberg) is a small city on the Baltic Sea in Poland. Before 1945, Kolberg was a German city in Pomerania (Pommern). Founded in the 9th century, Kolberg



Figure 1 View into a pharmacy, from the Marburg *Taxa* of 1564 (Universitätsbibliothek Erlangen-Nürnberg).

was granted the town charter in 1255 and was part of the Hanseatic League from 1284. During the Thirty Years' War, Swedish troops occupied the city (from 1631 to 1653). Until the end of this war, the *Ratsapotheke* – which was under the tight control of the council – was the only pharmacy in Kolberg (Meißner 1908).

From the Kolberg inventory list we have extracted a list of materials, including pigments, media and other art-related materials relevant to artists or to craftsmen. It is possible, however, that some of these 'artists' materials' also had a pharmaceutical or some other use (Tables 1 and 2). The detailed inventory list not only gives the description of the individual products but also the amount stocked and the current value. Names and prices of the products are given as cost per unit weight in a mixture of Latin and German. The

first part – usually in Latin – might have been directly copied from the vessel's label, whereas the second – usually in German – gives additional information about the price per unit weight. The amounts stocked are listed in *stien*, *pfundt*, *lodt* and *Bladt* (1 *stien* = 21 *pfundt*, 1 *pfundt* = 32 *lodt*, 1 *lodt* ~ 15 grams). The value is declared in *M(ark)*, *ß(schilling) lubeß*, *Orts Daler*, *Daler*, *gulden (florin)*, *groschen* and *pfennig* (1 *Taler* = 768 *pfennig*; 1 *Ortstaler* = 192 *pfennig*; 1 *Mark* = 6 *lubecker schilling*; 1 *lubecker schilling* = 24 *pfennig*; 1 *gulden (florin)* = 32 *groschen*; 1 *groschen* = 18 *pfennig* – conversion factors as given in Meißner 1908). To make the list easier to read, the amount is calculated in grams and the value in *pfennig*, i.e. the smallest unit. For a quick overview, the materials are sorted according to the stocked amount (Table 1), or according to price per gram (Table 2).

Table 1 Artists' materials in the Kolberg inventory list of 1589, sorted according to the amount stocked. The materials are to be found in the chapters *Aromata* (a), *Gummata* (g), *De Lignis* (l), *De Radicibus* (r), *De Fructibus* (f), *Succi* (s), *Mineralia* (m), *Ab Animalia sumpta* (an), *Olea cummunia* (oc), *Olea praeciosa* (op), and (later) added material (ad).

Stocked amount (grams)	Listed materials	Chapter	Translation
201600	<i>Resina alle durcheinander, 1 stien pro 1 fl 5 g 6 p facit</i>	g	different sorts of resins, mixed
177600	<i>Vitriol. Rom. 100 pfund pro 4 fl</i>	m	Roman vitriol
100800	<i>Braunrodt 1 pfund pro 1 ß lübs</i>	m	brown ochre or copper brown
56640	<i>Bolus Bohemus pro [1 pfund pro 4 Dal.]</i>	m	Bohemian bole
52080	<i>Therebinthinae 10 pfund pro 1 fl; zusammen facit</i>	g	turpentine
45360	<i>Litargiry 16 pfund pro 1 fl</i>	m	litharge
39360	<i>Lini 1 pfund pro 3 g facit</i>	oc	linseed oil
30240	<i>Leim darvon 1 stien pro 2 fl 4 g facit</i>	r	glue/size
30240	<i>Braunholz darvon 9 pfund 1 fl</i>	l	brown brazilwood (?)
29460	<i>[Cerusae] Citrinae wie es ist 6 pfund pro 1 fl facit</i>	m	different sorts of lead yellow as it is
25200	<i>Gallae Turcae 3 pfund pro 1 fl facit</i>	f	Turkish galls
23520	<i>Ochra alle pro [1 pfund pro 1 Daler facit]</i>	m	different sorts of ochre
23040	<i>Farlebuck 6 pfund pro 1 fl facit</i>	l	brasilwood
17970	<i>Arsenici Alb. [and] Arsenici Cit. 7 pfund pro 7 Orts Daler</i>	m	arsenic oxide and orpiment
15000	<i>Gummi Arabici 3 pfund pro 1 fl facit</i>	g	gum arabic
14880	<i>Rhôte durcheinander, 1 stien pro 2 fl facit</i>	l	different sorts of madder roots
14880	<i>Gallar. Commun. 5 pfund pro 1 fl</i>	f	common galls
14400	<i>Minium 10 pfund pro 1 fl</i>	m	red lead
10800	<i>Aurugo 1 pfund pro 19 ß lübs</i>	m	verdigris
10560	<i>Vitrioli Albi 5 pfund pro 1 fl</i>	m	white vitriol
10080	<i>Bresilium 1 pfund pro 4 g facit</i>	l	brazilwood
6720	<i>Antimonii Crud. 8 pfund pro 1 fl</i>	m	antimony
6720	<i>Coluphoniae 6 pfund pro 1 fl facit</i>	g	colophony
6240	<i>Curcuma, 1 pfund pro 1 ordts Daler facit</i>	r	curcuma [turmeric]
5760	<i>Reiss gelb 2 pfund pro 1 fl</i>	m	yellow pencil, ink or lake for drawing (?)
5040	<i>Vitriol. Ungar. alle pro [100 pfund pro 4 fl]</i>	m	Hungarian vitriol
4755	<i>Lazuri opt. 1 pfund pro ½ Daler</i>	m	best azurite
4650	<i>Olibanum 1 pfund pro ½ fl facit</i>	g	frankincense
4080	<i>Cerusae Alb. wie es ist 6 pfund pro 1 fl facit</i>	m	lead white as it is
2850	<i>Mirrha Communis 1 pfund pro 3 m.</i>	g	common myrrh
2820	<i>Auri pigmenti opt. 1 pfund pro ½ Daler</i>	m	best orpiment
2160	<i>Mumiae 1 pfund pro 1 fl facit</i>	an	mummy
2040	<i>Storax liquidae 1 pfund pro ½ Dal. Facit</i>	g	liquid styrax [resin]
1920	<i>Sandalum Rubr. gestossen u. ungestossen durcheinander 1 pfund pro 6 marck</i>	l	sandalwood, mixed pulverized and not pulverized
1853	<i>Crocus orientalis, gestossen undt ungestossen durcheinander, 1 pfund pro 10fl ... Noch eingefasset Zafran pro 2 fl. 14 g</i>	a	Oriental saffron, mixed pulverized and not pulverized ... saffron still in the cask
1830	<i>Aloes Epatica 1 pfund pro 1 Daler</i>	s	aloe epatica
1800	<i>Cinobaris 1 pfund pro 1 Dal.</i>	m	vermilion
1260	<i>Auri pigmenti com. 1 pfund pro 0.5 fl</i>	m	common orpiment
1245	<i>Storax Calamitae 1 pfund pro 2 Dal. Fac</i>	g	styrax calamita
1230	<i>Laudanum 1 pfund pro 1 fl facit</i>	g	gum laudanum
960	<i>Viridi mont. alle pro [100 pfund pro 4 fl]</i>	m	mountain green
930	<i>Marcasita 1 pfund pro 1 Ordts Daler</i>	m	bismuth or marcasite

Stocked amount (grams)	Listed materials	Chapter	Translation
810	<i>Dragagantis 1 pfund pro 20 β lübs</i>	g	gum tragacanth
780	<i>Borax Venetian. 1 pfund pro 4 Dal.</i>	m	Venetian borax
720	<i>Sandalum Alb. 1 pfund pro 1 fl 19 g</i>	l	sandalwood
720	<i>Camphora 1 pfund pro 2 Daler</i>	s	camphor
600	<i>Assae foetida, 1 pfund pro 1 fl facit</i>	g	gum asa foetida
570	<i>Indich blau 1 pfund pro 4 fl</i>	m	blue indigo
540	<i>Oleum Spicae 1 pfund pro 1 Dal</i>	op	spike or lavender oil
495	<i>Ammoniaci, 1 pfund pro 1 fl facit</i>	g	gum ammoniacum
480	<i>Hematitis pparat. pro [10 pfund pro 1 fl]</i>	m	haematite
480	<i>Therebinthinae pro [1 pfund pro 1 Dal]</i>	op	oil of turpentine
480	<i>Masticis pro - - [1 pfund pro 1 fl facit]</i>	g	mastic
480	<i>Sanguinis Draconis alle pro [1 pfund pro 1 fl facit]</i>	an	different sorts of dragon's blood
375	<i>Rubri Parisi 1 pfund pro ½ fl</i>	m	red lake
375	<i>Elemi, 1 pfund pro 1 Daler dact</i>	g	gum elemi
345	<i>Bley - alles pro [10 pfund pro 4 fl]</i>	m	lead
330	<i>Sarcocolla 1 pfund pro ½ fl facit</i>	g	gum sarcocolla
300	<i>Charabae albae, alle pro [1 pfund pro ½ fl facit]</i>	g	white amber
300	<i>Mirrha opt., 1 pfund pro 6 m.</i>	g	best myrrh
285	<i>Oppoponacum 1 pfund pro 2 fl facit</i>	g	gum opoponax
270	<i>Tornae Solis, 1 pfund pro ½ fl</i>	m	turnsole
270	<i>Sandaraca 1 pfund pro 1 fl facit</i>	g	sandarac
255	<i>Bolus Alb. alle pro [1 pfund pro 4 Dal.]</i>	m	white bole
240	<i>Visci quercini alle pro 1 pfund pro 10 m. facit]</i>	l	mistletoe of oak trees
240	<i>Assae Dulcis pro [1 pfund pro 1 fl facit]</i>	g	gum benzoin
225	<i>Lapis Lazuli pro [10 pfund pro 1 fl]</i>	m	azurite as stone
210	<i>Spodij - 1 pfund pro 1 ordtsdaler</i>	an	bone black (?)
210	<i>Serapinum 1 pfund pro 1 fl</i>	g	gum seraphinum
180	<i>Smirgell alle pro [10 pfund pro 1 fl facit]</i>	m	different sorts of emery
180	<i>Hederae 1 pfund pro 1 fl facit</i>	g	gum made of ivy
180	<i>Juniperi pro [1 pfund pro 1 Dal]</i>	op	oil of sandarac
165	<i>Asphaltum, 1 pfund pro 2 fl</i>	g	asphalt
135	<i>Bdelly 1 pfund pro ½ Dal. Facit</i>	g	gum bdellium
120	<i>Aes ustum 1 pfund pro ½ fl facit</i>	m	burnt copper
105	<i>Lacca Rubra durcheinander 1 pfund pro 4 fl facit</i>	g	different red lakes, mixed
90	<i>Nuclei Persicorum 1 pfund pro ½ fl disse sein nicht gerechnet</i>	f	peach stones
75	<i>Succi virides Alle pro [1 pfund pro 4 fl facit]</i>	s	different sap greens
75	<i>Bolus Armen. Verus 1 pfund pro 1 Dal.</i>	m	real Armenian bole
68	<i>Nucum (corrigiert u. unleserlich) - alle dar von 1 lodt pro 12 β lübeß facit</i>	op	different nut oils
225 Blatt	<i>Silber dass hundert ½ fl. facit</i>	ad	silver leaf
300 Stück	<i>Ossa Sepiae alle durcheinander pro [1 pfund pro 1 Daler facit]</i>	m	different sorts of cuttlefish bone, mixed
100 Blatt	<i>Zwist Goldt alles pro [dass hundert ½ fl. facit]</i>	ad	Zwisch gold leaf (cold-welded silver and gold)
50 Blatt	<i>Fein Goldt dass hunder pro 2 Daler facit</i>	ad	fine gold leaf
1 Reiss	<i>grob Maculatur - pro - [1 Reiss pro 1 fl]</i>	ad	low quality paper (wastepaper)
20 Reiss	<i>(unleserlich) Pappir 1 Reiss pro 1 fl</i>	ad	mid quality paper
27 Reis	<i>Bautzen. Pappir 1 Reiss pro 6 m</i>	ad	paper from Bautzen

A careful analysis of the inventory revealed two problems. As already noted by Meißner, the numerous miscalculations in the list prove that the person writing down the inventory list was either poor at mental arithmetic or simply mixed up the many weight and currency units. The values given in Table 2 refer to the amount as well as to the value given in the list, but are not based on the entries following the material description. Additionally, numerous material entries are followed by a simple *pro* which seems to be introduced by the writer to avoid repeating the entry of the line above. As can be seen from Table 1, however, these *pro*'s are not conclusive in all cases.

The *Ratsapotheke* in Kolberg stocked a large amount, around 1,023 kg, of pigments, media and related materials (Burmester and Krekel 1998) valued at 136 *gulden* (*florin*) 6

groschen. Although this represents only a little more than 8% of the total value of all the materials listed, the large investment indicates that these *Simplicia* were of great relevance for the pharmacist's trade. In terms of value (Table 2), (wal)nut oil, saffron, *Fein Goldt* (as gold leaf), borax, dragon's blood, red lakes and indigo were the most expensive materials. Silver leaf is about two-thirds the price of *Zwist Goldt* (cold-welded gold and silver), the gold leaf nearly four times as expensive as the *Zwisch gold*. Whereas most of the pigments in Table 1 are to be found in the section on *Mineralia*, all metal leaves are listed as an *addendum* following the section on *Con-dita* (spices). Lapis lazuli was offered and stocked in a small amount, however, its price was only four times the price of the best *Lasur* (azurite) which might indicate the use of an unprocessed piece of azurite as jewellery or a magical stone.

Table 2 Table 1 sorted according to the price (Reiss = a 'ream' of sheets of paper).

Stocked amount (grams)	Materials listed	Total value (pfennig)	Value pf[ennig] per gram	Stocked amount (grams)	Materials listed	Total value (pfennig)	Value pf[ennig] per gram
90	peach stones (not priced)			10800	verdigris	10260	0.95
45360	litharge	1080	0.02	300	white amber	288	0.96
177600	Roman vitriol	8640	0.05	75	different sap greens	72	0.96
23520	different sorts of ochre	1152	0.05	810	gum tragacanth	792	0.98
100800	brown ochre or copper brown	5040	0.05	2160	mummy	2592	1.20
201600	different sorts of resins, mixed	13440	0.07	1230	gum laudanum	1476	1.20
56640	Bohemian bole	4248	0.08	600	gum asa foetida	720	1.20
39360	linseed oil	4428	0.11	495	gum ammoniacum	594	1.20
5040	Hungarian vitriol	576	0.11	270	sandarac	324	1.20
14880	different sorts of madder roots	1728	0.12	210	gum seraphinum	252	1.20
14400	red lead	1728	0.12	180	gum made of ivy	216	1.20
30240	glue/size	3672	0.12	345	lead	432	1.25
52080	turpentine	6336	0.12	300	best myrrh	450	1.50
10080	brazilwood	1512	0.15	1830	aloe epatica	2928	1.60
6720	antimony	1008	0.15	1800	vermilion	2880	1.60
17970	arsenic oxide and orpiment	3576	0.20	540	spike or lavender oil	864	1.60
30240	brown brazilwood (?)	6048	0.20	180	oil of sandarac	288	1.60
6720	colophony	1344	0.20	75	real Armenian bole	120	1.60
23040	brazilwood	4617	0.20	1920	sandalwood, mixed pulverized and not pulverized	3456	1.80
29460	different sorts of lead yellow as it is	5904	0.20	720	sandalwood	1350	1.88
4080	lead white as it is	828	0.20	375	gum elemi	750	2.00
10560	white vitriol	2424	0.23	285	gum opoponax	684	2.40
14880	common galls	3576	0.24	165	asphalt	396	2.40
25200	Turkish galls	10080	0.40	135	gum bdellium	324	2.40
15000	gum arabic	6000	0.40	225	azurite as stone	576	2.56
6240	curcuma (turmeric)	2496	0.40	225 Blatt	silver leaf	648	2.88 ^a
930	bismuth or marcasite	372	0.40	1245	styrax calamita	3984	3.20
240	mistletoe of oak trees	96	0.40	720	camphor	2304	3.20
210	bone black (?)	84	0.40	480	mastic	1728	3.60
180	different sorts of emery	72	0.40	300 Stück	different sorts of cuttlefish bone, mixed	1152	3.84 ^b
1260	common orpiment	576	0.46	100 Blatt	Zwisch gold leaf	432	4.32 ^c
255	white bole	144	0.56	570	blue indigo	2736	4.80
5760	yellow pencil, ink or lake for drawing (?)	3456	0.60	480	different sorts of dragon's blood	2304	4.80
4650	frankincense	2790	0.60	105	different red lakes, mixed	504	4.80
960	mountain green	576	0.60	780	Venetian borax	4992	6.40
480	haematite	288	0.60	240	gum benzoin	1728	7.20
375	red lake	225	0.60	1853	Oriental saffron, mixed pulverized and not pulverized ... saffron still in the cask	23634	12.76
330	gum sarcocolla	198	0.60	50 Blatt	fine gold leaf	768	15.36 ^a
270	turnsole	162	0.60	68	different nut oils	1296	19.20
120	burnt copper	72	0.60	1 Reiss	low quality paper (wastepaper)	288	288.00 ^c
2040	liquid styrax	1620	0.79	20 Reiss	mid quality paper	11520	576.00 ^c
4755	best azurite	3804	0.80	27 Reiss	paper from Bautzen	23328	864.00 ^c
480	oil of turpentine	384	0.80				
2820	best orpiment	2304	0.82				
2850	common myrrh	2592	0.91				

Notes: a. pf/Sheet; b. pf/Piece; c. pf/Reiss

The list includes 29.5 kg of *Cerusa Citrina* (lead yellow) at the same price as *Cerusa Alba* (lead white), of which only 4 kg was listed. The unusually low amount of lead white might be explained by the fact that the barrel was nearly empty at the time when the pharmacy was sold. Cheaper pigments such as *Braunrodt* (100.8 kg) and yellow ochre (23.5 kg) were stocked in remarkable amounts clearly reflecting their frequent use. If the *Zafran* was still in the cask, its price was about a quarter of (un)powdered *Crocus orientalis*. The small amount of 300 g of white amber is low compared to 201.6 kg of mixed resins, which might include the lower quality yellow amber available in abundance at the Baltic shores of Kolberg. Although pharmacists were sometimes described as producers of pigments, the *Inventarium* does not list any alchemistic tools, vessels etc., which could have been employed to produce some of the

items listed. Therefore, it can be assumed that the pharmacist bought in all his materials from, for example, the Leipzig fair or from local producers and merchants.

Conclusion

In summary, the *Ratsapotheke* in Kolberg stocked the whole range of materials demanded by artists' studios and craftsmen's workshops. The Kolberg inventory list of 1589 is a documentary source of exceptional importance. It underlines the role of the pharmacies and the value of pharmacy prices and inventory lists for our understanding of the artists' material market of that time. This conclusion is, at least, true for small cities like

Kolberg. For larger and more important cities, more than one pharmacy might have existed. In those cases, a specialization and a close cooperation with related shops such as *Kramer* (grocer) can be supposed. These were usually under the direct control of the local pharmacist. In a Kolberg *Taxa* of 1613, artists' pigments are listed in a summarized way: *Metall, Bergard und Färbe wird nach dem gemeinen handkauff verkauffet* (metals, minerals and colours which are sold as from the common grocer). Although neither details nor prices are given, colours (*Färbe*) were still sold in 1613 as part of the daily business of the Kolberg pharmacy.

Notes

1. Available at www.doernerinstitut.de.
2. At the time of Meißner's transcription, the inventory list was in the possession of Prof. Dr Hugo Schulz, Greifswald (Germany). The present whereabouts of the inventory list is unknown.

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