



ERA PIGRA

# A Bitter Pill: Residues in two Apothecary Jars with the Inscriptions *JERA PIGRA* and *EL HIRAE PICRAE*

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Earthenware storage jars are not the objects in the Rijksmuseum's collection that receive the most attention. Showpieces as well as everyday items were made from this type of ceramic. The two objects that are the subject of this article belong in the second category: they are both apothecary jars.<sup>1</sup> They differ considerably in age: one was made in Italy in the early sixteenth century (fig. 1), the other more than two hundred years later in Delft (fig. 2). Both objects tell a story of illness and medicine, of life and death. Their inscriptions refer to the same pharmaceutical preparation – *hiera picra*. No longer generally known nowadays, it is one of the oldest compound remedies with a medicinal application, based on aloe.<sup>2</sup> This medicine was already being used more than two thousand years ago in Rome and Alexandria.<sup>3</sup>

The research into these objects was prompted by the discovery of residue in the jar from Delft, which was being studied to provide a technical description for the Delftware collection catalogue in the making. During a search through the collection database, a similar Italian apothecary jar came to light. Inspection revealed that it, too, contained traces of a residue. Given the relatively small collection of pharmaceutical ceramics in the

< Fig. 1  
*Albarelo*  
(Apothecary Jar),  
Italy (possibly Deruta  
or Castel Durante),  
c. 1500-30.  
Majolica, h. 21.7,  
diam. 12.3 cm.  
Amsterdam,  
Rijksmuseum,  
inv. no. BK-15346-A;  
J.W.E. vom Rath  
Bequest, Amsterdam.

Fig. 2  
De Drie Klokken  
Delftware factory,  
*Albarelo*  
(Apothecary Jar),  
c. 1770-1820.  
Dutch tin-glazed  
earthenware h. 16.2,  
diam. 10.4 cm.  
Amsterdam,  
Rijksmuseum,  
inv. no. BK-NM-8912.

Rijksmuseum, it is extraordinary that two apothecary jars with similar inscriptions still contain traces of what they once held. The colour and composition of the brown residue in the Delft jar looks like dried aloe. The idea of taking samples from both jars and getting them analysed was too good to resist, since it could reveal more about their use. The research into the residue, inscription, shape and application was set in motion. It has provided interesting insights into the



historical context of similar jars, and information for a more biographical approach to these objects.

### Tin-Glazed Pottery

Around 800 CE, potters in Iraq discovered that it was possible to make transparent glaze white and opaque by adding tin ash to it.<sup>4</sup> This technique reached Italy by way of North Africa and Spain, and around 1500 Italian potters developed a new type of ceramic based on it, which they called majolica.<sup>5</sup> Painted, coloured decorations were applied to coarse earthenware on a ground of opaque white tin glaze.

A great deal of colourful tableware was made from majolica, intended to adorn lavishly laid tables. Many storage jars were also produced using

this technique. Private individuals used them in their homes for storing products that could be obtained from apothecaries at that time, such as medicines, herbs, spices, candied fruit, candles, sugar, wax and sponges. Fifteenth-century paintings reveal that the jars were used as flower vases as well.<sup>6</sup>

Storage jars like these, however, were mostly used by hospitals and apothecaries, which purchased them in large numbers.<sup>7</sup> The earliest known image of an apothecary using jars of this kind is in a fourteenth-century Hebrew manuscript with fifteenth-century illustrations. It shows the Persian polymath Avicenna (980-1037) in front of an apothecary displaying white majolica jars decorated with dark blue leaves, a motif characteristic

Fig. 3  
Avicenna outside  
an apothecary  
with majolica jars.  
In *Canon Medicinae*  
van Avicienna  
(*Ibn Sina*), fourteenth  
century, with  
fifteenth-century  
miniatures (detail).  
Bologna, Biblioteca  
Universitaria, MS 2197,  
c.492r.  
© Alma Mater  
Studiorum, Università  
di Bologna – Biblioteca  
Universitaria di  
Bologna



of fifteenth-century Florentine workshops (fig. 3).<sup>8</sup>

The use of majolica jars increased in the Low Countries, too. Italian storage jars were imported from the beginning of the sixteenth century and were also made in the Netherlands later.<sup>9</sup> After the Fall of Antwerp in 1585, potters with knowledge of the Italian majolica process fled to the Northern Netherlands. Haarlem and Delft became the major centres of majolica production.<sup>10</sup> From 1600 onwards, no fewer than eighteen potteries in Delft were making apothecary jars.<sup>11</sup> Around the same time, expensive Asian porcelain was introduced into the Republic by the Dutch East India Company; it was lighter and finer than earthenware, and very soon became popular.<sup>12</sup> This is why around 1620 Dutch potters, particularly in Delft and Haarlem, began to concentrate on improving the Italian majolica technique.<sup>13</sup> They adapted it specifically to make blue and white earthenware that resembled Asian porcelain in order to compete with it.<sup>14</sup> The end result was a more sophisticated product, but in principle the manufacturing process remained the same. As the product was specifically intended to imitate Asian porcelain, this type of ceramic was called Dutch tin-glazed earthenware rather than majolica. The difference in the two names is an art-historical distinction, not a technical distinction.

### Apothecary Jars

The use of these jars took off in the Low Countries when a special regulation came into force at the end of the sixteenth century (between 1584 and 1594) in Delft. Apothecaries in that city were required to store products containing acid ingredients in glass or ceramic jars instead of the containers made of lead, pewter or tin they had previously used.<sup>15</sup> This was prescribed by the municipal committee, the *Collegium Medico Pharmaceuticum*, which regulated the apothecaries.<sup>16</sup> This committee also determined and

monitored the exact composition of medicines, which from 1636 onwards were recorded in official recipe books: municipal pharmacopoeias.<sup>17</sup>

Apothecaries in the Low Countries bought the jars from potters and displayed them on shelves behind their counters. A display of blue and white pottery like this gave their shops prestige.<sup>18</sup> The best-known type of apothecary jar is the *albarello*. It has a characteristic cylindrical shape with a narrow base and a short, wide neck, and was mainly used for storing solid or viscous preparations. It is an easily-accessible storage jar, suitable for efficient arrangement on shelves. Like the technique, this shape came from the Middle East (fig. 4) and found its way to Europe by way of Spain and Italy.

Fig. 4  
*Albarello*  
(Apothecary Jar),  
Syria, c. thirteenth  
century. Fritware,  
h. 25.5, diam. 16 cm.  
Amsterdam,  
Rijksmuseum,  
inv. no. BK-NM-11857.





< *Fig. 5a*  
 Collector's Cabinet  
 with a Miniature  
 Apothecary's Shop,  
 probably  
 Amsterdam, 1730.  
 Oak with olive wood  
 veneer, Pernambuco  
 wood (Brazil wood)  
 beading, h. 206.8 x  
 w. 96.5 x d. 74 cm.  
 Amsterdam,  
 Rijksmuseum,  
 inv. no. BK-1956-44.

*Fig. 5c*  
 The three basic  
 shapes from  
 the miniature  
 apothecary's shop.  
 From left to right:  
 a syrup jar, an oil  
 jug and an albarello.





Fig. 5b  
Detail of the  
apothecary's shop  
in the collector's  
cabinet.

Besides cylindrical jars, there were also pieces with spouts. The syrup jar, as the name suggests, was used to hold syrup and is spherical with a handle and a spout. The oil jug, by contrast, used for medicinal oils, is straight with a handle and a spout. These three basic shapes are also found in the miniature apothecary's shop in an early eighteenth-century collector's cabinet in the Rijksmuseum's collection. It contains ninety-two miniature Delft jars and jugs in blue and white pottery (figs. 5a-c). In addition to the three basic shapes, there were also pitchers for water and special pots for pills and ointments. The mouths of the apothecary jars were covered with a piece of leather, vellum or pig's bladder and secured with a length of string (fig. 6). Later on, lids made of earthenware and metal were produced. As a result, the top rim of apothecary jars was made straight instead of curving outwards.

As the use of jars made of glazed pottery increased, so the popularity of painted labels in their decoration grew, too. The colourful *albarelli* had to make a good impression on customers and inspire confidence in the quality of the contents and the professionalism of the dispensing apothecary. Decorations, coats of arms, figurative motifs and inscriptions are to be found on the fronts of the objects, the side visible in apothecaries' shops. These labels were often abbreviated so what was in the jars could be seen at a glance without having to take them off the shelf.

A motif frequently used on Delft apothecary jars was a cartouche with a banderol containing the Latin abbreviation of the medicine in the jar. Below the cartouche is the head of an angel and above it two peacocks with a basket of flowers, which explains the name 'peacock motif'. Many blue and white apothecary jars with peacock



Fig. 6

FRANS VAN MIERIS II,  
*The Apothecary*, 1714.  
 Oil on panel,  
 39.5 × 33.5 cm.  
 Amsterdam,  
 Amsterdam Museum,  
 inv. no. SA 7553.  
 On the table right a  
 Delftware apothecary  
 jar, closed with red  
 leather or vellum  
 and a piece of string.

Fig. 7  
 ANONYMOUS,  
*A Seventeenth-  
 Century Dutch  
 Apothecary's Shop*,  
 c. 1650.  
 Oil on canvas,  
 101 cm × 134 cm.  
 Stockholm,  
 Apotekarsocieteten.



motifs can be seen in an anonymous painting of the interior of a Dutch apothecary shop dating from around 1650 (fig. 7), which tells us that this motif was in use around that time. This decoration remained the same for a hundred years. A change came in the second half of the eighteenth century, when other motifs were introduced.<sup>19</sup>

The Latin name of the contents was shown on the painted label. The letter above the name indicated what kind of medicine it was, for example 'o' for *oleum* (oil), 's' for *syripus* (syrup) and 'u' for *unquentum* (ointment). The contents of the jars corresponded to the recipes in the pharmacopoeias.

Advances in chemistry saw the pharmaceutical industry flourish over the course of the eighteenth century, which meant that the preparation of medicines increasingly took place elsewhere than in apothecaries' shops. Delft apothecary jars remained in use until the first half of the nineteenth century;<sup>20</sup> the jars made after 1850 were decorative objects rather than items for everyday use. From then on, they were replaced by porcelain



jars that were made abroad and those made of tin-glazed earthenware became collectors' items.<sup>21</sup> Pharmacists may have continued to use them for other purposes for a long time until they found their way into the hands of collectors.

### Pharmaceutical Ceramics in the Rijksmuseum

The pharmaceutical ceramics in the Rijksmuseum consist mainly of apothecary jars made of tin-glazed earthenware. Over the years nothing has been specifically collected in the context of apothecaries, which means that this collection has little coherence. There are some fifty-six jars altogether, which can be subdivided into forty or so cylindrical storage jars (*albarelli*), twelve syrup jars, two bottles, two lids and some fragments and shards. The oldest apothecary jar dates from the thirteenth century (see fig. 4); most were made in the sixteenth and the late eighteenth century. Aside from objects made of tin-glazed earthenware there are also twenty or so red and yellow fired earthenware ointment pots with transparent lead glaze (figs. 8a, b). Finally, the pharmaceutical ceramics include three stoneware apothecary jars and five porcelain bottles and pots.<sup>22</sup>

### The Italian Apothecary Jar

The oldest object in which residue was found is a sixteenth-century Italian majolica *albarello* made in Deruta or Castel Durante (see fig. 1). It is cylindrical and has concave walls made of white glazed earthenware with polychrome decoration. The jar is unmarked and in the middle of the body has a banderol with the inscription *JERA PIGRA*, a corruption of the words *hiera picra*, a medicine based on aloe. This pharmaceutical preparation and the history of its development are discussed in greater depth later in this article. Above the banderol there is a painted coat of arms with a griffin's head on each side. Below it is the painted head of an angel within a laurel wreath. The decoration, arms and inscription are on the front of the jar, whereas the back has hardly any decoration at all. The waist of the object made it more elegant and also more manageable when it came to holding it or placing it on a shelf in an apothecary's shop.

Their quality makes majolica objects, particularly those produced in famous Italian centres like Castel Durante and Montelupo, popular collectors' items. The art historian Luke Syson believes that many of

*Figs. 8a, b*  
Two ointment pots,  
c. 1500-1799.  
Red fired earthenware,  
h. 4.1, diam. 4.3 cm;  
and yellow fired  
earthenware,  
h. 5.8, diam. 4.8 cm.  
Amsterdam,  
Rijksmuseum,  
inv. nos. BK-KOG-  
1706-39, 1708-6;  
on loan from  
the Koninklijk  
Oudheidkundig  
Genootschap.

these jars found their way on to the market in pairs by way of collectors and antique dealers, as if they were specifically intended as vases for mantelpieces.<sup>23</sup> The description on the inventory card proves that this jar did indeed arrive as one of a pair in 1941, as a bequest made by the art collector J.W. Edwin vom Rath (1860-1940).<sup>24</sup> However the second object has a different inscription.<sup>25</sup> As the pendant does not contain any residue it has not been described in this study.

There is one comparable example of the Italian apothecary jar in the collection of National Museums Scotland. This object is also decorated with a laurel wreath and likewise has the inscription *IERA PIGRA* (fig. 9).<sup>26</sup> An example with different decoration but an almost identical inscription, *JERA PIGRA*, is in the Victoria and Albert Museum; it was made in Holland or Antwerp, not Italy (fig. 10).<sup>27</sup>

### *The Delftware Apothecary Jar*

The second piece is also an *albarello*. Better quality than the Italian jar, as we have seen, it was made in the late eighteenth or early nineteenth century in Delft (see fig. 2). It has a narrowed neck and base, with a blue decoration. This apothecary jar has been in the Rijksmuseum's collection since 1889. According to the inventory card, it was purchased by Victor de Stuers (1843-1916), but we do not know how it found its way into the collection.<sup>28</sup>

The Delft jar has the peacock motif with the inscription *HIRAE PICRAE* in the banderol, with the letters *EL* above it. Only twenty percent of all Delftware jars with a peacock motif are marked; this is one of them.<sup>29</sup> On the underside of this jar there is a mark referring to the place where it was produced: De Drie Klokken pottery in Delft, which existed from 1670 to 1841 (fig. 11).<sup>30</sup> This object is the only one

Fig. 9  
*Albarello*  
(Apothecary Jar),  
Italy (Castel Durante  
or Deruta), mid-  
sixteenth century.  
Majolica, h. 20.8,  
diam. 12.2 cm.  
Edinburgh, National  
Museums Scotland,  
inv. no. 000-190-  
004-705-C.

Fig. 10  
*Albarello*  
(Apothecary Jar),  
Holland or  
Antwerp, 1520-40.  
Dutch tin-glazed  
earthenware,  
h. 25.5, diam. 12.3 cm.  
London, Victoria and  
Albert Museum,  
inv. no. C.64-1930.





Fig. 11  
Underside of the Delft apothecary's jar with the mark of De Drie Klokken (fig. 2).

Fig. 12  
Apothecary jar made of tin-glazed earthenware from the miniature apothecary's shop (fig. 5), h. 22 mm, with the inscription E/HIER PG (third in the row).

with this mark in the Rijksmuseum's collection of pharmaceutical ceramics. Of the eighteen Delft potteries that made pharmaceutical earthenware, it was the most productive and we know of twenty-one different decorative motifs on pieces it produced.<sup>31</sup> In his *Delftse apothekerspotten*, the pharmacist Dirk Arnold Wittop Koning mentions three more pieces that also have a peacock motif as well as the De Drie Klokken mark. They are two cylindrical objects and a syrup jar, dates unknown, all with different inscriptions.<sup>32</sup>

The miniature apothecary in the collector's cabinet mentioned earlier contains numerous little jars in tin-glazed earthenware, including a mini-

ature version of the Delft jar. This object is only 22 mm tall and has the inscription E/HIER PG and the peacock motif (fig. 12). We also know of apothecary jars with similar inscriptions but different motifs. One of them can be found in the Museum Arnhem collection: a cylindrical apothecary jar with the mark  $\frac{D}{12}$ , and a motif of seated angels and the inscription E HIER:PICRA:G.<sup>33</sup>

### Technique

In fact, both jars were produced using the same technique, even though more than two centuries elapsed between the dates of their making. In both cases they were raised from a lump of clay on a potter's wheel. The neck and shoulders were formed and the piece was cut off the wheel and left to dry. The object was then fired in a kiln at around 950°C.<sup>34</sup> Unlike porcelain, pottery remains porous after firing so it has to be glazed inside and out to make it impervious to liquid and grease. From time immemorial this glaze has contained lead and tin.<sup>35</sup> For the inside, the piece was filled with a thin glaze paste and the surplus was poured out. For the outside, the object was submerged upside-down in the glaze bath by holding the base in the fingers. This action often leaves traces on the object in the form of fingerprints. The decoration was painted on the dried, but as yet unfired, layer of glaze and then the object was fired for



the second time at a higher temperature (around 1020°C).

Manganese brown and copper green colours were usually used for the earliest European majolica.<sup>36</sup> Later the products were decorated with additional colours such as the darker cobalt blue and all kinds of yellow and orange hues, which were obtained by using antimony and ferrous oxide. These colours were used for the Italian jar, but cobalt oxide alone was used for the decoration of the apothecary jar from Delft.

There are also other external differences between the jars, because in Delft the emphasis was on imitating porcelain from Asia. A cheaper lead glaze was usually used for the hidden parts of objects made from majolica, like the backs of plates or the insides of jars. This is also true of the Italian jar: it has a transparent lead glaze on the inside and an opaque tin glaze on the outside, whereas the Delft jar has an opaque tin glaze both inside and out. What is more, the Delft jar is also glazed on the underside, while the Italian version is not. The Italian version is heavier: it has thicker walls and broader rims than the Delft jar.<sup>37</sup> Lastly, the Italian jar has a curled rim around which a piece of string could easily be tied, whereas the top rim of the Delft pot is straight so that it could be closed with a lid.

An extra layer of clear lead glaze, a second glaze or *coperta*, was sometimes added to give objects extra lustre.<sup>38</sup> The Delft jar does not have this extra layer. We do not know whether the Italian jar has a second glaze.<sup>39</sup>

### *Hiera picra*

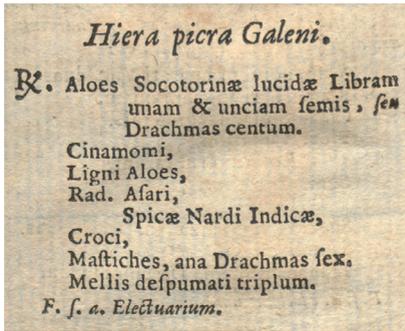
Although the inscriptions on the two apothecary jars differ slightly, both objects were originally intended for storing the same kind of medicine. In the case of the Italian jar it is indicated as *JERA PIGRA*, and on the Delft jar as *EL/ HIERAE PICRAE*. The letters *EL* are an abbreviation of the Latin

*ELECTUARIUM*, a sticky preparation with the consistency of honey. In the apothecary's shop it was transferred from the storage jar to a shallow bowl, from which it could be consumed by licking the bowl, or by using the forefinger, known as the 'lickpot'.<sup>40</sup>

*Hiera picra* is one of the oldest medicines. Supernatural strength was attributed to it. It is said to have been invented by the Roman physician Themison, who was active during the reign of Emperor Augustus (27 BCE-14 CE).<sup>41</sup> The name of the medication, which translates as Holy Bitter, alludes to the bitter taste and the supposed magical effect (Greek: *ieró* = holy en *pikró* = bitter).

Down the ages different spellings of the medicine can be found on apothecary jars and in medicine books. The oldest prescription book used in the Low Countries is the *Antidotarium Nicolai*, which was compiled around 1300.<sup>42</sup> There are three variations of *hiera picra*: 'Yera Pigra Constantini', 'Yera Pigra Abbatis' and 'Yera pigra Galyeni'.<sup>43</sup> W.S. van den Berg remarked in his doctoral thesis about the *Antidotarium Nicolai* that the first two preparations were rarely if ever used at that time, so they would not be found in apothecaries' shops.<sup>44</sup> The suffix Galyeni, added to the third and most widely used preparation, was a reference to Claudius Galenus (129 - c. 216 CE), known as Galen.<sup>45</sup> This famous Greco-Roman physician was a supporter of Hippocrates's humours theory, which posited the existence of four bodily fluids, the 'humours': blood, black bile, yellow bile and phlegm.<sup>46</sup> A disruption of the balance in these bodily fluids would lead to illness, and the balance could be restored by means of such things as sweating, vomiting and purging.

*Hiera picra* is known for its laxative and therefore 'cleansing' action, which was entirely in line with Galen's theory.<sup>47</sup> It was used internally against 'all stomach ills, worms, constipation,



Figs. 13a, b  
 Ingredients and  
 method of prepara-  
 tion of Hiera  
 picra Galeni from  
 the Amsterdam  
 pharmacopoeia  
 (*Pharmacopoea*

*Amstelredamensis*),  
 1643 (4th edition),  
 p. 54 and  
 frontispiece.  
 Munich, Bayerische  
 Staatsbibliothek,  
 M.med. 801.

and to cleanse menstrual discharges'.<sup>48</sup> Because of this last application it was also used over the centuries by women as a self-prescribed way of terminating unwanted pregnancies. It was readily available from grocers and chemists' shops, even for the poorest of the poor.<sup>49</sup> This information confirms that behind both objects there are hidden stories about disease and medicine, about life and death.

*The Preparation of Hiera Picra*  
 Nicolai's manuscript or a derivative of it would have been key in the preparation of *hiera picra* when the Italian jar was made. When the Delft jar was produced in the eighteenth century, many physicians were still working with Galen's humours theory, although over the course of the century there was a gradual change. It is likely that a municipal pharmacopoeia had been consulted for the remedy in the Delft jar. There were variations in formulas in these prescriptions because the distribution of medicines had yet to be centrally regulated.

According to Themison, no fewer than seven ingredients were needed to



prepare *hiera picra*: Socotrine aloe (*Aloe socotrina*), mastic (*Mastiches*), cinnamon (*Cinamomi*), saffron (*Croci*), spikenard (*Spicæ Nardi Indicæ*, a lavender-like plant), carpobalsam (*balsam fruit*) and hazelwort root (*Rad. Asari*) (figs. 13a, b).<sup>50</sup> However, carpobalsam did not feature in for instance the *Hiera picra Galeni* recipe



in the Amsterdam pharmacopoeia of 1643, nor in later versions.<sup>51</sup> *Ligni aloes* (paradise wood) was listed instead. Although this name implies a connection with the succulents in the aloe family, the plant is not related to it. Paradise wood is a member of the genus *Aquilaria*: trees that have wood rich in aromatic resin.

The bitter taste and the strong purgative action when *hiera picra* was ingested were caused by the main ingredient: aloe. There are more than three hundred species of it, *Aloe vera* being the best known. However, Socotrine aloes are cultivated from the species *Aloe perryi* and came from the island of Socotra in the Indian Ocean, off the coast of Yemen and Somalia (figs. 14, 15a-b).<sup>52</sup> According to John Mesue (777-857 CE), a Persian physician, it was the very

best aloe for the preparation of *hiera picra*, because it gave the strongest reaction, possibly due to the high concentration of aloin.<sup>53</sup>

The ingredients had to be ground into a powder to prepare the remedy. In Galen's work we find for the first time a recipe for *hiera picra* containing added honey to make the ingredients more palatable.<sup>54</sup> The powder was mixed with 'three pounds and five ounces of skimmed white honey which was cooked to the appropriate thickness'; this produced a sticky substance that would actually keep for two years.<sup>55</sup> *Hiera picra* was also administered in the form of pills, as the translation of Nicolai's manuscript informs us. This made the medicine less unpleasant to ingest, although it obviously remained a bitter pill.<sup>56</sup>

Fig. 14  
Harvesting  
*Aloe Socotrina*.  
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Bridgeman Images

Fig. 15a  
Albarelo  
(Apothecary Jar)  
with inscription  
ALOE SVCVTRIO,  
Montelupo,  
1490-1500.  
Tin-glazed  
earthenware, h. 26,  
diam. 14,5 cm.  
London, Victoria  
and Albert Museum,  
inv. no. 667A-1884;  
Castellani Collection.

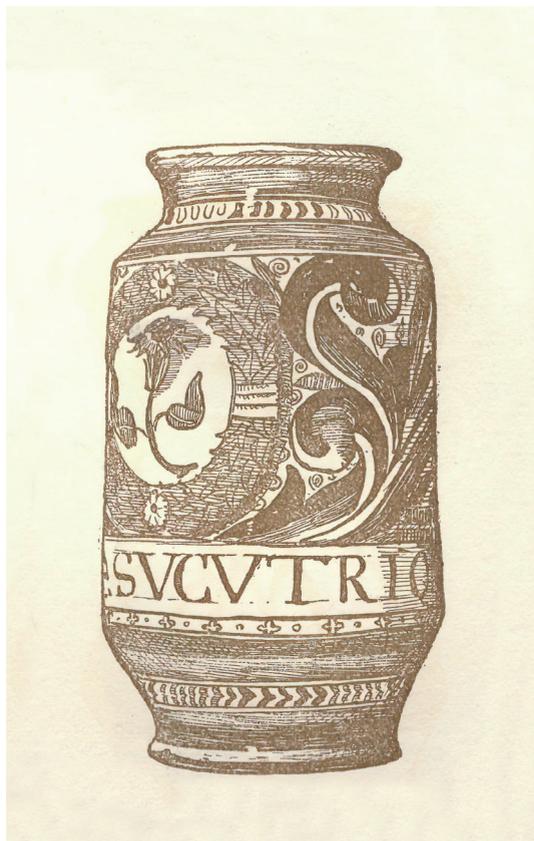


Fig. 15b  
Albarelo (Apothecary Jar)  
with inscription ALOE.  
SVCVTRIO, illustration from

Henry Wallis, *Italian Ceramic Art: The Albarello: A Study in Early Renaissance Maiolica with Illustrations*, London 1904, p. 53.

In England, over the course of time the number of ingredients was reduced to two: aloe and cinnamon, in the vernacular known as 'hikey pikey' and 'hickery pickery'.<sup>57</sup> It was obtainable until at least the beginning of the twentieth century.<sup>58</sup>

### The Contents of the Jars

Everyday objects often show signs of use. When handling objects, conservators have to take care that these traces are not erased. It is extremely unusual to have found residues in these two apothecary jars. Many of the objects in the ceramics collection have been cleaned in the past, with the best of intentions, and this is why they no longer contain – visible – remains.

In the Italian example a white residue with a homogenous appearance was found at the bottom and around the rim (fig. 16). Inside the Delft jar – at the bottom and under the top rim – there are traces in various shades of yellow and brown. In another place below the rim, there are crystals that

Fig. 16  
Italian jar (fig. 1)  
with a white residue  
on the inside wall.

Fig. 17  
Delft jar (fig. 2) with grey  
residue with crystals  
under the inside rim.



fluoresce with a lamp (fig. 17). In the jar there is a little handwritten label (from the twentieth century) bearing the inventory number in pencil, with below it the word 'plakt' – sticks.

The Italian jar with the inscription *JERA PIGRA* does not have 'EL' in front of the name. This is where the inscription, and also the possible contents, differ from those of the Delft jar. Prior to the examination it was not certain whether the composition of the residues found in the two jars would indeed match the inscriptions, but this could not be ruled out either. Of course, the jars may also have been used later to store other medicines or products. In his book *Thrifty Science* Simon Werrett, professor of the History of Science, outlines a historical context in which he describes how goods and materials

were used for other purposes in the early modern period.<sup>59</sup> The concept of 'recycling' was unknown, but reusing goods and materials was the order of the day, in households and elsewhere.<sup>60</sup>

### Analysis of the Residues

Three samples were taken from the residue in the Italian jar. Four samples were taken from the Delft jar as the residue did not look homogenous. To analyse them, we used thermally assisted hydrolysis and methylation gas chromatography-mass spectrometry (THM-GCMS) in combination with pyrolysis as the sample introduction technique. In this last technique sample material is mixed with chemicals and heated. The mixture is then separated by gas chromatography, after which the individual components are detected

*Figs. 18a-c*

- Sample locations of the Delft jar (fig. 2):
- a) no. 1 inside bottom and no. 2 inside rim bottom;
  - b) no. 3 inside neck (grey residue with crystals);
  - c) no. 4 inside neck.



Sample	Appearance	Py-gc/ms results
Sample no. 1: bottom light	Light brown residue, fat powdery composition.	Oil with a small amount of copal (Manila, Pontianak).
Sample no. 2: bottom dark	Dark brown residue, syrupy composition.	Oil.
Sample no. 3: rim crystal	Grey residue with crystals, fat powdery composition.	Oil and mercury.
Sample no. 4: rim yellow	Yellow residue, fat powdery composition.	Oil and small amounts of starch and mercury.

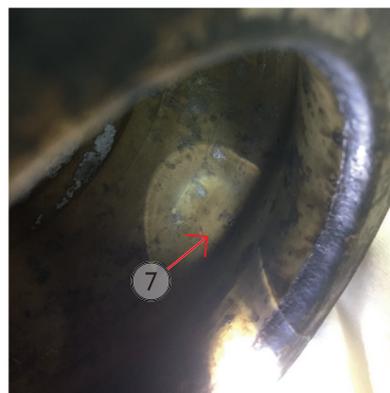
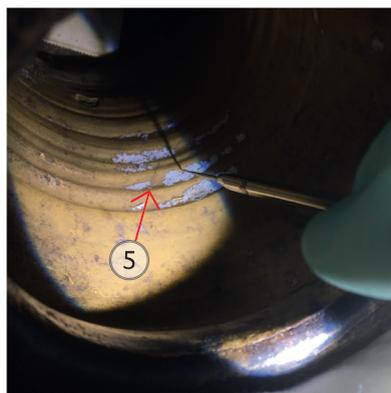
and identified using mass spectrometry. It is an extremely sensitive method that requires very little sample material and is ideal for analysing traditional and modern binding agents, such as resins and waxes. The analysis of oil and fats takes about thirty minutes. This method was also used here to detect sugars because of the *electuarium* inscription on the Delft jar. This required an adjustment to the research equipment and made the process much more labour intensive. The analysis of these samples took three days.

#### *Analysis of Samples from the Delft Jar*<sup>61</sup>

The contents of the Delft apothecary jar were the first to be analysed. Four samples were taken: two from the bottom (nos. 1 and 2) and two from

under the rim (nos. 3 and 4; figs. 18a-c). It was clear from the results that the composition was indeed not homogenous. An oil was found in all four samples whose fatty acid proportions may indicate a mixture of fish and castor oil in the ratio 9:1. This explains why the residue is sticky, as noted on the label inside the jar. In addition, small quantities of copal (Manila, Pontianak), starch and mercury were found, but not in every sample. This could be because the ingredients had separated after a long time. It is also possible that they were the remnants of different medicines or other products that had been kept in the jar. Mercury (samples nos. 3 and 4), for example, still featured in the *Nederlandsche pharmacopee* of 1889 in mercury ointment, a mixture of one part mercury and three parts pork lard.<sup>62</sup>

*Figs. 19a-c*  
Sample locations of the Italian jar (fig. 1):  
a) no. 5 white residue, in the white of the inside rim  
b) no. 6 white crystals, oval spot under light, inside, deep in the jar;  
c) no. 7 white residue with crystals, under the rim of the jar.



Sample	Appearance	Py-gc/ms results
Samples nos. 5, 6 and 7	White residue.	Specifically free fatty acids, palmitin (FA-C16) and stearin (FA-C18) with indications of unsaturated fatty acids. Traces of phosphates, soot and furfural.

### *Analysis of Samples from the Italian Jar*<sup>63</sup>

Three samples were taken from the white residue in the Italian jar (nos. 5, 6 and 7; figs. 19a-c). Unsaturated fatty acids were found in all three samples. There is also a typical component indicative of beeswax (C16-15OH), but due to the lack of other components no convincing evidence can be provided for the presence of this substance. The fatty acid pattern of this sample indicates solid fats, the unsaturated fatty acids of which have oxidized over time. In addition to fatty acids, traces of phosphates, soot and furfural (degradation product of cellulose) were found.

### Results and Discussion

The samples from the Delft jar are remnants of oil, whereas those taken from the Italian jar consist of remnants of (hard) fats. The visual similarity to aloe seen on inspection gave false hope, because aloe was not found. In the reference collection of the Cultural Heritage Agency of the Netherlands (RCE), where the analysis of the residue took place, four species of aloe are present, among them a sample of *Aloe socotrina* that contains a reference spectrum with two specific components. Neither aloe nor any other components of the recipe were encountered in any of the samples taken from the two objects. Nor was any honey found in the samples from the Delft jar with *EL* in the inscription. The research results from both jars revealed no direct link to *hiera picra*.

This result is no surprise. Research into a residue comes up against all kinds of obstacles, because it is influenced by many factors, such as the variation in recipes. Different pharmacopoeias have local variations in recipes, and while apothecaries were, it is true, trained to recognize ingredients, this offered no guarantee of the correct identification of them. In the trade,

charlatans tried to take advantage of this by supplying false or uncheckable products. In times of scarcity, ingredients were sometimes replaced with others because the right raw materials could not be obtained. Furthermore, ingredients may have degraded to such an extent over time that nothing can be found of them today. The method of preparation, such as whether or not the aloe was boiled, may also play a role. The jars might also have been used for other purposes later. It should be borne in mind that the analysis only involved the residue present on the glaze inside the jar. There may also have been other materials drawn into the earthenware, in the damaged, unglazed parts of the jars, where the ceramic was porous.

The beeswax detected in the Italian jar unfortunately gives us little to go on; this general-purpose ingredient was – and is – used for many preparations. In pharmacies it served as a basis for ointments, but it also had many other household applications. The private individual who donated the object to the museum in 1941 may have owned it for some time. Assuming that this art collector did not use the storage jar himself, the contents could date from before 1900-20.

There was evidence of mercury in two samples from the Delft jar (nos. 3 and 4), including the sparkling sample taken from under the rim. We do not know whether it is a mercury compound or metallic mercury, because the research method employed can provide no answer to this. This could, though, be determined by further examination. Knowledge of the right mercury compound is needed to be able to make a good comparison with old recipes and with research results of residues from other objects. In medicine, compounds of mercury have long been employed for internal and external use, for example as mercury sulphide (vermilion) in cosmetics, for skin problems, but also in medication, such as in the treatment of syphilis.<sup>64</sup> In 1889, the year

the Delft jar became part of the Rijksmuseum's collection, mercury was still being used in medicines, as can be seen in the *Nederlandsche pharmacopee* published in that same year.<sup>65</sup>

Pharmacy historian Annette Bierman has been searching for a link between mercury and the components discovered, but has as yet been unable to narrow it down to a specific remedy.<sup>66</sup> It is possible that further research, specifically focusing on mercury and mercury preparations, will provide more clarity about this. Initially this would flesh out the story behind the object, but it is also important from the point of view of conservation. Nowadays mercury is regarded as a dangerous substance subject to special rules.

It is certain that both apothecary jars have been used in the past, not just for *hiera picra*, but for other medicines or products as well, as the chemical composition of the residues shows. After better alternatives for the storage of pharmaceutical preparations came on to the market, they still served as storage jars for other remedies – in pharmaceutical practice or outside of it. It is extraordinary that the two objects can be linked to a remedy whose history goes back more than two thousand years. The research into the residue in two apothecary jars has brought to light a number of stories hidden in these objects.

#### ABSTRACT

Residue was found in two cylindrical apothecary jars with similar inscriptions in the Rijksmuseum's collection. There is a considerable difference in the age of these jars: the majolica *albarello* was made in Italy in the early sixteenth century, whereas the *albarello* made of tin-glazed earthenware was made in Delft more than two centuries later. Their inscriptions (*JERA PIGRA* and *EL/ HIRAE PICRAE* respectively) refer to the pharmaceutical preparation 'hiera picra' (Holy Bitter). The history of this medicine, which was said to give supernatural powers, goes back more than two thousand years. The main ingredient of this preparation was *aloe Socotrina*, which gave it its bitter taste.

The research included the technique, shape, inscriptions, use and contents of these objects. Samples were taken from the residues found in both objects in order to determine the chemical composition. This was achieved using gas chromatography-mass spectrometry (THM-GCMS) in combination with pyrolysis. A link to *hiera picra* could not be established, but the research provided a great deal of information about the background of both objects.

#### NOTES

- \* With thanks to Annette Bierman, Lucienne van Valen, Saskia Smulders (RCE) and Femke Diercks (Rijksmuseum).
- 1 Much has been published by Dirk Arnold Wittop Koning and others. The Delft jar is mentioned in his *Delftse apothekerspotten*, Deventer 1954, p. 149. The Italian apothecary jar can be found in the Rijksmuseum's acquisition catalogue: David Cornelis Roëll, *Aanwinsten 1940-1946. Tentoonstelling van schilderijen, beeldhouwkunst, meubelen, kunstnijverheid, teekeningen en prenten, verworven in de jaren 1940-1946*, cat. Amsterdam (Rijksmuseum) 1946, no. 260, p. 76.
  - 2 Clyde M. Snow, 'Pharmaceutical Preparations of Aloes', *Journal of Pharmaceutical Sciences* 11 (1922), no. 8, pp. 621-23, esp. p. 621.
  - 3 John S. Haller, Jr, 'A Drug for All Seasons: Medical and Pharmacological History of Aloe', *Bulletin of the New York Academy of Medicine* 66 (1990), no. 6, pp. 647-59.
  - 4 Timothy Wilson, *Maiolica: Italian Renaissance Ceramics in the Metropolitan Museum of Art*, London/New Haven 2016, p. 7.
  - 5 *Ibid.*, p. 9. Majolica is a corruption of the Spanish term for lustreware from *obra de malaga* (and not from the island of Majorca as is often suggested). There is

- much confusion about the name of this type of pottery, such as maiolica, faience and tin-glazed pottery.
- 6 Luke Syson, 'Italian Maiolica Painting: Composing for Context', in Wilson 2016 (note 4), p. 18. Examples of paintings featuring a jar as a flower vase are Carlo Crivelli, *Annunciation with Saint Emidius*, 1486, London, The National Gallery, inv. no. NG739; and Hugo van der Goes, *Portinari Altarpiece*, 1477-78, Florence, Gallerie degli Uffizi, inv. no. 1890 n. 3192.
  - 7 *Ibid.*, p. 19.
  - 8 W.H. Hein and Dirk Arnold Wittop Koning, *De apotheek in miniaturen*, Frankfurt am Main 1982, p. 76.
  - 9 Wilson 2016 (note 4), p. 9.
  - 10 Dirk Arnold Wittop Koning, *Apothekers-potten uit de Nederlanden*, Utrecht 1991, pp. 37-41.
  - 11 *Ibid.*, p. 49.
  - 12 Much has been written about the introduction of porcelain, see for example Jan van Campen and Titus Eliëns (eds.), *Chinese and Japanese Porcelain for the Dutch Golden Age*, Zwolle 2014; Cynthia Viallé, 'De bescheiden van de voc betreffende de handel in Chinees en Japans porselein tussen 1634 en 1661/The Records of the voc Concerning the Trade in Chinese and Japanese Porcelain between 1634 and 1661', *Mededelingenblad van de Vereniging van Vrienden der Aziatische Kunst* 22 (1992), no. 3, pp. 6-33; Christiaan J.A. Jörg, *Porcelain and the Dutch China Trade*, The Hague 1982.
  - 13 Wittop Koning 1991 (note 10), pp. 41-43.
  - 14 Marion S. van Aken-Fehmers, *Delfts aardewerk: Geschiedenis van een nationaal product*, 6 vols., cat. The Hague (Gemeentemuseum Den Haag) 1999-2020, vol. 1, p. 17.
  - 15 Henriëtte A. Bosman-Jelgersma, *Vijfeeuwen Delftse apothekers*, Amsterdam 1979, p. 377.
  - 16 *Ibid.*, p. 104.
  - 17 Tim Huisman, *Delft Apothecary Jars: A Descriptive Catalogue*, coll. cat. Leiden (Museum Boerhaave) 2005, p. 10.
  - 18 Margo van Schinkel, 'Potjeslatijn', *Vormen uit Vuur* 235 (2017), no. 3, pp. 12-29.
  - 19 Wittop Koning 1954 (note 1), p. 34.
  - 20 Dirk Arnold Wittop Koning, *Compendium voor de geschiedenis van de pharmacie van Nederland*, The Hague 1986, p. 250.
  - 21 Huisman 2005 (note 17), p. 13.
  - 22 Stoneware and porcelain objects are made from different kinds of clay, which have to be fired at higher temperatures than earthenware pieces.
  - 23 Syson 2016 (note 6), p. 13.
  - 24 J.W. Edwin vom Rath was a wealthy lover of early Italian art in particular, and after his death almost all of his fortune and his art collection was left to the city of Amsterdam.
  - 25 This *albarello*, inv. no. BK-15346-B, has the inscription *DA PRASSIO*.
  - 26 National Museums Scotland website: <https://nms.scran.ac.uk/database/record.php?usi=000-190-004-705-C> (consulted 9 January 2021).
  - 27 In a pharmaceutical manuscript dating from 1328, the spellings 'ierapigra' and 'jerapigra' are both used for the remedy. Wilhelmus Franciscus Daems, *Boec Van Medicinen In Dietsche. Een middelnederlandse compilatie van medisch-farmaceutische literatuur*, Leiden 1967, pp. 193, 195.
  - 28 Victor de Stuers was a politician. He is regarded as the pioneer of the Dutch organization for the preservation of historic buildings. He was a collector of objects of applied art, among other things, and closely involved with the building of the Rijksmuseum.
  - 29 Wittop Koning 1991 (note 10), p. 19.
  - 30 *Ibid.*, p. 68.
  - 31 *Ibid.*, pp. 49, 69.
  - 32 Two cylindrical jars with the inscriptions *B LUCATELLI* and *E PULV GUMM ARABIC*, respectively, and a syrup jar with the inscription *S CARMINATIV*.
  - 33 Arnhem, Museum Arnhem, inv. no. 2370. Wittop Koning 1954 (note 1), p. 84.
  - 34 Earthenware (pottery) is a type of ceramics created using a firing temperature of around 800°C to a maximum of 1150°C.
  - 35 Wilson 2016 (note 4), p. 7.
  - 36 *Ibid.*, p. 8.
  - 37 The Italian jar weighs 1,122 grams and the Delft variant 677 grams.
  - 38 Wilson 2016 (note 4), p. 9.
  - 39 Measurements using X-ray fluorescence (XRF) by Annelies van Hoesel in 2019 did not reveal a second glaze.
  - 40 Henriëtte A. Bosman-Jelgersma, 'De inventaris van een Leidse apotheek uit het jaar 1587', *Scientiarum Historia* 20 (1994), no. 1-2, pp. 57-70, esp. p. 68.
  - 41 Haller 1990 (note 3).
  - 42 W.S. van den Berg (ed.), *Antidotarium Nicolai (Ms. 15624-15641. Kon. Bibl. te Brussel)*, Leiden 1917, p. 217, [http://www.dbnl.org/tekst/\\_ant004wsva01\\_01/colofon.htm](http://www.dbnl.org/tekst/_ant004wsva01_01/colofon.htm) (consulted 15 October 2021). See also Dirk Arnold Wittop Koning, *De oude apotheek*, Delft 1966, p. 14.
  - 43 Van den Berg 1917 (note 42), p. 218.

- 44 Ibid. 'Yera pigra Constantini is geheeten naar Constantinus (zie aldaar) en blijft 2 jaar goed. Volgens J.d.S.A. [Johannis de S eto Amando Expositio super Antidotario Nicolai] zou het niet veel gebruikt worden, zoodat men het niet vaak in eene apotheek gereed vindt. Het komt voor bij N.M. [Latin publication of Nicolaus Myrepsus by L. Fuchsius]. Yera pigra Abbatis, samengesteld door Abbas de Curia (zie aldaar); blijft 2 jaar goed (Salad. de Asc.). Volgens J.d.S.A. wordt het niet meer gebruikt. Men geeft er, volgens Galenus, evenveel van als van Hiera picra. Bij N.M. heet het Hiera ducis.' (Yera pigra Constantini is named after Constantine (q.v.) and remains good for two years. According to J.d.S.A. [Johannis de S eto Amando Expositio super Antidotario Nicolai] it was not much used, as it is not often found ready in an apothecary's shop. It occurs in N.M. [Latin publication of Nicolaus Myrepsus by L. Fuchsius]. Yera pigra Abbatis, formulated by Abbas de Curia (q.v.); remains good for two years (Salad. de Asc.). According to J.d.S.A. it is no longer used. Galen maintains that is used as much as Hiera picra. N.M. calls it Hiera ducis.)
- 45 Paul van Duin et al., *Verzamelaarskast met miniatuurapotheek*, Amsterdam 2017, p. 41.
- 46 Bosman-Jelgersma 1994 (note 40), p. 62.
- 47 'purgiert die mage', Van den Berg 1917 (note 42), p. 182.
- 48 'alle maagqualen, wormen, hartlyvige [obstipatie], en om de [maand]stonden te suiveren'. Anonymous, *Pharmacopoea Amstelredamensis, of d'Amsterdammer apotheek, in welke allerlei medicamenten, tot Amsterdam in 't gebruik zynde, konstiglyk bereyd worden*, Amsterdam (Jan ten Hoorn) 1714 (7th ed.), p. 107, see [https://www.dbnl.org/tekst/\\_pha001pharo5\\_01/colofon.php](https://www.dbnl.org/tekst/_pha001pharo5_01/colofon.php) (consulted 13 October 2021).
- 49 'A wide variety of drugs and herbs were tried, singly or combined, which were easily and cheaply available without prescription, from herbalists and chemists' shops. They included ... 'hiera picra', Patricia Knight, 'Woman and Abortion in Victorian and Edwardian England', *History Workshop* (1977), no. 4, pp. 57-68, [www.jstor.org/stable/4288122](http://www.jstor.org/stable/4288122) (consulted 5 January 2020).
- 50 Haller 1990 (note 3), p. 654.
- 51 Anonymous, *Pharmacopoea Amstelre-damensis*, Amsterdam (Iohannem Blaev) 1643 (4th ed.), p. 54, [www.stichtingfarmaceutischerfgoed.nl/resources/gedigitaliseerde-farmacopees](http://www.stichtingfarmaceutischerfgoed.nl/resources/gedigitaliseerde-farmacopees) (consulted 17 October 2021). See for instance also note 48.
- 52 Van den Berg 1917 (note 42), p. 198.
- 53 Ibid. The fact that Socotrine aloe was said to be the best can also be found in William Lewis, *The New Dispensatory: Containing 1. The Elements of Pharmacy, II. The Materia Medica*, London 1770, vol. 2, p. 81: 'Socotrine aloes [...] contains more gummy matter [...] it is likewise found to purge more, and with greater irritation.'
- 54 Snow 1922 (note 2), p. 621.
- 55 'drie pond en vijf oncen witte geschuimde honing die tot een behoorlijke dikte was ingekookt.' Van den Berg 1917 (note 42), p. 218.
- 56 Ibid.
- 57 Jacob Bell (ed.), *Pharmaceutical Journal and Transactions: A Weekly Record of Pharmacy and Allied Sciences*, London 1859, vol. 18, p. 321, available for consultation online via Google Books (consulted 18 October 2021). On the name 'hikey pikey' in popular terminology, see also Knight 1977 (note 49).
- 58 'Hiera picra', *The British Medical Journal* 2 (1911), no. 2639, p. 250.
- 59 Simon Werrett, *Thrifty Science*, Chicago 2019.
- 60 Ibid., p. 110.
- 61 RCE, project number 2019-006.
- 62 Anonymous, *Nederlandsche pharmacopee*, The Hague 1889 (3rd ed.), p. 266, available online via Google Books (consulted 13 October 2021).
- 63 RCE, project number 2019-072.
- 64 Van Duin et al. 2017 (note 45), p. 17.
- 65 Anonymous 1889 (note 62).
- 66 Personal communication with Annette Bierman, 30 September 2019.