

# Byzantine Jewellery? Amethyst Beads in East and West during the Early Byzantine Period

Jörg Drauschke

*For Prof. Dr Heiko Steuer on the occasion of his 70th birthday*

Precious stones are an integral part of Byzantine jewellery throughout the life of Byzantine culture. This contribution focuses on the time-span between the 5th and the 7th centuries; thus a snapshot from the early Byzantine period. It saw a widespread use of gemstones not only within the Byzantine Empire, but also beyond its borders, for example in the Germanic kingdoms of the West where amethyst and amethyst beads were highly appreciated. These are often found on necklaces from women's graves, particularly in the regions inhabited by Franks, Alamanni and Bavarians, but they are also known from Anglo-Saxon England, Langobardic Italy and, of course, from Byzantine jewellery found throughout the Mediterranean. This paper presents some considerations on the appearance of amethyst within Byzantine jewellery, about the possible deposits that were exploited for the raw, mineral material, and about the connections between East and West that are clearly visible in the archaeological record.<sup>1</sup>

## **Precious stones in Antiquity and the Early Byzantine period and the problems of identification**

For the analysis of the widespread distribution of amethyst beads it is necessary to show briefly which gemstones were used in the Byzantine Empire, which minerals can be identified with these gemstones according to modern nomenclature, and especially how amethyst was perceived. Judging from pictorial representations the wearing of jewellery in the Mediterranean world seems to have increased from the 4th century onwards.<sup>2</sup> Pearls and precious stones were mounted on individual pieces in the form of inlays and pendants. Good examples are the jewelled collars which also appear from the 4th century onwards. According to Stolz, collars with pendants are absent in private contexts from the 5th century onwards and only appear in mythological and Christian illustrations, and of course in depictions of members of the emperor's family.<sup>3</sup> Despite the criticisms of several ecclesiastic dignitaries, decoration with precious stones became an important attribute of imperial dress, which was also charged with Christian symbolism. For example, just as the celestial Jerusalem was also decorated with gold, gemstones and pearls, the emperor's dress was compared with the breastplate of the Jewish high priest that was mounted with 12 precious stones.<sup>4</sup> To prevent increasing imitation of this richly decorated clothing, edicts were enacted which tried to restrict the use of certain gemstones to the emperor's family.<sup>5</sup>

Regardless, precious stones remained in use for many different objects such as bracelets, earrings, finger-rings, and necklaces. Unfortunately, modern descriptions of the particular mineral used are rarely based on a mineralogical analysis. Certainly, in many cases minerals can be

distinguished by their external appearance. Differences in colour and crystal shape are clear between, for example, emerald (green), rock crystal (colourless), lapis lazuli (deep blue), aquamarine (light blue - colourless), garnet (deep red), quartz (white), and chalcedony as well as sardonyx (different colours). These can be distinguished from sapphire and amethyst, which are respectively normally blue and purple. But depending on the particular deposit, the colour can vary and it can be difficult to differentiate between sapphire and amethyst. Sometimes these difficulties increase when it is necessary to draw conclusions from published illustrations, because the colour-rendering can also vary a great deal. In addition, not all droplet-shaped beads with a purple or blue colour are minerals and precious stones, as can be shown by the beads from Menouthis, which are of purple glass.<sup>6</sup>

We must be aware of the fact that colour was the most important characteristic of a precious stone in Antiquity due to the lack of a classification based on a knowledge of the chemical components. Given the great number of gemstones with similar or even identical colours this kind of classification led inevitably to identical appellations for different minerals. Therefore it remains unclear in some cases which gemstones were meant in terms of modern nomenclature.<sup>7</sup> A good example of these difficulties is the famous 'carbunculus'. Pliny the Elder describes in book 37 of his *Natural History* the fiery red colour and distinguishes four main types: *indicus*, *garamanticus* (also called *carchedonius*), *aethiopicus* and *alabandicus*. It is hard to decide which red mineral mentioned by Pliny is identical to the gemstones classified by the modern system and called today red garnet, ruby, jacinth (hyacinth), and spinel.<sup>8</sup> We must assume that all these minerals were in use in Antiquity and later; at least Cosmas Indicopleustes was still aware of the *carbunculus* in the first half of the 6th century.<sup>9</sup>

The amethyst is partly affected by these circumstances. Pliny's description of amethysts (*amethysti*) is very detailed and specifies the places of deposits (see below) as well as the brilliant, purple colour, almost that of wine, which could be an explanation for the name. Pliny classifies the mineral into five kinds according to its colour, from deep purple to nearly colourless, and mentions some of its falsely ascribed attributes: that amethyst prevents drunkenness, protects against spells, helps while approaching a king as a suppliant, and wards off hail and locusts.<sup>10</sup> Just as Pliny relied partly on the gemmological study by Theophrastus (c. 371–287 BC),<sup>11</sup> so Isidore of Seville (560–636) partly based his work on Pliny's. For gemstones he tried to establish his own system depending on their colours. According to him, the amethyst (*amethystus*) ranks first of the purple minerals, owes its name to its similarities with wine and can be divided into five types.<sup>12</sup>

Perceptions of amethyst remain fixed over a long period as

can be seen in the work of the Byzantine scholar Michael Psellos (c. 1017–78) who wrote a short piece about the mineral ἀμέθυστος.<sup>13</sup> Perhaps this tradition can be explained by the fact that amethyst was included among the gemstones of the Jewish high priest's breastplate from the first Greek translation of Exodus 28:17–20, dated around 300 BC (Septuagint), and was repeated in the Latin translation (Vulgate).<sup>14</sup>

With regard to the mineral's description, it is almost certain that the stone named amethyst in Antiquity is identical with the mineral today called amethyst, even if the attributes changed and were reinterpreted in a Christian perspective.<sup>15</sup> But a different name is also considered to have referred to amethyst crystals in Antiquity, that is *hyacinthos*. In Pliny's work this gemstone is clearly differentiated from the amethyst, although he admits to some similarities. But all in all, the much paler colour, reminiscent of the tint of the hyacinth flower, permitted a separation between the two. This distinction is repeated in the 6th century by Isidore of Seville<sup>16</sup> and can also be found in the work of Claudianus in his description of the dress of the Emperor Honorius (395–423) adorned with emeralds, amethysts and hyacinths, the latter marked by a blue colour.<sup>17</sup>

The information presented by Cosmas Indicopleustes cannot be interpreted as totally reliable. Cosmas does not explicitly mention amethyst as a precious stone mined in Sri Lanka and traded from there to the west, but only names the *hyacinthus*.<sup>18</sup> He also describes a large and fiery red hyacinth crystal, stored in a temple in Sri Lanka.<sup>19</sup> This has been interpreted as an amethyst, but also – and, given the described colour, more convincingly – as a ruby.<sup>20</sup> No distinctions are drawn either in paragraph 11.12 from the *Codex Iustinianus*, where it is forbidden to decorate belts, saddles and bridles with emeralds and hyacinths, but without any detailed description.<sup>21</sup> Nevertheless an understanding of the differences between the minerals in question survived into the Middle Byzantine period, for Michael Psellos describes the Ὑάκινθος separately as a gemstone of a marine colour.<sup>22</sup>

In the light of these sources it is no surprise that the identification of the *hyacinthus* is anything but clear. The stones in question include sapphire, amethyst, ruby and the stone still called today jacinth (hyacinth). According to Hunger<sup>23</sup> the ancient term *hyacinthus* must be understood as an expression for amethyst, whereas Lüschen, Friess and Zwickel<sup>24</sup> identify it with the sapphire, but Friess leaves open the possibility that sometimes this term was also assigned to a more purple type, namely the amethyst. Greiff argues that it was attributed to the mineral called hyacinth according to its modern classification.<sup>25</sup> Commenting on the text of Cosmas Indicopleustes, Weerakkody concedes that 'we do not know whether by this word [*hyacinthus*] Cosmas meant the jacinth, the sapphire, or the amethyst: he may even have used the word in a general sense to mean 'precious stones'.<sup>26</sup> All we can acknowledge is the awareness in Antiquity of the existence of a mineral called amethyst and a different gemstone called *hyacinthus* with a bluer colour tinging towards light purple. It seems that this knowledge was still extant during the Middle Ages. Regarding the recorded descriptions and especially the mentioned colours, it is, in my opinion, most convincing to identify the *hyacinthus* with the modern gemstone sapphire. Nonetheless it cannot be excluded that in Antiquity some pale

purple minerals, which would be classified as amethyst according to modern nomenclature, were subsumed under the term *hyacinthus*, because it was not possible to distinguish between them. This seems to be confirmed by the fact that nearly all droplet-shaped mineral beads known from Late Antique and Early Byzantine jewellery are made of sapphire and amethyst. In addition an antique name for the frequently used sapphire is missing. Of course the precious stone *sappirus/sapphirus* is mentioned, for example by both Pliny and Isidore,<sup>27</sup> but given the description of its deep blue colour, opaque crystals and the sometimes visible golden inclusions, it is widely accepted to identify the ancient *sappirus* as a general term for blue stones, and perhaps particularly for lapis lazuli which was used at least until the Late Middle Ages.<sup>28</sup>

### Scientific research on the origins of ancient gemstones and the possible provenance of amethyst

The preceding overview of the ancient classification of precious stones was necessary to show what knowledge existed about the minerals frequently used in Byzantine jewellery. A survey of the jewellery by Baldini Lippolis has shown that in fact – following modern classifications – sardonyx, emerald, sapphire, amethyst, chalcedony, rock crystal, quartz, lapis lazuli, and aquamarine were the favourite types of precious stones for necklaces, followed by beads made from glass paste, pearls and beads made from other types of stone.<sup>29</sup> In this context red garnet is very rarely mentioned, but it was, for example, frequently used for Mediterranean disc-brooches dating from the 5th century.<sup>30</sup> Today we know that the amethyst is a purple variety of quartz and that its colour is generated by iron components. Amethyst deposits are widely spread over the world, with the most important ones situated in South America, especially in Brazil and Uruguay.<sup>31</sup> Of course, the ancient sources are of greater interest for our purpose. Pliny specified many deposits for the above mentioned sardonyx and/or onyx, lapis lazuli, and emerald, but the places of origin between India and the eastern Mediterranean are often repeated and therefore not particularly reliable.<sup>32</sup> Pliny lists amethyst deposits in India, around Petra in Jordan, Armenia, Egypt and Asia Minor, Cyprus and Thasos.<sup>33</sup> For Egypt, at least, traces of mining prove the extraction of the mineral in Roman times.<sup>34</sup> It is typical of Pliny's work that deposits in the West, especially in the then new Roman provinces in north-west Europe, are hardly mentioned. A study of the literature from the time before large overseas sources of raw material were discovered reflects well the pre-modern conditions of gem supply. According to this, deposits of amethyst were also known from Spain and the Pyrenees, in Ireland, in the alpine regions of Switzerland, south Germany and north Italy, Hungary, Bohemia, Sweden, Saxonia, the Auvergne, as well as Idar-Oberstein and other European areas.<sup>35</sup>

Nevertheless an oriental provenance for amethyst is very probable given the recent research on the origins of red garnets in the 5th until the 7th century. Greiff analysed several garnet inlays from Merovingian pieces of jewellery and compared the results with the chemical composition of the over 70 garnet sources known today. The clear result was that the most similar deposits were to be found in India.<sup>36</sup> Later analyses by German and French teams confirmed these results, but also added

interesting aspects. It was possible to distinguish between different garnet sources: gemstones from the 5th and 6th centuries could be connected with sources in India and Sri Lanka, whereas objects dating to the second half of the 7th century were decorated with garnets from Bohemia. This was first shown by the German team assembled by Quast and refined by French colleagues who were able to divide the oriental garnets into three and the Bohemian ones into two kinds. The first appearance of Bohemian garnet could be dated to the time around 600, but minerals from Asiatic sources continued in use for several decades.<sup>37</sup> Generally a change of sources is clearly visible, but this is not the place to speculate about proposed explanations.<sup>38</sup>

Only a few modern studies of Byzantine jewellery include mineralogical analyses. One deals with the materials used for the collar from the so-called Assiût treasure.<sup>39</sup> With the help of different analytical methods and characteristics – refractive indices, inclusions, and specific light effects ('asterism') – both the original and replaced crystals could be identified. Both the pendants and the inlays on the ornamented plaques are sapphires; only one pendant is an amethyst, and this perhaps is a modern replacement. A comparison with older publications of the collar, where one can find descriptions of aquamarine or rock crystal, shows the importance of modern scientific analyses. Moreover the identification of characteristic inclusions – so-called healing-fissures – in the sapphire droplets suggested Sri Lanka as a place of origin, thus the same provenance as some red garnets. The sapphire beads found in Berenice, the famous harbour and trading port on the Red Sea coast, where many exotic imports from southern Asia were found during the recent excavations, point in the same direction.<sup>40</sup>

To date no attempts have been made to identify exploited amethyst deposits with the help of scientific methods, although there is a possibility of success for such a research programme. The differences between sources with regard to the main chemical components are not decisive, but with the help of trace element analysis and specific isotopes it might be possible to obtain some results, particularly as amethyst deposits are

not as numerous, for example, as garnet deposits. These methods have been applied successfully to carnelian beads from western India and West Africa.<sup>41</sup> Even though the origin of the amethysts used for Byzantine necklaces and also for necklaces in the West has not yet been scientifically confirmed, it is most probable in my opinion – given the written sources and the results for red garnets and sapphires – that the sources were located in southern Asia, *i.e.* India and/or Sri Lanka, or in the regions of Egypt, Ethiopia, the Near East, Asia Minor, and Greece. At the very least the production of beads from the crystal raw material must be sought in the Byzantine Empire. Not only does the appearance of numerous mineral beads and inlays on Byzantine jewellery point in this direction, but so do the remains of workshops where the raw mineral material has been excavated, for example in the city of Alexandria.<sup>42</sup> Mineral raw materials (but not amethyst) are also amongst the finds from the recent excavations at the Crypta Balbi in Rome.<sup>43</sup> Working on gemstones was not restricted to the heartland of the Byzantine Empire.

### Amethyst beads and pendants in Mediterranean and Byzantine jewellery

Typical droplet-shaped amethyst beads are in most cases components of Byzantine necklaces and earrings. But especially for the early period not many jewels with amethyst can be cited. A 4th- to 5th-century diadem, now in the Walters Art Museum, Baltimore, bears amethyst cabochons.<sup>44</sup> Oval amethysts can also be found on the plaques of an openwork necklace and an openwork bracelet from the second half and last third of the 4th century in the Dumbarton Oaks Collection.<sup>45</sup> Similar amethyst inlays remain rare in later centuries. An exception is the collar that is believed to belong to the Assiût treasure, today in the Antikensammlung, Berlin.<sup>46</sup>

Droplet-shaped amethyst beads and pendants seem to appear later, and then were widely used in the 6th and 7th centuries. Many examples are known from Egypt, but were recorded during old excavations, so a chronological context is lacking.<sup>47</sup> Within the eastern Mediterranean area three necklaces are known from treasures probably buried in



**Plate 1** Necklace with 13 amethyst beads, Washington DC, Dumbarton Oaks Collection, Inv. no. 59.61 (not full-scale)



**Plate 2** Necklace from Lambousa (Cyprus). Nicosia, Cyprus Museum, Inv. no. J 429 (not full-scale)

Constantinople at the end of the 6th and during the 7th century (today in the Dumbarton Oaks Collection in Washington DC) which feature amethyst beads (Pl. 1).<sup>48</sup> Three further necklaces with similar beads must be added which belong to the collection of the Cyprus Museum in Nicosia. At least two of them were certainly found in Lambousa – one (Pl. 2) part of treasure 1 brought to light in 1883 and probably buried in 653/54 – and a third one is possibly of the same origin.<sup>49</sup> Looking at the Byzantine Balkan provinces the collar from Sadovec, Sadovsko Kale on the Danubian frontier must be added, dated by its context to the 6th century. The five amethyst beads were parts of single pendants of which the collar was composed.<sup>50</sup>

In the western Mediterranean a few Byzantine necklaces are known from Sicily. The treasure of Pantalica, most probably hidden during the second half of the 7th century, was found in 1903 and contained at least five of them, but only parts of them survive in the Archaeological Museum of Syracuse and in a private collection in the USA. Amethyst beads are mentioned in the descriptions of the necklaces, but only two of the illustrations feature droplet-shaped beads which could be compared with typical amethyst beads.<sup>51</sup> A further necklace with similar amethyst beads formed part of a burial in Nissoria (Sicily) from the end of the 6th century.<sup>52</sup> In addition Baldini Lippolis recently presented a necklace from a treasure found in Campobello di Mazara (Sicily) with amethyst pendants, presumably buried at the end of the 7th or in the 8th century (see Baldini Lippolis, this volume, Pl. 23). A chain found at the Forum Romanum in Rome and dated to the end of the 6th and the 7th centuries was identified as a bracelet and also included comparable beads.<sup>53</sup>

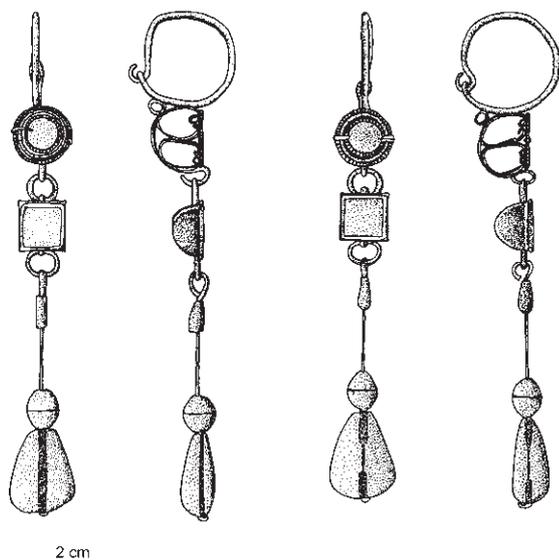
The *corpus* of necklaces and collars can be completed by pieces from private and museum collections, without any context or origin. A very interesting, because probably very early, example is the necklace from the George Ortiz Collection

in Geneva, dated from the second half of the 5th to the first half of the 6th century.<sup>54</sup> Droplet-shaped amethyst beads are also components of necklaces in the Benaki Museum, Athens,<sup>55</sup> the Skulpturensammlung und Museum für Byzantinische Kunst, Berlin,<sup>56</sup> the Indiana University Art Museum, Bloomington,<sup>57</sup> the Field Museum of Natural History, Chicago,<sup>58</sup> the Metropolitan Museum of Art, New York,<sup>59</sup> and the Walters Art Museum, Baltimore.<sup>60</sup> A necklace in a private collection in Munich was perhaps recently assembled from ancient pieces.<sup>61</sup> In general the above mentioned pieces all belong to the 6th and 7th centuries.

Beyond the borders of the Byzantine Empire, but also from a Mediterranean context, are some well-known collars which were excavated in women's graves within Langobardic cemeteries in Italy. The Byzantine impact on the dress fashions of the Langobardic invaders is clearly visible, so it is no surprise that finds of amethyst beads are very frequent: at the cemetery of Nocera Umbra, for example, they have been found in at least 19 female graves.<sup>62</sup> They cover a period from the last third of the 6th up to the second half of the 7th century. Some very prominent examples are known from graves 10, 17, 69, and 95.<sup>63</sup>

The second main group of Byzantine jewellery with droplet-shaped amethyst beads consists of earrings. Their distribution is very similar to the necklaces mentioned above. From Menouthis in Egypt two pendants were recorded which certainly belonged to an earring.<sup>64</sup> From Beit Jibrin (Palestine) two pairs of gold earrings with similar amethyst beads are known from a burial. Unfortunately the exact grave context has been lost, but the earrings themselves belong to the 6th and 7th centuries.<sup>65</sup> One pair of earrings and one single earring formed part of the first Cyprus treasure from Lambousa,<sup>66</sup> whereas the second treasure, unearthed in 1903 and presumably buried at the same time as the first, around 653/54, contained a pair of gold earrings.<sup>67</sup> They all feature droplet-shaped amethyst beads. From Constantinople itself no certain examples are known. One piece from the Walters Art Museum in Baltimore could also have an origin in southern Spain.<sup>68</sup> A 6th-century pendant, which most probably belonged to an earring, has been found in Sadovec.<sup>69</sup>

Earrings with amethyst pendants are also known from places in the western Mediterranean, for example, in Italy. In Patti Marina (Sicily) a grave was found in 1973 with a pair of gold earrings dating from the second half of the 6th century.<sup>70</sup> Grave 57 from Arezzo, Duomo Vecchio, can probably be dated slightly later to the end of the 6th or the beginning of 7th century and it too contained a pair of gold earrings (Pl. 3).<sup>71</sup> From Luni (Liguria) comes a pair of gold earrings which Baldini Lippolis has suggested belong to a rather earlier type of the 5th or 6th century.<sup>72</sup> Very early Byzantine examples with amethyst pendants, with regard to both the eastern and western Mediterranean, are known from two graves in Henchir Kasbat (*Thuburbo maius*) and Mactar (*Mactaris*) in modern Tunisia. A pair of gold earrings was found in 1912 in a woman's grave within the basilica of Henchir Kasbat, whereas the gold earring from Mactar came from a similar grave associated with the local church.<sup>73</sup> In spite of doubts as to whether women from the Vandal ruling class were buried here, the earrings are a perfect example of the Byzantine style that was obligatory for all Mediterranean elites and they can be dated on the basis of the grave contexts to around the mid- 5th century.



**Plate 3** Pair of gold earrings with amethyst beads from Grave 57 from Arezzo, Duomo Vecchio, Italy

Again, several earrings from museum and private collections must be added to complete the picture. They are generally from the 6th and 7th centuries and include a single earring, acquired in 1943, in the Walters Art Museum, Baltimore.<sup>74</sup> Further pairs of gold earrings with amethyst pendants are in the collections of the Museo del Bargello, Florence,<sup>75</sup> the Ashmolean Museum, Oxford (Pl. 4),<sup>76</sup> and the Schmuckmuseum, Pforzheim.<sup>77</sup>

From Langobardic cemeteries in Italy two very well-known pairs of gold earrings with three pendants must be mentioned. They were found in grave 7 at Civezzano and grave S at Castel Trosino, and date respectively to around 600 and the early 7th century.<sup>78</sup>

At the end of this inventory of mainly droplet-shaped amethyst beads from the Mediterranean some finds must be mentioned whose functions are unknown. A gold droplet-shaped pendant with a central amethyst bead, found in Egypt and now in the British Museum in London,<sup>79</sup> and a pendant with an amethyst bead from the Byzantine and Christian Museum in Athens<sup>80</sup> were probably parts of earrings or necklaces. Similar droplet-shaped amethyst beads were also used as pendants for jewels from the famous treasure of Guarrazar in Spain. Including only those pieces found today at the Museo Arqueológico Nacional and the Real América del Palacio Nacional in Madrid, 23 gemstones could be identified as amethysts, whereas 245 sapphires, 14 emeralds and 185 pearls were recorded in addition to other stones. Amethysts are not only frequently used as pendants on crosses, like the example in the Museo Arqueológico Nacional, and a similar one in the Musée National des Thermes et de Hôtel de Cluny, but also in crowns like the 'corona de estructura calada de doce tramos', also in the Cluny collections. Gemmological characteristics hint at a south Asian origin for the sapphires – like those from the Assiût collar – but PIXE-analyses of the emeralds suggest an alpine source for these gemstones.<sup>81</sup> As the burial of the treasure probably occurred at the end of the 7th or the early 8th century (the invasion of the Arabs took place in 711), one must assume a longer period of time (perhaps more than 100 years) for the manufacture of the different objects. Therefore the fact that the gemstones originate from different



**Plate 4** Pair of earrings with amethyst pendants. Oxford, Ashmolean Museum, Inv. no. AN 1909.822

sources should not come as a surprise.

In summary one can say that amethyst beads typically of droplet shape were used quite frequently – but not as often as sapphires or emeralds – especially for necklaces, collars and earrings throughout the Mediterranean in the 6th and 7th centuries. Earlier pieces are hard to identify and it seems that a common use of this kind of pendant began at least in the 5th century and saw a widespread distribution from the 6th century onwards.

#### The 'barbarian' perspective: amethyst beads from the eastern Merovingian Kingdom

North and west of the Alps amethyst beads have been found in very large numbers within the borders of the Merovingian Kingdom, in particular in the northern and eastern parts belonging to the 'row-grave-culture'. This culture is characterised by large 'row-grave' cemeteries, where the dead were sometimes buried with opulent grave goods. The frequently recorded necklaces in female graves, which are assumed to have been part of daily clothing, incorporated amethyst beads in surprisingly high numbers. They are generally interpreted as Mediterranean<sup>82</sup> or particularly Italian imports.<sup>83</sup> Their occasional combination with gold pendants has even led to the suggestion that whole collars were imported from Italy,<sup>84</sup> but this assumption cannot be extended to all the beads found in the North. Schulze-Dörflamm tried to explain the increasing use of amethyst beads from the end of the 6th century onwards as an imitation of Byzantine court costume as seen on the well-known Theodora mosaic panel in the church of San Vitale in Ravenna.<sup>85</sup> Another point must be made here: in general amethyst beads are small, almond- or droplet-shaped and have a strong colour (Pl. 5). It has been recognised that – beginning from the second half of the 7th century – some crystals became longer and pale to colourless (Pl. 6), which has been explained as evidence of a change of raw material, perhaps the result of falling back on local resources.<sup>86</sup> So the question arises as to whether the beads from the area north of the Alps can be considered as Mediterranean, perhaps Byzantine products, and whether a change of raw material can really be determined for the 7th century.



**Plate 5** Necklace from grave 10 from Lahr-Burgheim (Germany) with typical droplet shaped amethyst beads (not to scale)

To answer these questions I analysed the finds of an area which covers southern Germany and adjacent regions (Pl. 7). It was inhabited during the 6th and 7th centuries by Franks, Alamanni and Bavarians. It is generally accepted that amethyst beads from female 'row graves' are to be dated between approximately 565/70 to 620/30,<sup>87</sup> but this time span, as demonstrated by the chronological analyses of Roth and Theune some years ago, has to be substantially extended.<sup>88</sup> Within the designated area the first beads appear around the middle of the 6th century, reach an amazingly high number of finds around 600 and are still known from graves at the end of the Merovingian period around 700.

Except as beads within collars amethysts are used in only two further types of jewellery. The semi-precious stone has been identified only twice as inlays on 7th-century disc-brooches.<sup>89</sup> In addition three pairs of earrings from three different graves were equipped with amethyst pendants. These graves can be dated to the time around and after 700, so we might detect traces of a particular fashion in this period.<sup>90</sup>

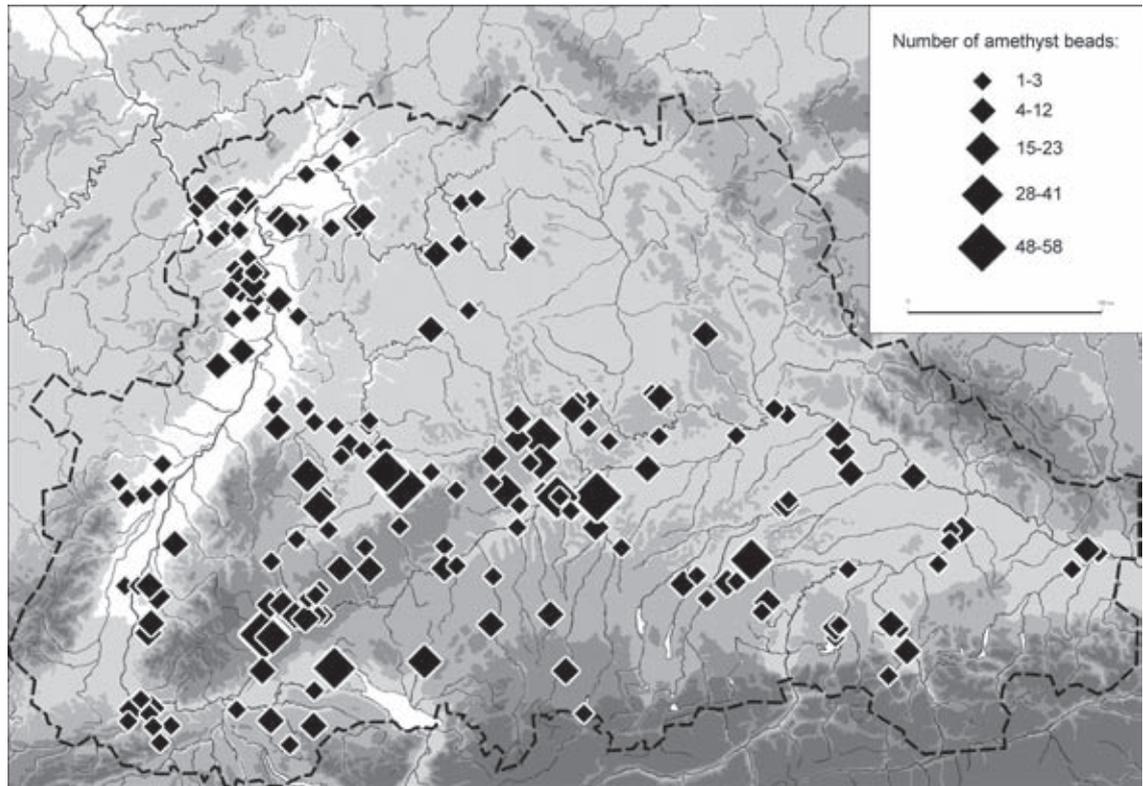
Altogether the collection from south Germany includes at least 1005 amethyst beads from 383 find-contexts, in addition to which a higher number of archaeologically recorded pieces must be estimated as the exact numbers of beads are not known from some contexts. It was possible to define a closer dating for 287 contexts with 808 amethysts (Pl. 8).<sup>91</sup> Samples of the phase around the middle of the 6th century are rare, with 30 beads from 16 graves. Only one burial can be clearly dated before 550, whereas the rest of the graves are distributed mainly in the west of the area in question. In the following time phase at the end of the 6th century the number of graves with amethyst beads rises substantially to 95, and at the same time their distribution expands to include the entire southern German region, a pattern which remains unaltered in the course of the following 7th century. A comparison of the distribution of amethyst in the 6th and 7th centuries shows that they are well represented in all micro-regions and cover all areas which are thought to have been inhabited during this time. The number of datable finds decreases from 72 in the beginning, to 38 and 27 in the middle of the 7th century, but increases again to 40 around 700. The number of amethyst beads repeats the trend of the contexts. The high esteem in which these beads were held from the end of the 6th century can be also demonstrated by the average number of pieces per grave, being 2.6 at the beginning and reaching a maximum of 3.2 beads per grave around 700.<sup>92</sup>

Regarding the shape of amethyst beads, the designations 'almond-shaped' and 'droplet-shaped' dominate in the literature, sometimes supplemented by the description 'flat'. 'Spindle-shaped', 'round' or 'discoid' are very rarely used terms. A comparison of the pieces reveals that behind these different descriptions identical or at least very similar profiles are hidden. Generally amethyst beads are characterised by a

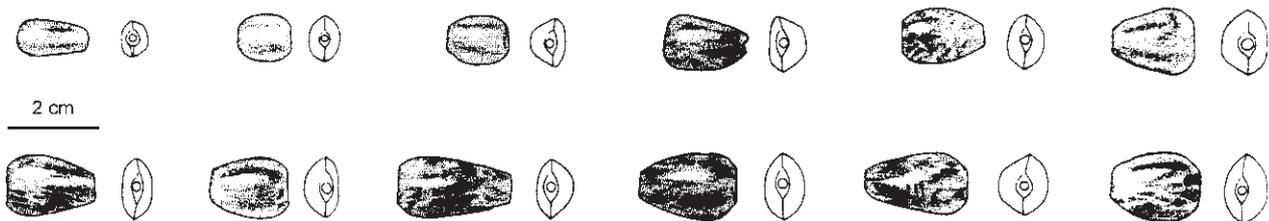
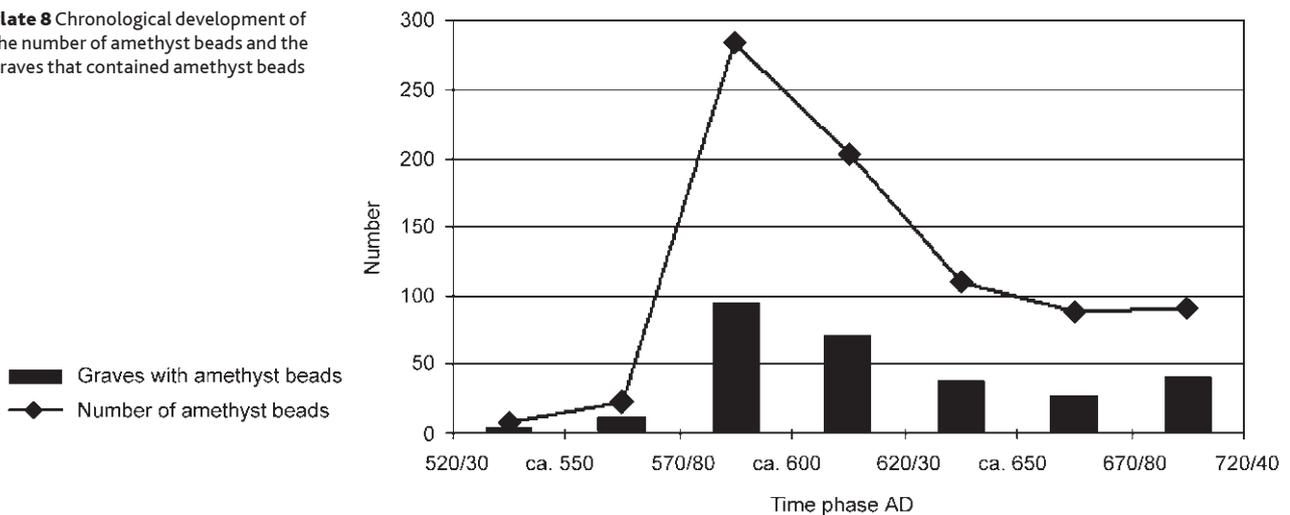


**Plate 6** Necklace from grave 32 from Bruckmühl (Germany) with partly pale amethyst beads of a differing shape

**Plate 7** Distribution of amethyst beads from the 6th and 7th centuries in southern Germany and adjacent areas



**Plate 8** Chronological development of the number of amethyst beads and the graves that contained amethyst beads



**Plate 9** Amethyst beads from grave 30 from Schleithem, Church of Sta Maria (Switzerland)

contour similar to a drop or an almond, whereby the largest width lies in the centre or is shifted to one end (Pl. 9). The differences between ‘pillow-shaped’ and ‘almond/tear-drop shaped’ beads cannot be determined exactly, and it is not possible to make a clear distinction. The cross-section of the beads is mostly pointed, whereas one side can be more strongly curved than the other and sometimes bears an aris (sharp

ridge). The sides are sharp edged-polished to rounded. The width of the beads increases proportionally to the length, but rarely exceeds 1.5cm, so that the length to width relationship on the longer pieces shifts. Only the bead length remains as a reliable and examinable size,<sup>93</sup> which was always consulted as the main criterion for the differentiation of the beads as mentioned above. In order to study the beads’ chronological

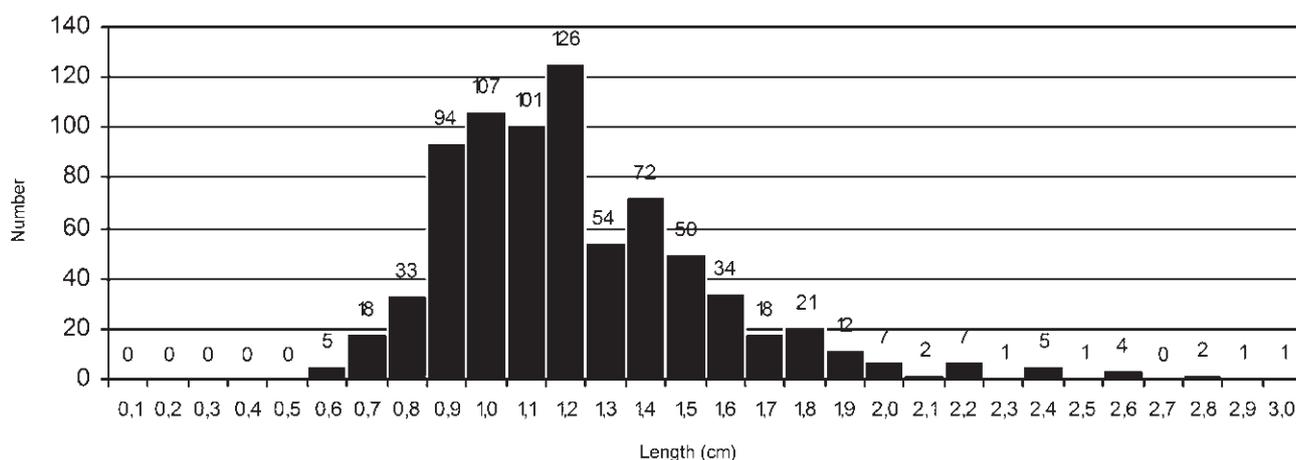


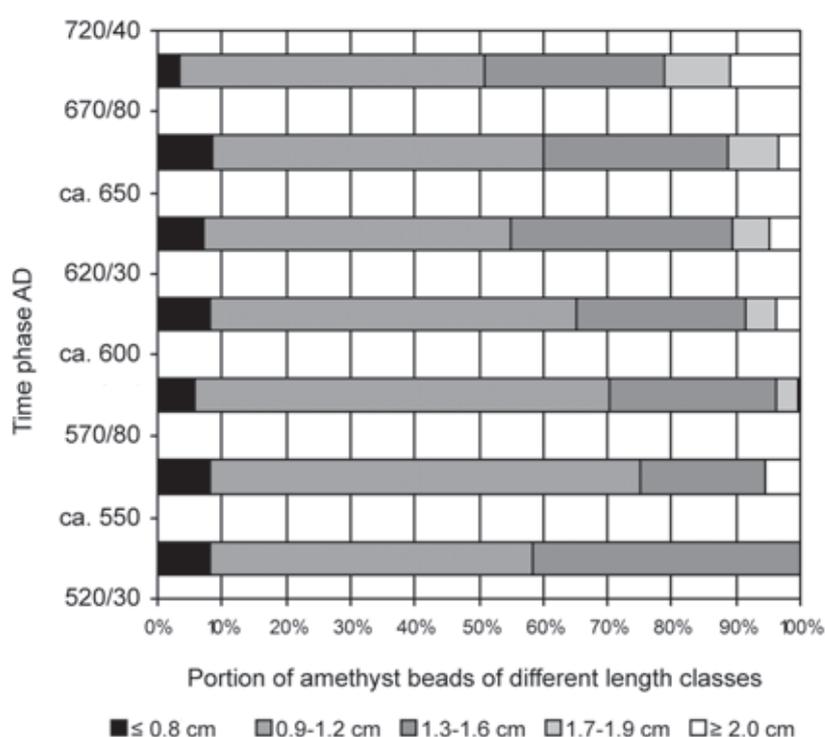
Plate 10 Number of different lengths of amethyst beads

development, the length of 776 pieces was measured, whereby clear tendencies could be detected (Pl. 10), which were summarised into five groups: Group 1 – beads of 0.8cm in length or smaller (numerically insignificant); Group 2 – beads of between 0.9cm and 1.2cm in length (much the largest group, comprising 428 examples); Groups 3 and 4 of between 1.3cm and 1.6cm and 1.7cm and 1.9cm in length respectively; Group 5 – beads of 2cm or more in length (rare). It is evident that rather long beads must be understood as exceptions over the whole period.

The groups of different spans were combined into the five groups above, and their frequency and percentage within the time phases from the middle of the 6th to the end of the 7th century were examined: 672 beads from 229 find-contexts were available.<sup>94</sup> The frequency of the individual groups and their percentage in the different time phases is informative (Pl. 11). The otherwise insignificant small beads (Group 1) were in use up to the time around 700, whereas the beads of Groups 2 and 3 are the most frequent ones. Their number decreases continuously over the whole time span, but always forms the

largest percentage (70%–90%) of all beads. The large beads of Groups 4 and 5 appear during the second half of the 6th century, but only with a percentage of 10%–12% and only around 700 do they reach somewhat more than 20%. The results can be summarised as follows: over the whole period beads of a length from 0.9 to 1.6cm are the most popular, whereas smaller pieces remain infrequent, but were still in use in the period around 700. Beads starting from a length of 1.7cm are known from the end of the 6th century onwards, but mainly belong to the 7th century. Until the time around 700 they remain insignificant. As a result, the dating of amethyst beads according to their lengths remains a methodological problem and should be avoided. In addition, a sudden change in the deposit source for the amethyst raw minerals corresponding to the size of the beads is not visible within the material; but the existence of an alternative mineral source of raw stones, which supplied large crystals for the larger beads of the 7th century, being exploited during the same period cannot be ruled out. A regional preference for the larger beads of Groups 4 and 5 could not be detected.

Plate 11 Percentage of different length classes of amethyst beads during the 6th and 7th centuries



In addition it is important to emphasise that the decreasing, but still constant frequency of amethysts during the 7th century, shows clear differences to the red garnet from south Asia, falling out of use very quickly after 600 and being replaced by crystals from Bohemia (see above). In order to explain this situation, different scenarios are conceivable. If the sources of amethyst are not to be found in southern Asia, but in Egypt or elsewhere around the eastern Mediterranean, then the supply of the raw material must be seen separately and amethyst would not have been affected by circumstances which influenced the trade in red garnets. But if we assign a south Asian origin to amethyst – which is very probable due to the results concerning the origin not only of garnets, but also of several sapphires (see above) – and a break in the trade connections between south Asia and the Byzantine Empire around 600, caused by the Sasanian conquest of south Arabia and visible in the West because of the further absence of garnets,<sup>95</sup> then the diverging development of the gemstones used during the 7th century must be explained in a different way. Perhaps it will be possible in the near future to use scientific methods which help us to identify the deposits of the amethyst raw material. If the results prove India or Ceylon as the region of origin even for pieces of the 7th century, the absence of south Asian red garnet after 600 cannot be due to difficulties of supply. But it is also possible that a change of amethyst deposits can be detected that is not visible at the moment with regard to individual objects.

#### Amethyst beads in East and West

A comparison of amethyst beads from Merovingian contexts with those from the Mediterranean reveals several similarities: the identical droplet shape and use of the beads, the identical drilling technique and the more or less parallel origin for this kind of bead as a necklace ornament from the 6th century onwards. Of course, on Merovingian necklaces they were not worn as pendants and they were never strung on a gold chain link as was common in the Mediterranean. But this is no surprise considering the fact that Mediterranean (or Byzantine) jewels in the form of finished products are very rare in the archaeological material of the Merovingian realm.<sup>96</sup> Regarding the finds from the Byzantine Empire, the western Mediterranean and the eastern parts of the Merovingian Kingdom, I would conclude that the amethyst beads found in the region north of the Alps are imports from the Mediterranean, specifically the Byzantine Empire and that they arrived in the form of single beads, not attached to whole necklaces or collars. They show an unbroken production until the end of the 7th century, of course with less intensity at the end, whereas the higher percentage of bigger and paler beads may indicate the existence of a different source. They also show the close relations between East and West during this time. Amethyst beads are also very common in Anglo-Saxon graves in Great Britain, but they have different polished shapes and their average size is much larger than those from the Continent or Mediterranean area.<sup>97</sup> The question as to whether they are local products from deposits in northern Europe, or whether they also represent Mediterranean beads, as has been frequently assumed,<sup>98</sup> cannot be answered here, but perhaps a detailed study could also bring to light different types of beads which could be connected to specific deposits. In contrast, the

amethyst beads of the 6th and 7th century found in southern Scandinavia seem to be comparable with the Merovingian and Byzantine ones, as well as the few examples of amethyst beads from Avar graves in the Carpathian Basin.<sup>99</sup>

Of course, in the light of the wide distribution of droplet-shaped amethyst beads even in the Barbaricum it is debatable whether they should be called 'Byzantine'. At least they reflect an international fashion, but the origin of this fashion and the origin of the material itself must be sought around the eastern Mediterranean.

#### Notes

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- 48 Washington DC, Dumbarton Oaks Collection, Inv. no. 58.28: Ross (n. 45), 135, no. 179 B, pl. 94, with seven amethyst beads; Baldini Lippolis (n. 29), 135, no. 2.III.1.c, 11; Washington DC, Dumbarton Oaks Collection, Inv. no. 58.27: Ross (n. 45), 136, no. 179 C, pl. 95, with two amethyst beads; Baldini Lippolis (n. 29), 140, no. 2.III.2.b, 1; Washington DC, Dumbarton Oaks Collection, Inv. no. 59.61: Ross (n. 45), 7, no. 4A, pl. 8, with 13 amethyst beads; Baldini Lippolis (n. 29), 135, no. 2.III.1.c, 12; A. Yeroulanou, *Diatrita. Gold pierced-work jewellery from the 3rd to the 7th century*, Athens, 1999, 216, no. 66. According to Baldini Lippolis the necklaces generally belong to the mid-5th to early 8th century.
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- 67 New York, Metropolitan Museum of Art, Inv. no. 17.190.145-146: Baldini Lippolis (n. 29), 112, no. 2.II.9.1.
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- 72 Florence, Archaeological Museum, Inv. no. 72605: Baldini Lippolis (n. 29), 93, no. 2.II.4.c.5.
- 73 Henchir Kasbat (*Thuburbo maius*), Tunisia: D. Quast, 'Völkerwanderungszeitliche Frauengräber aus Hippo Regius (Annaba/Bône) in Algerien', *JBRGZM* 52 (2005), 237–315, esp. 273, no. 3; Mactar (*Mactaris*), Tunisia: *ibid.*, 276–7, no. 5, fig. 30A, 1.
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- 78 Grave S from Castel Trosino (Italy), Rome MAM, Inv. no. 1276/1277: Menis (n. 63), 203, no. IV.86; Grave 7 from Civezzano (Italy), Trento MPA, Inv. no. 4172/4173: *ibid.*, 117–8, II.19g.
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- 85 M. Schulze, 'Einflüsse byzantinischer Prunkgewänder auf die fränkische Frauentracht', *Archäologisches Korrespondenzblatt* 6 (1976), 149–61, esp. 157. **See also, Stolz, this volume, Pl. 2.**
- 86 Christlein (n. 84), 72; U. Koch, *Der Runde Berg bei Urach 6: Die Glas- und Edelsteinfunde aus den Plangrabungen 1967–1983* (Heidelberger Akademie der Wissenschaften, Schriften der Kommission für Alamannische Altertumskunde, 12), Sigmaringen, 1987, 346 with literature.
- 87 Koch (n. 86), 346.
- 88 H. Roth and C. Theune, *SWI - V: Zur Chronologie merowingerzeitlicher Frauengräber in Südwestdeutschland* (Archäologische Informationen aus Baden-Württemberg, 6), Stuttgart, 1988, Tabelle 6.
- 89 G. Graenert, *Merowingerzeitliche Filigranscheibenfibeln westlich des Rheins* (Europe médiévale, 7), Montagnac, 2007, 193, no. 29, b (Griesheim, grave 400); 183, no. 6 (Armsheim).
- 90 Grave 9 (1920) from Dürrmenz, Baden-Württemberg, Germany: W. Veeck, *Die Alamannen in Württemberg* (Germanische Denkmäler der Völkerwanderungszeit, 1), Berlin/Leipzig, 1931, 232, no. 3, grave 9 (1920), pl. 27, 8; Grave 70 from Knittlingen, Baden-Württemberg, Germany: F. Damminger, *Die Merowingerzeit im südlichen Kraichgau und in den angrenzenden Landschaften* (Materialhefte zur Archäologie in Baden-Württemberg, 61), Stuttgart, 2002, 232, pl. 22B; Grave 131 from Salzburghofen, Bavaria, Germany: R. Knöchlein, *Studien zur Archäologie der Merowingerzeit im Rupertiwinkel*, Munich, 1997, 55–6, pl. 13B.
- 91 The mentioned absolute dates correspond to time phases AM I–III (older Merovingian) and JM I–III (younger Merovingian) defined by Ament, but with a partitioning of the phases AM II and JM II in smaller sections (a and b), due to the chronological framework developed by Koch: H. Ament, 'Zur archäologischen Periodisierung der Merowingerzeit', *Germania* 55 (1977), 133–40; U. Koch, *Das alamannisch-fränkische Gräberfeld bei Pleidelsheim* (Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg, 60), Stuttgart, 2001, 26–88.
- 92 J. Drauschke, *Zwischen Handel und Geschenk – Studien zur Distribution von Waren im östlichen Merowingerreich des 6. und 7. Jahrhunderts anhand orientalischer und lokaler Produkte*, PhD Freiburg, 2005, 58–9; average number of amethyst beads in one necklace: before c. 550: c. 1.4; after c. 550: c. 2.1; end of 6th century: c. 3.0; beginning of 7th century: c. 2.7; before c. 650: c. 2.9; after c. 650: c. 3.2; end of 7th century/ beginning of 8th century: c. 2.3.
- 93 Cross-sections and colour are only seldom described in detail and could therefore not be evaluated.
- 94 The creation of length classes also helps to minimize the effects of possible measuring inaccuracies.
- 95 Von Freeden (n. 38).
- 96 J. Drauschke, 'Byzantine' and 'oriental' imports in the Merovingian Empire from the second half of the fifth to the beginning of the eighth century', in A. Harris (ed.), *Incipient globalization? Long-distance contacts in the sixth century* (Reading Medieval Studies, 32/BAR International Series, 1644), Oxford, 2007, 53–73, esp. 61–7; J. Drauschke, 'Zur Herkunft und Vermittlung 'byzantinischer Importe' der Merowingerzeit in Nordwesteuropa', in S. Brather (ed.), *Zwischen Spätantike und Frühmittelalter. Archäologie des 4. bis 7. Jahrhunderts im Westen* (Ergänzungsband zum Reallexikon der Germanischen Altertumskunde, 57), Berlin/New York, 2008, 367–423.
- 97 *E.g.* in graves 53, 67, 75, 124, 127, 132, and 133 from Buckland. The published amethyst beads reach a length of 2.0 up to 3.0 cm with one exception (1.4 cm): V.I. Evison, *Dover: The Buckland Anglo-Saxon cemetery* (Archaeological Report, 3), London, 1987, 60, pl. 28, 53.1a; pl. 37, 67.1a; pl. 38, 75.1b; pl. 51, 124.1; pl. 52, 127.1a; pl. 54, 132.2a; pl. 55, 133.2a.
- 98 Huggett (n. 34), 66–8, fig. 2 (distribution of amethyst beads).
- 99 For information about amethyst beads and Byzantine objects in Scandinavia I would very much like to thank Dr John Ljungkvist – an article on this subject is under preparation; É. Garam, *Funde byzantinischer Herkunft in der Awarenzeit vom Ende des 6. bis zum Ende des 7. Jahrhunderts* (Monumenta Avarorum Archaeologica, 5), Budapest, 2001, col. pl. 9, 1 (Dunapentele); col. pl. 15, 2 (Ozora-Tótipuszta).