

A MEDIEVAL WIND INSTRUMENT FROM SCHLETTWEIN, THURINGIA

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“Andolt der meister jagenes hie blies mit einem zinde.”

(Albrecht von Scharfenberg (ca. 1270), *Der jüngere Tituel*)¹

Archaeological evidence, it has been argued, can extend our knowledge of musical instruments and sound devices from the Middle Ages as well as later periods.² The many organological objects discovered in archaeological contexts can be essential in bridging gaps in our knowledge, not only in regard to morphological details of construction, but also concerning the relationship of an instrument to its maker and user (i.e., its social and cultural context). The fragmentary character of any archaeological record however frequently poses new questions more than it answers old ones.³

Many instruments preserved in museums present problems in dating as well as in their contextual evaluation. They are frequently totally separated from their former context, unless there is additional information from written records from the time of their acquisition. Unlike musical instruments preserved above ground, archaeological finds are generally suitable for dating by scientific and stratigraphic methods, because they have survived in a distinctive contemporary context. Archaeological work aims to give a documentation of this context as objectively as possible. Results of such studies may offer certain advantages, but normally the fragmentary nature of the material leads to subsequent interpretation, reconstruction, and sometimes even speculation as well. Even if a recovered instrument or its fragments appear to be “complete,” we may be unaware of certain associated structures that have been lost during, before, or particularly after deposition. The events which led to the deposition of the objects frequently cannot be defined from the archaeological context. In the course of time, human-influenced processes—such as use, withdrawal from use, repair, restoration, conservation, and re-use, as well as physical and chemically influenced ageing-processes after deposition—may have a considerable impact on any instrument’s structure. These processes have also affected musical instruments which have been preserved above ground in museum collections. In short, a conclusive description of the instrument’s original form is often impossible.

Additionally, it must be emphasized that the social context of any “historical” instrument is irretrievable. Whereas the object itself is subject only to conditions of preservation, its social environment will be lost in the course of time after deposition or after falling into oblivion. This applies in particular to the contemporary reception, i.e., to the habits of hearing of past performers and listeners. The instrument as an artifact moves from a *systemic* to an *archaeological* context and is “no longer part of an ongoing society.”⁴ The object might attract attention again, at least as a result of its recovery. It therefore becomes once more a part of a present systemic context, but its function will now be totally different from its

function in the past.

In the course of any research in organology and musicology, one attempts to reconstruct past systemic contexts by means of different extant objects, such as sources provided by museums, archives, and libraries. Recovering, preserving, and collecting have considerably changed the use and function of these artifacts. As a result of random selection, "the sample of items that survives from any past time period by virtue of conservatory processes is far from representative."⁵

Thus any extant "historical" instrument of music is at best a sound device, a fragmentary object, relating to a past soundscape. Its position within social frameworks of a past society must be considered in the course of its further interpretation. As the source situation concerning musical instruments of the past is quite limited, considerable responsibility in handling as well as interpreting these items is always required.

In the following case-study a musical instrument from an archaeological context appears quite complete to us. Yet its further organological interpretation, admittedly based merely on the thing itself, presents some problems. The structure of this object appears nevertheless to be significant for the history of some brass instrument types.

The Schlettwein instrument: a lip-vibrated aerophone?

In the course of excavations in the area of the former Rittergut Schlettwein, carried out by the staff of the Weimar Museum für Ur- und Frühgeschichte Thüringens in 1964, the foundations of a moated castle were uncovered. Cited in written sources as *castrum Slotwyn*, the castle has two constructional phases, dating from the 13th and 15th centuries respectively.⁶ The conditions of preservation for organic materials in the sediments of the moat, positively influenced by high ground water level, were quite good.

Three objects that may be classified as wind instruments were recovered from these deposits: two small bone-whistles and a third, larger, instrument. Through their proximity to certain distinctive types of pottery, it was possible to assign the recovered objects to the 13th century.⁷

The larger instrument (Figure 1,⁸ was painstakingly made from the tine of a deer's antler, the spongy internal tissue having been removed in the process of manufacture. It has three fingerholes and a thumbhole, carefully cut in the frontal and reverse sides respectively. The surfaces around the fingerholes are slightly smoothed down, and their diameters are quite similar, between 12 and 13mm. The total length of the Schlettwein instrument is 289mm. Close to the bell-end it has a small hole ca. 4mm in diameter, probably for fixing a strap. The internal diameters are 14-15mm at the mouthpipe and between 21 and 27mm at the bell-end of the instrument. The cross-sections are oval and slightly deformed. The choice of antler as a raw-material ensured the thinness of the walls of the tube and a rather narrow conical bore. At both ends the thickness of the walls is about 1-2mm.

The condition of the instrument is quite good, and there is no reason to assume that it is merely a fragment. The material presumably has shrunk somewhat, thereby producing some fine cracks within the substance of the antler. Some areas of the object have obviously been retouched in the course of restoration work, just after excavation in the 1960s.

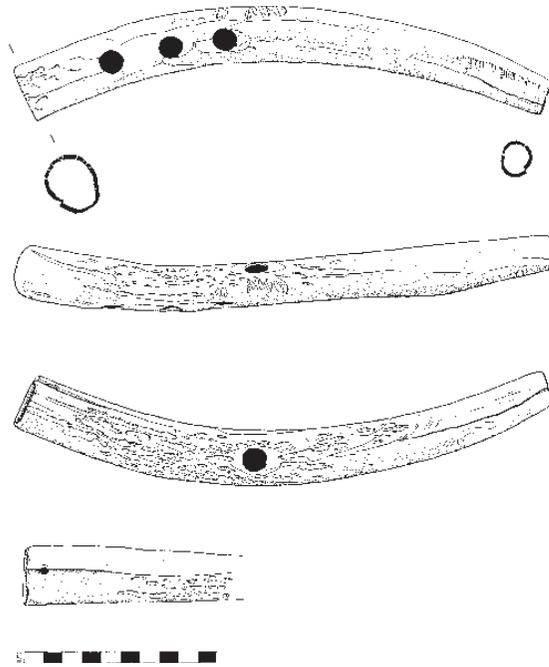


Figure 1

The 13th-century aerophone, found at Pößneck-Schlettwein, Thuringia
Antler, Length 289 mm

(Courtesy of Thüringisches Landesamt für Archäologische Denkmalpflege, Weimar; Inv. Nr. 111/64)

The surface of the instrument at the mouthpiece end has been carefully worked, but at the bell end the grooved surface structure of the antler⁹ remains visible. Traces of cutting and perhaps filing are still recognizable on the areas of the worked surface.

There is no evidence on the instrument to suggest an integrated cup-shaped mouthpiece, therefore a detachable cup- or funnel-shaped mouthpiece would have been required in order for it to serve as a lip-vibrated aerophone.¹⁰ The Schlettwein instrument might thus be interpreted as a fingerhole-horn.¹¹ Single wooden mouthpieces are known from contemporary Slavic archaeological contexts, but are presumably related to wooden, birch-bark covered trumpet- or horn-like aerophones.¹² There is no doubt that it would have been possible to blow the Schlettwein “horn” without a detachable mouthpiece, or even with a double or single reed, possibly fitted with a leather or animal bladder wind-bag (Figure 2); there is possibly some iconographical evidence for the latter hypothesis as well.¹³ Thus interpretation of the object as a former constructional part of a type of *Platerspiel* or

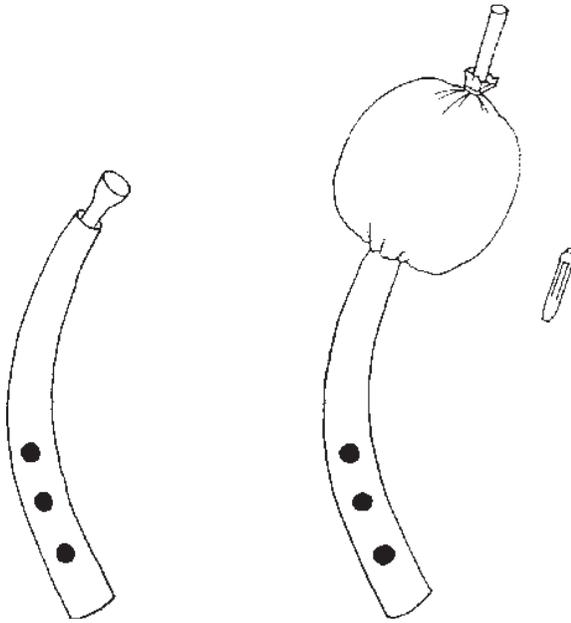


Figure 2
The Schlettwein wind-instrument as a fragment:
lip-vibrated or reed-pipe aerophone?

bagpipe cannot be ruled out, although there are no clear traces of roughed surfaces or wax and pitch on the instrument that could result from fixing it to a wind-container. Whether a lip-vibrated aerophone or not, the Schlettwein instrument appears to be unique among extant musical instruments dating from before 1500.¹⁴ Perhaps its closest “relative” is a four-holed bovine horn from Falun in Sweden, tentatively dated to the 10th century.¹⁵

Iconographical evidence

In organological interpretation of iconographical evidence, the problem lies basically in the question of the precise fitting of typological analogies between the object and its sign. Information about constructional details of the instrument frequently cannot be derived from the iconographical source. The author’s intention, except in organological treatises, might not have been to illustrate the object in “photographic” detail, but rather to use undefined musical instruments as signs or attributes carrying symbolic meaning. Again, the contemporary social context of the pictorial source is lost. We must consider iconographic sources in their content of multiple layers and as “entities of symbols and realities.”¹⁶ The formulation of critical questions regarding any iconographic evidence is an inevitable requirement for further exegesis.

Making clear distinctions between lip-vibrated and reed-pipe aerophones in medieval pictorial sources is often quite difficult, because the means of sound-production, i.e., reeds and cup-shaped mouthpieces, are scarcely visible while the instrument is in use. In illuminations of the 11th and 12th centuries, both types of aerophones have been interpreted as fingerhole-horns or even (proto-)“cornetts.” These illuminations frequently show a bell in the shape of an animal-head (see Figure 3).¹⁷ Obvious fingerhole-horns, very long and curved, appear in the hands of angel sculptures on Bamberg cathedral, dating from about 1235. The portrayal of curved one-hand finger-hole horns prior to the 15th century is very rare.¹⁸ Many different musical instruments appear in the hands of Death in woodcuts from 15th-century death dances, sometimes clearly as attributes of the status or character of the person, who is doomed to death. The illustration of a “virtual cornett”¹⁹ appears in the Lower German death dance, a xylographic block-book from circa 1465 (Figure 5).²⁰ A woodcut in an incunabula probably printed in Heidelberg by Heinrich Knobloch after 1485²¹ unequivocally shows at least fingerhole-horns (Figure 4). These contemporary sources also depict bladderpipes, which look like fingerhole-horns fitted with an animal bladder.²² In addition to a portrayal on the *Buxtehuder Altar*, painted by Meister Bertram around 1400,²³ a further portrayal appears on the *Portinari-Altar* by Hugo van der Goes (painted around 1445), showing a three-holed fingerhole-horn with its strap and a clearly detachable mouthpiece, attached to a shepherd’s bag (Figure 6).²⁴

At the beginning of the 16th century, Sebastian Virdung includes a woodcut of a fingerhole-horn in his *Musica getutscht*, published at Basel in 1511 (Figure 6).²⁵ The curved instrument shows a steeper conical shape, an obviously integrated mouthpiece, one thumbhole, and three fingerholes. In the same context appears a straight cornett with a detachable mouthpiece, one thumbhole, and six fingerholes. Remarkably, Virdung judges the skill required for playing a “holed” instrument by the number of fingerholes.²⁶ The last 16th-century source on this subject is Martin Agricola, whose information was obviously based on the treatise by Virdung.²⁷ Later organological treatises, for example Praetorius and Mersenne, ignore the instrument.

The steep conical outer shape of fingerhole-horns in the pictorial evidence mentioned above suggests a cow horn rather than an antler as raw material. Such instruments are frequently fitted with a carrying-strap (*Hornfessel*) and show a reduced number of fingerholes, which allows them to be blown with one hand. Mobility while blowing, illustrated in the altarpieces by van der Goes and Meister Bertram in a bucolic context, seems to have been a distinctive feature of this type of wind instrument. This pictorial evidence, however, postdates the Schlettwein instrument by some 200 years.

Literary evidence

Georg Karstädt cites verse 4803 of the *Jüngerer Titarel* by Albrecht von Scharfenberg (ca. 1270) as the earliest known instance of the term *zind* in reference to a lip-blown aerophone.²⁸ From the standpoint of the Schlettwein instrument, it is significant that the Middle High German terms *zinke* and *zanke* also mean the tine or branch of a stag’s antlers.²⁹ There is no evidence prior to the 15th century to suggest that the German terms *zind*, *zinke* or

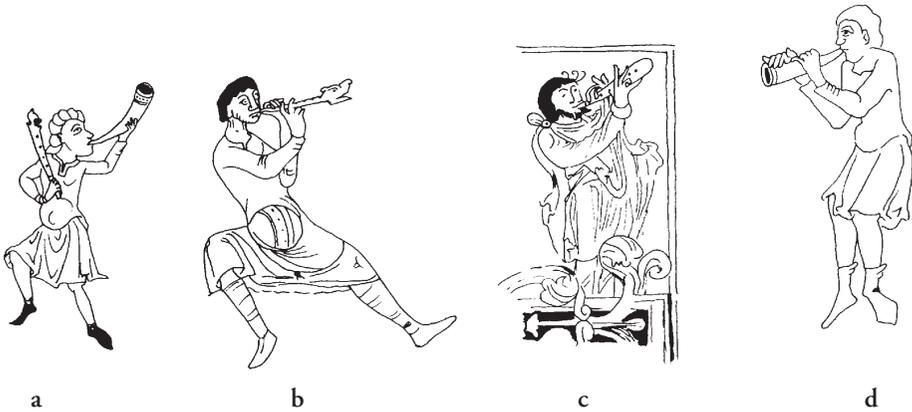


Figure 3

Holed wind instruments (“Proto-cornetts”?)
from 11th- and 12th-century sources

- a) London, British Library, Harley 2804, fol. 33 (Worms, 1148)
 - b) Pommersfelden, Gräflisch Schönbornsche Bibliothek, 334, fol. II 148' (Rhineland?, 2nd half of 11th century)
 - c) Cambridge, University Library Fff 23, fol. 4' (psalter, England, first half of 11th century)
 - d) Cambridge, St John's College, B 18, fol 1 (St Rémy-de-Reims, early 12th century)
- (Line drawings after reproductions from Seebass 1972)



Figure 4

xxv: Death and the Thief

xxiii: Death and the Gambler

Woodcuts from *Der doten dantz mit figuren*
 ... (Heidelberg: Heinrich Knoblochtzler?),
 printed ca. 1484
 (Munich, Staatsbibliothek, Imago mortis 1;
 from Lemmer 1991)



Figure 5

Death and the Cardinal

From the Lower German Death Dance
 (four lines), a xylographic block-book,
 printed ca. 1465

(Heidelberg, University Library, Cod.
 Palat. germ. 438; from Kaiser 1983)

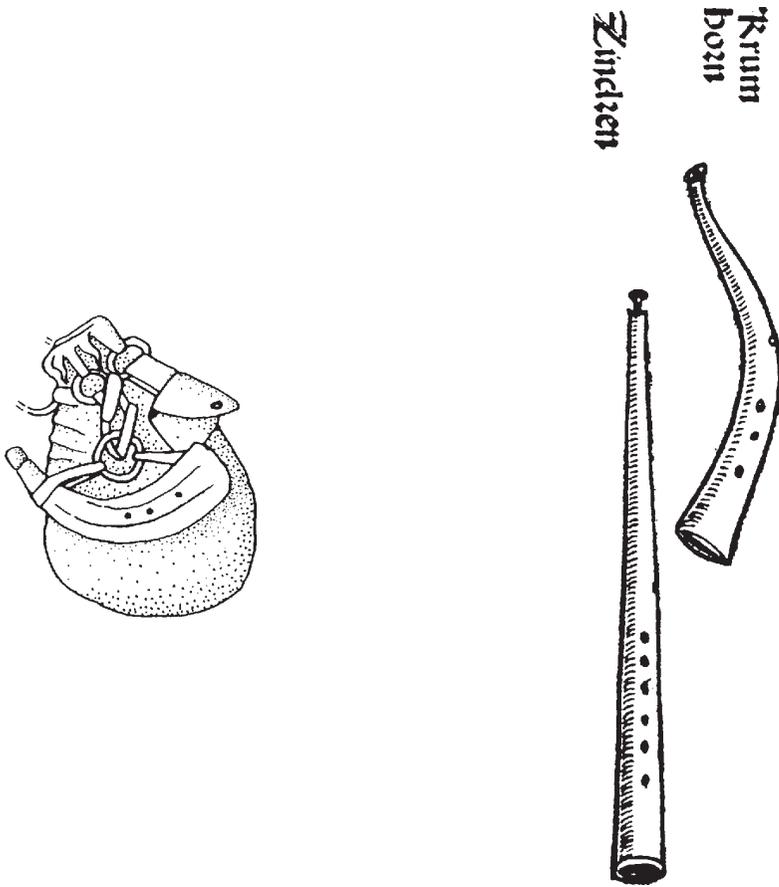


Figure 6
 Fingerhole-horn fitted with a detachable mouthpiece,
 detail from the *Portinari-Altar* painted by Hugo van der Goes around 1445
 (Florence, Uffizi Gallery)
 Fingerhole-horn (*Krumhorn*) and cornett (*Zincken*)
 from Sebastian Virdung, *Musica getuscht vnd ausgezogen*,
 Basel, 1511, nn. fol. 8r

zanke distinguish “horn” from “fingerhole-horn,” or “cornett.”³⁰ The famous illustrated *Thierbuch* by Conrad Gesner (Zurich, 1539) mentions “*arborea cervorum cornua* die vil zincken oder ende habend wie ein baumast” (“branched antlers which have many *zincken* or ends like a tree’s branch”).³¹ A German dictionary from the end of the 17th century issued by Kaspar Stieler offers two meanings for the term *Zink*: one definition refers to the familiar wind instrument, the other—*Hirschhornzinken*—to the point of a stag’s antlers.³² Actually, the word “zinc” (Ger.: *Zink*, chem.: *Zn*) has the same etymological origin. It is characteristic that this metal element, which is a significant component of brass alloys, settles in the course of smelting its ores in the form of points or hooks on the walls of the furnace.³³

Conclusions

The evidence under consideration here raises an important question: Can the aerophone found at Schlettwein be interpreted as a link in the early history of cornett-type instruments? Definitive identification of the Schlettwein aerophone as a fingerhole-horn is however not possible, and so on the basis of current knowledge it should not be connected with the earliest depictions of cornetts. Pictorial evidence for the cornett³⁴ seems not to appear before the middle of the fifteenth century,³⁵ though the earlier animal-headed wind instruments (see Figure 3) await further consideration in this regard.

There seems to have been considerable variety in the materials used for fingerhole-horns in early times. All sorts of skeletal and skin materials from animals—ivory, horn, leather, and even antler, as in the present case—were possible. The constructional pattern of two joined wooden halves, glued and/or bound together, appears to have been customary in the 13th century, as a find in the well of Friedberg castle near Meilen proves.³⁶ This horn has an integrated mouthpiece, but no fingerholes. Such instruments, bound with willow switches, appear also in iconographical sources.³⁷

Animal horn as raw material for both natural and fingerhole-horns is well known, as exemplified by the fingerhole-horn types of Sweden and Norway, known as *Prillar-* or *Bukke-*horns.³⁸ But the use of antler as raw-material for fingerhole-horns was unknown prior until now.

Apart from the material, the most remarkable feature of the Schlettwein instrument is its narrow bore, determined by the choice of a deer’s antler. This choice of material also dictates the thin walls of the tube. Use of a cow-horn of comparable size would have produced a much wider conical bore, fixed by the bone core, and thicker walls. Therefore, assuming that the selection of a deer’s antler was not due to a shortage of other horn material, it could possibly be explained by a desire to produce a different tone quality. Such sound-devices might have presented some acoustical and/or constructional advantages suitable for further development, perhaps leading in the direction of the earliest cornetts as depicted in some 15th-century iconographical sources.

Author's note: I wish to thank Dr. Wolfgang Timpel of the Thüringisches Landesamt für Archäologische Denkmalpflege at Weimar for his kind support of my studies and for permission to analyze and to publish material on the Schlettwein instrument. I am also indebted to Livia Ruszthy, now of Budapest, and Dr. Grenville Astill, of the Department of Archaeology, University of Reading, for their kindness in offering suggestions on my various drafts.

Dietrich Hakelberg has been studying archeology at the University of Freiburg, and at the University of Reading. He is currently working on a PhD dissertation on the discoveries of sound-devices and musical instruments in medieval and post-medieval archaeological contexts.

NOTES

- 1 "Andolt the hunting master was blowing here with a *zind*." See Jacob and Wilhelm Grimm, *Deutsches Wörterbuch*, vol. 15, Leipzig, 1913, col. 1384 (*zind*); K. A. Hahn (Ed.), *Der jüngere Titurel*, (Quedlinburg and Leipzig, 1842), p.473, verse 4803.
- 2 See, *inter alia*, Graeme Lawson, "Conservation Versus Restoration: Towards a Handling and Performance Policy for Excavated Musical Instruments, with Special Reference to Microwear Studies and Finds from the English Warship Mary Rose (1545)," in Cajsa S. Lund (Ed.), *Second Conference of the ICTM Study Group on Music Archaeology, Stockholm 1984, Congress report*, vol. I: *General Studies* (Stockholm, 1986), Publications issued by the Royal Swedish Academy of Music, no. 53, pp.123ff.
- 3 The following general thoughts about the tradition of material culture apply not only to archaeological finds recovered from the soil, but in particular to any kind of human-made material culture that has been also preserved above ground. The extant traces of past music cultures are merely represented by written, iconographic, and organological sources, which are components of material culture and handed down by chance. The sounds of past music cultures are irretrievably lost. Interpretation of past performing practices, based on extant sources, happens in the present, and it is not possible to prove any past reality in this way.
- 4 Michael B. Schiffer, *Formation Processes of the Archaeological Record* (Albuquerque, 1987), pp. 3-4. "Systemic context refers to artifacts when they are participating in a behavioral system.... In contrast, artifacts that interact only with the natural environment, such as those in dump, are said to be in archaeological context."
- 5 *Ibid.*, p. 35.
- 6 Wolfgang Timpel, "Archäologische Untersuchungen zur materiellen Kultur in hoch- und spätmittelalterlichen Burgen Thüringens," in *Adelige Sachkultur des Spätmittelalters. Internationaler Kongress Krems a.d.D. 1980* (Vienna, 1982), Veröffentlichungen des Instituts für mittelalterliche Realienkunde Österreichs, no. 5, Österreichische Akademie der Wissenschaften, Sitzungsberichte der historisch-philosophischen Klasse, 400. bd., pp. 293-310.
- 7 Personal communication from Dr. Wolfgang Timpel, Weimar.
- 8 The find is in the possession of the Thüringisches Landesamt für Archäologische Denkmalpflege in Weimar (Inv. Nr. 111/64).
- 9 This significant surface structure is due to the velvet, which is a blood-vesselled tissue, covering the antler at an earlier stage of its growth.

- 10 Marin Mersenne mentions separate mouthpieces, made of wood, elder sticks, or clay, for shepherd horns without fingerholes. See K. Taut, *Die Anfänge der Jagdmusik*, Leipzig, n.d. [1930], p. 106, citing M. Mersenne, *Harmonie Universelle, Traité des Instruments, Liure cinquiesme, Proposition X* (Paris, 1636), pp. 244-247.
- 11 Sibyl Marcuse, *A Survey of Musical Instruments* (Newton Abbot and London, 1975), p. 770-772. See also David Munrow, *Instruments of the Middle Ages and Renaissance* (London, 1976), pp. 19-20.
- 12 Horst Keiling, "Ein jungslawischer Siedlungsplatz mit Flußübergang und Kultbau bei Parchim im Bezirk Schwerin," in *Society and Trade in the Baltic During the Viking Age. Papers of the VIIIth Visby Symposium 15.-19. Aug. 1983, Acta Visbyensia* 7, 1983): 161. See also Frederick Crane, *Extant Medieval Musical Instruments* (Iowa City, 1972), no. 444.4, p.60. The construction of the Parchim fragment provides an interesting comparison to certain long birch-bark-covered wooden straight trumpets from Sweden, the Finnish *tuohitorvi*, and the Russian *rozok*. See Munrow, *Instruments*, pp. 19-20; Raymond Parks, "The *Tuohitorvi*: Cornett-Survival or Re-Creation?," *Galpin Society Journal* 48 (March, 1995): 188-93; Michael Praetorius, *Syntagma Musicum*, vol. 3, *De Organographia: Theatrum Instrumentorum* (Wolfenbüttel, 1620), pl. VIII, 12. This wooden trumpet appears to correspond exactly with the Swedish wooden trumpets mentioned above.
- 13 See, *inter alia*, Heinz Becker, *Zur Entwicklungsgeschichte der antiken und mittelalterlichen Rohrblattinstrumente* (Hamburg, 1966), pp. 167-172.
- 14 Excavations in the core town of Lübeck have recently brought to light a three-holed bovine fingerhole-horn, dated by simultaneous finds to the 13th century. I am very much indebted to Alfred Falk, M.A., of the Amt für Vor- und Frühgeschichte at Lübeck, who kindly brought the find to my attention.
- 15 Crane, *Extant*, 443.3, p. 59: "From Viking period (about tenth century)."
- 16 "Musical instruments as an iconographical problem," in Tilman Seebass, *Musikdarstellung und Palterillustration im früheren Mittelalter*, Bern, 1974, pp. 138-141.
- 17 These instruments are frequently depicted in the hands of Ethan, one of king David's musicians. For reproductions see *Ibid.*, Bildband, pp. 22, 102, 110, and 111.
- 18 E.g. the illumination of a 12th-century manuscript in the treasure of Trier cathedral. See Georg Karstädt, "Zur Geschichte des Zinken und seiner Verwendung in der Musik des 16.-18. Jahrhunderts," *Archiv für Musikwissenschaft* 4 (1937): 390, Abb. 2; and E. Buhle, *Die musikalischen Instrumente in den Miniaturen des frühen Mittelalters* (Leipzig, 1903), pp. 24f., Taf. 4 and 6.
- 19 "Virtual cornett" is defined here as a curved or uncurved fingerhole-horn with at least six fingerholes, which consequently requires a two-handed playing technique, a tube with a rather narrow and conical bore, and fitted with either an integrated or separated cup-shaped mouthpiece.
- 20 Universitätsbibliothek Heidelberg, Cod. Palat. germ. 438: W. L. Schreiber, *Der Totentanz* (Leipzig, 1900). See also G. Kaiser, *Der tanzende Tod* (Frankfurt/M., 1983), p. 292.
- 21 M. Lemmer ed., *Der Heidelberger Totentanz von 1485* (Frankfurt/M., 1991), pp. 30-1.
- 22 *Ibid.*, p. 14.
- 23 Hamburg, Kunsthalle. See R. Happel, "Der Buxtehuder Altar," in W. Hofmann, ed., *Die Hamburger Kunsthalle* (Munich, 1986), p. 17, Abb. 5.
- 24 Florence, Ufficio. See K. Arndt, *Hugo van der Goes: Der Portinari-Altar* (Stuttgart, 1965), p. 17, Abb. 8 and 10.
- 25 Sebastian Virdung, *Musica getuscht vnd ausgezogen* (Basel, 1511), nn. fol. 8^r (reprint, Kassel, 1988).

- 26 Ibid., nn. fol. 7r: "... vnd so vil sye der loecher mer habe[n] / so vil dester besser vnd gwiser mag man sye reguliern [...]."
- 27 Martin Agricola, *Musica Instrumentalis deudsch* (Wittenberg, 1529), fol. xi' (reprint, Hildesheim and New York, 1969).
- 28 Karstädt, *Geschichte*, p. 391.
- 29 Albrecht von Halberstadt: "eins hirzes horn er abe brach daz dâ hienc an der want: dâmite er warf er zuhant, daz im *zinken* zwêne sân begunden in die ougen slân und daz blût nider ran [...]," cited in Matthias Lexer, *Mittelhochdeutsches Handwörterbuch* (Leipzig, 1878), vol. 3, col. 1124. See also David Dalby, *Lexicon of the Medieval German Hunt* (Berlin, 1965), p. 321. Dalby does not consider *zinke* in the sense of a blowing-horn.
- 30 On the contrary, the Old French term *coradoiz* appears from the 13th to the 15th centuries. It has been argued that it is synonymous with *cor a doigts*, which would definitely mean a finger-hole-horn. See Sibyl Marcuse, *Musical Instruments: A Comprehensive Dictionary* (London, 1964), p. 124.
- 31 See Grimm and Grimm, *Deutsches Wörterbuch*, col. 1407.
- 32 Kaspar Stieler, *Der Teutschen Sprache Stammbaum und Fortwachs oder Teutscher Sprachschatz* (Nürnberg, 1691), col. 2650.
- 33 Walther Mitzka (Ed.), *Trübner's deutsches Wörterbuch*, vol. 8, Berlin, 1957, p. 407.
- 34 See n. 19.
- 35 Keith Polk, *German Instrumental Music of the Late Middle Ages* (Cambridge, 1992), pp. 71-3. A sculpture from Lincoln Cathedral (c. 1260) shows an angel blowing an unidentifiable type of wind instrument. It is formed by a pair of tubes of different length bearing a hexagonal cross-section (see A. Gardener, *Handbook of English Medieval Sculpture* [London, 1937], fig. 157). The polygonal faceted cross-section is however not sufficient to identify a wind instrument as a cornett-type. In this context it must be emphasized that this pattern appears on numerous ceramic horns without any finger-holes that are known from many archaeological sites throughout Europe. The objects are closely connected with medieval pilgrimage. See Andreas Haasis-Berner, "Hörner aus Keramik—Wallfahrtsdevotionalien oder Signalhörner?," *Zeitschrift für Archäologie des Mittelalters* (1995, forthcoming; I should like to thank Andreas Haasis-Berner for his kind permission to examine his typescript), and Günter Mangelsdorf, "Das Aachhorn von Greifswald—ein Beitrag zur mittelalterlichen Devotionalienkunde," *Bodendenkmalpflege in Mecklenburg-Vorpommern* (1991) (Schwerin, 1992), pp. 219-225. On the other hand, the well-known ivory oliphants of the 10th-14th centuries show the same polygonal pattern.
- 36 Felix Müller, "Die Burgstelle Friedberg bei Meilen am Zürichsee," in *Zeitschrift für Archäologie des Mittelalters* 9, 1981 (1983), pp. 45, 52, 57, 59, Abb. 39.
- 37 See Walter Salmen, "Bilder zur Geschichte der Volksmusikinstrumente in Österreich vor 1600," in *Studia Instrumentorum Musicae Popularis* 7 (Stockholm, 1981), p. 168, pl. III-4.
- 38 See Munrow, *Instruments*, p. 19; and particularly Reidar Sevåg, *Det gjallar og det læt*, Oslo, 1973, pp. 35-46. See also Jan Ling, *Svensk Folkmusik. Bondens musik i helg och söcken* (Stockholm, 1964), pp. 20-27, pl. II. I am very grateful to Jeremy Montagu, who pointed the latter source out to me.