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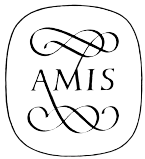

Early Bassoon Reeds: A Survey of Some Important Examples

PAUL WHITE

THE PRINCIPAL AIM of the following survey is to present in a standardized format details of some twenty-eight early bassoon reeds currently located in private and public collections in England, the Netherlands, and France. (These reeds are described in detail in the Appendix, below.) My hope in this work is not only to show criteria for documenting original reeds, but also to provide an impirical guide for bassoonists who may wish to attempt an approach to reed building based on historical methods. Early bassoon reeds are integral parts of the instruments for which they were made, and studying them can yield important information on historical bassoon making and performance practices. Reeds are also, in fact, miniature instruments in themselves—shaped, voiced, and finished with the same care that went into making the bassoons to which they were attached.

A method for measuring bassoon reeds was described in 1977 in an article by Hansjürg Lange and Bruce Haynes.[1] Their suggestions are very good as far as they go, but there is more to a reed than just lengths and shapes. When I first began to record measurements on the reeds included in the present survey, it occurred to me that such a strict approach must also be accompanied by an explanation of how and why certain things are measured. The lengths, heights, widths, and depths of the reeds, in conjunction with an illustration of the scrape of the blades, seemed to be obvious points to cover, but eventually I realized that there were secondary features that could tell a great deal about the age of a reed and the techniques used to construct it. The following information is based on the major historical sources,[2] written by H. de Garsault (1761),[3] Pierre Cugnier

1. Hansjürg Lange and Bruce Haynes, "The Importance of Original Double Reeds Today," *Galpin Society Journal* 30 (May, 1977): 145–51.

2. See Thomas E. Warner, *An Annotated Bibliography of Woodwind Instruction Books, 1600–1830,* Detroit Studies in Music Bibliography, 11 (Detroit: Information Coordinators, Inc., 1976).

3. H. de Garsault, *Notionaire, ou mémorial raisonné de ce qu'il y a d'utile et d'intéressant dans les connoissances acquises depuis la création du monde jusqu'à présent* (Paris, 1761).

(1780),[4] Étienne Ozi (ca. 1787 and 1803),[5] Joseph Fröhlich (1810–11),[6] and Karl Almenraeder (ca. 1842).[7] It is also complemented by my own practical experience in hand-building reeds for my own five-key Thierriot Prudent bassoon, as taught me by Jesse Read, as well as extensive discussion and correspondence with early-bassoon specialists throughout the world over the past several years.[8]

The Scrape

For the most part the scrapes on these early bassoon reeds are different from those used today on the modern French and German systems. Through close observation of these and other reeds, however, it might be possible to identify certain characteristics as the predecessors of contemporary designs. Most of the scrapes fall into two distinct categories (with the remainder composed of a mixture of the elements of each). Visually, both categories can be identified by a scrutiny of the blade surface where definite patterns are created along the blade as the cane's differing strata are exposed during the scraping process.

Let us review briefly the structure of *arundo donax* and the effect the various strata have on the playing characteristics of the reed. The two outermost layers of the cane are called the *sclerenchyme*. Of these, the outer is the *epidermis* (which is commonly called the bark), and below it lies the *dermis*, a layer of slightly softer material with a creamy texture and golden tint. Below the sclerenchyme is a much softer layer of whitish colored material known as the *parenchyme*. This material has a series of tubes running its length, which gives it a grainy appearance. In the outer layers these tubes are finer and packed more densely than those located closer to the center of the plant.[9] For our purpose here, only these several areas, from hard to soft, need be labeled: bark, dermis, dense parenchyme, and broad

4. Pierre Cugnier is believed to be the author of the instructions for the bassoon (pp. 313–43) in Jean-Benjamin de La Borde, *Essai sur la musique ancienne et moderne*, vol. 1 (Paris, 1780).

5. Étienne Ozi, *Méthode nouvelle et raisonnee pour le bassoon* (Paris, ca. 1787); idem, *Nouvelle méthode de bassoon* (Paris, 1803).

6. Joseph Fröhlich, *Vollständige theoretisch-praktische Musikschule* (Bonn, 1810–11).

7. Karl Almenraeder, *Die Kunst des Fagottblasens* (Mainz, ca. 1842).

8. I especially wish to acknowledge the guidance and support of Prof. Phillip T. Young, University of Victoria.

9. Marilyn S. Veselack, "Arundo Donax: The Source of Natural Woodwind Reed," *Double Reed* 1 (April, 1979): 5. See also J. M. Heinrich, "The Bassoon Reed," *International Double Reed Society Journal* 7 (1979): 23, 24, 39.

parenchyme. The manner in which a reed responds, its timbre, and many other playing characteristics are all tied to the way one cuts across these strata and how they in turn are balanced against one another. For example, a modern German reed will utilize the soft inner regions of the parenchyme by exposing them along either side of a harder length of dense parenchyme or dermal spine; in this case the bark is cleared completely from the entire surface of the blade.[10]

With the structure of the cane understood, we now turn to the basic types of scraping used on early reeds. The first type, perhaps the most striking because it is so radically different from our modern system, is one that shows itself as a series of concentric rings or inverted arches orbiting about the center of the tip (see fig. 1). It seems to be a straight, simple scrape working its way back from the broad parenchyme at the tip through to the bark at the back (see Appendix, reed 3). Instead of a long central spine, this design uses an opposite approach, whereby the softer, more resilient material is surrounded by and suspended within a gradually expanding series of rings of progressively harder material. This very much resembles the reed scrapes illustrated in the tutors by Ozi and Fröhlich. In some cases the bark forms an arch with ends running up the sides of the blade, depositing very dense material on the edges of the tip and producing extra thinning in the internal gouge (see Appendix, reeds 2 and 3).[11]

The second form (see Appendix, reed 6) is less complex in appearance and seems outwardly related to the modern French reed. These patterns are shown in regular, horizontal graduations along the width of the blade (see fig. 2). The effect suggests an even series of stripes, beginning at the tip in broad parenchyme and working back through harder material. The point at which the bark meets the scrape (the collar) often forms a straight or slightly ellipitical line.

The Silhouette

Generally, the thickness of the blade will show itself in silhouette when held against a light. The most common historical silhouettes are seen as either a crescent (see Appendix, reeds 1–3) or a straight horizontal gradation (Appendix, reeds 14 and 15). In some cases the crescent coincides with an exterior scrape of concentric rings creating patterns in opposition (see fig.

10. Heinrich, "The Bassoon Reed," pp. 21, 22, 39.

11. Harold Eugene Griswold, "Reed-making—Étienne Ozi (1754–1813)," *International Double Reed Society Journal* 9 (1981): 19.

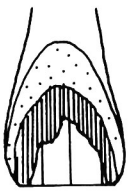

FIGURE 1. Schematic illustration of the first type of scrape found on early bassoon reeds. Beginning at the tip of the reed, the layers are: broad parenchyme, dense parenchyme, dermis, and bark.

FIGURE 2. Schematic illustration of the second type of scrape found on early bassoon reeds.

3). In such instances one might speculate that the extra internal gouging mentioned by Fröhlich[12] has exposed harder material (dermis or bark) along the sides of the blade up to and including areas of the tip (see Appendix, reed 2).

The Tip

Observing the tips head-on will, among other things, give an indication of the nature of the scrape of the blade. A reed designed with a central spine that has extra material removed from the sides of the back will tend to collapse into a diamond shape (see Appendix, reed 20).[13] This configuration is quite common in modern German reeds or with reeds that tend to produce a dark sound. Reeds with a straight, even scrape form an opening that is parallel or elliptical in shape. This is the form that most old reeds tend to take, and it corresponds to the modern French tip.[14] All of the old reeds I have studied had to be measured in a dry state. It is well known that the size, shape, and function of reeds are greatly affected by soaking in water, and therefore few conclusions should be drawn from measurements of tip openings made in this condition. Not knowing the circumstances of storage for these reeds during the last two centuries, it would be very hard for one to be sure that they are in fact "frozen" into

12. Ibid.

13. Heinrich, "The Bassoon Reed," pp. 19–20 (description of the Heckel reed), 23 (dark reed).

14. Ibid., pp. 21 (description of the Buffet reed), 23 (bright reed).

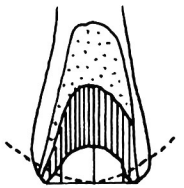

FIGURE 3. Schematic illustration of an early bassoon reed. The curved broken line touching the tip symbolizes a crescent-shaped silhouette opposing the pattern created by an exterior scrape of concentric rings.

their actual performing shape. Almost all of the reeds have had their tips clipped or rounded at the corners.

The Collar

This is the point where the scrape initially cuts through the bark. In most of the examples I have examined, this is the beginning of a very gradual descent through the cane's strata. Rarely have I seen a radical cut deep into the sub-levels, forming an abrupt shelf or shoulder between the blade and the bark, as is common on the modern German scrape[15] (see Appendix, reeds 1 and 2). Another common feature, differing from the modern habit of bringing the beginning of the blade close to the first wire, is the practice of leaving a substantial area of the bark between the wire and the collar (see Appendix, reed 10).

The Sides of the Blade

This may seem an unimportant part of the reed to be concerned with, yet there are many variables associated with it that affect the performance of the reed. The slope of the sides from wire to tip can be straight, convex, or concave (see Appendix, reeds 4, 9, and 1, respectively). The joint between the upper and lower blades may be either beveled or unfinished. On some reeds the edges were beveled before folding, bringing them flush against each other; on others they were left untouched, so that thin, sharp edges meet with a minimum line of contact (see fig. 4). In either case the blades might then have been planed to make the edges perpendicular to the face (see fig. 5). This was probably done either when the reed was finished, in order to put an "edge" on a dull sound, or later, to help raise the pitch of a reed that had become flat through age or overscraping.

15. Ibid., pp. 21, 39.

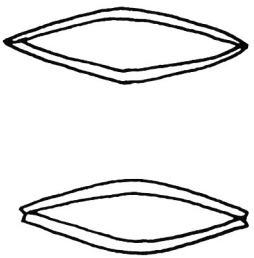

FIGURE 4. Illustration of the tip end of an early bassoon reed, showing two methods of forming the edges of the blades before folding: beveled so that they lie flush against each other (above), or left untouched (below).

FIGURE 5. Illustration of the tip end of an early bassoon reed, with broken lines indicating the cuts made at the edges perpendicular to the face.

The Gouge

William Waterhouse assigns the invention of the gouging machine to 1845 at the hand of Triebert.[16] One cannot be sure that regularity in the thickness of a gouge is an indication of the use of a machine, because the same sort of consistency can be achieved by hand by a highly skilled reed-maker in good form. On the other hand, irregularity, especially in regard to differences in upper and lower blades, would most definitely indicate that the cane had been hand-gouged. (In their discussions of the gouging process, Ozi, Fröhlich, and Almenraeder all mention that the thickness of the gouge under the blade half of the reed is made thinner than that under the tube.[17] In effect, the profile of the scrape is determined by action on the inside of the blade (see Appendix, reed 2), rather than from the outside, as is common today. Perhaps this refinement died out with the advent of the production-line reed.

The Wires and Wrap

The style and method of forming the two wire bindings used to wrap the tube can be very helpful clues to the age of an early bassoon reed. The

16. William Waterhouse, "Bassoon," *The New Grove Dictionary of Music and Musicians*, 2: 264–79.

17. Griswold, "Reed-making—Étienne Ozi," p. 19. Karl Almenraeder, "Making Bassoon Reeds," trans. Ester Froese, *International Double Reed Society Journal* 8 (1980): 26–27.

wires tell us many things about the reed and its player. As a binding they shape the interior of the throat to the degree of roundness desired by the performer. The height of the arch at the wires is an indicator of how open the throat of the tube is. The wires also act as a fulcrum by which a number of performance factors are controlled: pitch, tip opening, response, and timbre, to name just a few. The position of the wires also creates a dividing point from which one may compute the proportion of tube-to-blade length. The early tutors make specific mention of the form, materials, and function of the wires. Cugnier and Fröhlich call for the use of brass and iron.[18] Ozi states that there should be a preformed band of iron slipped into place (see Appendix, reed 10).[19] Almenraeder uses a twisted wire that is not only crimped from the sides to control the reed, but can also be moved forward and back to compensate for gouge deficiencies.[20] All of the historical sources prescribe the use of two wires except Ozi, who calls for only one.[21]

In all of the references the wrap is of heavily waxed string, wound from the second wire (unless only one exists) toward the butt and tied with a flat knot.

The Butt

The interior opening of the butt may not tell us exactly what the dimensions were of the crook tip that penetrated it, but it can give a rough idea of what the maximum size might have been. This in fact might be possible to determine exactly by inserting a small caliper internally by degrees. The historical sources do not suggest the use of a turban or the addition of a third wire on the tube, although both of these features appear on some reeds. If a turban exists, however, it is usually not as fully developed as is common today.

The Historical Sources

In using the information supplied from the five historical sources as a guide to associating and dating early bassoon reeds, it must be emphasized that any conclusions drawn pertaining to the reeds described in this article

18. Griswold, "Reed-making—Étienne Ozi," p. 22.
19. Ibid.
20. Almenraeder, "Making Bassoon Reeds," pp. 26–27.
21. Heinrich, "The Bassoon Reed," p. 43, n. 34.

must not be considered "hard and fast." These men were all working under different musical conditions with instruments that had widely varying performance characteristics.

The earliest two writers, Garsault and Cugnier, represent a Parisian musical practice that had as many as three or more pitch levels in use at one time.[22] Garsault describes a long, slender reed with two wires separated by a space from the beginning of the wrap. Measurements taken from his full-scale drawings yield the following information: total length (75 mm.), tip width (10–12 mm.), distance from collar to tip (31 mm.), distance from first to second wire (10 mm.), and width before the first wire (8 mm.).[23] Cugnier gives little information about his reed other than to state its total length (66–71.5 mm.).[24] He illustrates a fingering chart for a five-key instrument that ascends to *f''*.

Ozi's fingering charts for six- and seven-key bassoons (the firms of Bühner & Keller, Bizey, and Prudent are mentioned) rise to *d''*.[25] The first edition of his tutor shows a reed with one preformed iron band, while a reed with two wires is shown in the second edition. The scrape of the reed has a **V** shape, and the blade is convex. Ozi gives measurements for the total length (63.16 mm.), tip width (18 mm.), distance from first to second wire (6.77 mm.), width before first wire (11.28 mm.), and gouge (1.1 mm.).[26]

Fröhlich's seven-key "Dresdener" fingering chart, published twenty-three years after Ozi's, ascends to only *b♭'*. Fröhlich describes and illustrates two reeds as a solution to the problem of varying pitch levels. Both reeds have a distinctive convex, spade shape. A dual-wire system is shown that partially covers the beginning arch of the scrape. Both reeds measure 17 mm. in tip width and 6.7 mm. in the distance from the first to the second wire. Measurements taken from his drawings indicate a total length of 60 mm. for the short reed and 65 mm. for the long reed.[27]

22. Bruce Haynes, "Bach's Pitch Standards: Questions of Tonality for the Oboe and Other Woodwinds" (unpublished article).

23. Lawrence Intravaia and Gerald Corey, "A History of Bassoon Reedmaking from the Late 17th Century to the Late 19th Century," *To the World's Bassoonists* 6, no. 2 (1976): 5. See also Waterhouse, "Bassoon," p. 268, where the Garsault reed shown in illustration 3a is incorrectly identified as a late eighteenth-century English reed.

24. Intravaia and Corey, "A History of Bassoon Reedmaking," p. 6.

25. These fingering charts are reproduced in Harold Eugene Griswold, "Étienne Ozi (1754–1813), Bassoonist, Teacher, and Composer" (Ph.D. diss., Peabody Institute of Johns Hopkins University, 1979).

26. Griswold, "Reed-making—Étienne Ozi," pp. 17–25.

27. Ibid. See also Marvin D. Degrade, "A Translation and Study of Joseph Fröhlich's

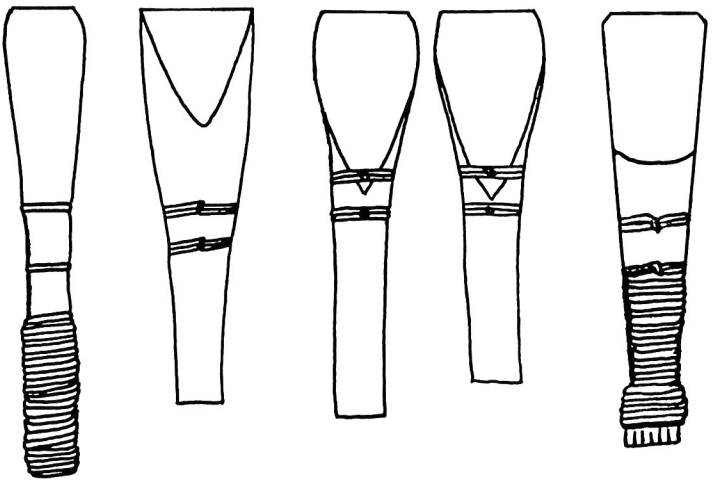

FIGURE 6. Drawings of bassoon reeds illustrated (left to right) by Garsault (1761), Ozi (ca. 1787), Fröhlich (two reeds, 1810–11), and Almenraeder (ca. 1842).

Almenraeder's reed is straight-sided and has two wires. It fitted an eighteen-key instrument that could be described as the earliest generation of the modern German bassoon. Although Almenraeder is the latest source considered here (ca. 1842), his reeds are among the greatest in length. Measurements taken from his illustrations reveal a large reed indeed: total length (70 mm.), tip width (17 mm.), distance from collar to tip (24 mm.), distance from collar to first wire (33.4 mm.), width before first wire (11.4 mm.), and width before second wire (9.2 mm.).[28]

Drawings of bassoon reeds illustrated by Garsault, Ozi, Fröhlich, and Almenraeder are shown in figure 6 and may be compared with the twenty-eight historical reeds discussed and illustrated below in the Appendix.

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Vollständige theoretisch-praktische Musikschule (1810–11)" D.M.A. diss., Indiana University, 1970).

28. Almenraeder, "Making Bassoon Reeds," pp. 23-27.

Appendix

Thirteen Reeds from the Collection of Henk deWit, Amsterdam

Reeds 1–3. The first three reeds are associated with a thee-holed, solid wood reed box that is stained a bright cherry red. All three reeds bear a general likeness in size and shape, as well as sharing scrape characteristics, and for these reasons it probably would be assumed that they were built by the same maker, most likely for the same instrument. An even greater similarity lies in the manner in which the holding wires have been presented on each of the three. The front wire has three twists, while the second uses a heavier gauge with only a double twist. An oval with the letters "AD . . ." (Adler?) is stamped on one blade of each. The butts were reamed instead of being formed to fit. From the irregular gouges one could conclude that these were done by hand. Gouge thicknesses range from 1.27 mm. to 1.55 mm., but on any given reed the variance is no more than 0.1 mm. from blade to blade. A close inspection of reeds 2 and 3 demonstrates the concentric-ring form mentioned above. These rings run counter to the silhouette, indicating internal profiling. Note that about half of each blade is made of bark or dermis. All blades have a perpendicular shoulder planed their entire length.

Reeds 4–8. These reeds belong to a warped, leather-covered box with six reed cavities. Mr. deWit believes these to be the oldest of his collection because of the vintage of the paper used to line the box. The most apparent feature of all, except in reed 6, is the uniformity of their lengths (66.5–68 mm.) and narrow tips (12.6–15.2 mm.). The wraps are made of thick string treated with beeswax. Another common feature is that the twists on both wires are located on the same side of the reed. Individual features are described below.

Reed 4. The blade is composed mostly of dermal and dense parenchyme material. The tips are uniform but thick. A shelf has been formed at the back of the blade. The holding wires are of a thin gauge tied with a double twist. The sides of the blades are beveled together and have not been planed flat. The tip opening is 2 mm., first-wire height 5.7 mm., and second-wire height 6 mm.

Reed 5. This reed has a very crude-looking scrape due to an attempt to compensate for an extremely thick gouge (1.7 mm.). The scrape adjacent to the shelf looks as if it has chewed its way through the dermis and dense parenchyme in as short a distance as possible to expose the blade to as

much soft material as could be done. The reed has no middle wire, but has had one of very heavy gauge added at the butt. The tip opening is 2 mm. and the second-wire height 7 mm. There is a crack in one blade.

Reed 6. This is similar to reed 4. The only feature that differs markedly is the tip, which seems to have collapsed into a distorted diamond shape. The tip opening is 3 mm.

Reed 7. This is similar to reeds 4 and 6. The tip opening is 2 mm., collar height 5.6 mm., first-wire height 6.2 mm., and second-wire height 6.9 mm.

Reed 8. This is similar to reeds 4, 6, and 7, except that the tube has been beveled and the sides of the blades planed perpendicular. The tip opening is 3 mm., collar height 5.8 mm., first-wire height 6.3 mm., and second-wire height 6.7 mm. There is a crack in one blade opposite a long missing section. The other blade is missing a corner.

Reeds 9 and 10. These reeds, along with reed 11, are contained in a sharkskin case. Reeds 9 and 10 have a black decal with the name "T. LING / LONDON" located above the first wire. Lyndesay Langwill gives Thomas Ling's dates as 1794–1835.[29] Both reeds have a single soldered band (1.2 mm. wide) located at the midpoint. The wrap of coarse waxed string begins at the band and covers half of the reed length. Both butts have been notched and reamed. The tips on both are the thickest I have seen, and neither yields a pronounced silhouette. The sides of the blades have been planed. Reed 9 has a wire height of 5 mm. and a tip opening of 2.5 mm. Reed 10 has a wire height of 6.4 mm. and a tip opening of 2.8 mm.

Reed 11. The name "J. GERRAND / LONDON" is neatly stamped in black, forming an oval around a single soldered band (1.9 mm.) located at the midpoint of this reed. The wrap of heavy string has been lacquered black. The butt is notched like the Ling reeds and contains a very wide hole (6.3 mm.). Unfortunately the blade has been badly cracked, and a good portion is missing entirely. I estimate that the original width of the blade was 12–14 mm. The scrape is long and extreme, mostly made of dense parenchyme. The tube has been beveled flush to the band, and the sides have not been flattened. The height of the first wire is 6.7 mm. and of the second 7.4 mm. The tip opening is 2.1 mm.

Reeds 12 and 13. These reeds were selected as representatives of the thirteen reeds contained in a large wooden box. I am a bit hesitant to include them in this study as they seem to be of very late nineteenth-century vin-

29. Lyndesay G. Langwill, *An Index of Musical Wind-Instrument Makers,* 6th ed. (Edinburgh: Lindsay & Co., Ltd., 1980), p. 107.

tage. They look very similar to five "B & H" (Boosey & Hawkes?) reeds, measuring 60 mm. and probably made about 1930, owned by William Waterhouse.[30] There is a pertinent tale to tell about them. Henk deWit rescued the box and its contents from a trash bin where they had been placed by the seller of a bassoon recently purchased by Mr. deWit. The man had tossed them out because of their apparent uselessness and extreme filth. We have them today only because Mr. deWit insisted they be dug out and included with the instrument.

Twelve Reeds from the Musée du Conservatoire national de musique, Paris

A number of these reeds were formerly in the collection of G. Thibault. Several years ago, William Waterhouse had a chance to sketch eight of them while they were still in that collection. At that time the reeds were still in their original boxes (covered with reptile skin) associated with three historic bassoons, instruments made by Carl Friedrich August Jehring of Mainz (1798–1837),[31] Rust of Lyon (fl. early nineteenth century),[32] and Jean Winnen of Paris (1795–1867).[33] Somehow during the transfer of the collection to the Musée, these reeds became separated from their boxes and were integrated into the Conservatory's larger collection of early reeds. I visited the collection with the sketches made by Mr. Waterhouse hoping to be able to re-establish the identity of the reeds, but was only partially successful. According to Mr. Waterhouse's information, the Jehring bassoon had three reeds, measuring 65 mm. in length by 14.5 mm. in width, 64 mm. in length (width not given), and 60 mm. in length by 16.5 mm. in width. These reeds were contained in a square-cornered green box with three holes. The Rust bassoon had four reeds, measuring 63 mm. by 17 mm., 59 mm. by 17.5 mm., 60 mm. by 17.5 mm., and 60 mm. by 18 mm. The Winnen bassoon had a hexagonal reed-box with three holes, containing a reaming tool, a modern reed, and an old reed measuring 61 mm. by 17.5 mm.

Reed 14. The letter "F" is stamped into the bark between the wires, twist side out. The scrape of this reed is even, gradual, and horizontal. The grain on the blade is quite dense and hard. The collar does not form a shelf and is about 12 mm. wide. The tube has been beveled flush and the sides planed

30. Ibid., p. 17. See also William Waterhouse, *The Proud Bassoon* (Edinburgh: Edinburgh University Collection of Historic Musical Instruments, 1983), no. 38.

31. Langwill, *An Index*, p. 87. Jehring was the uncle of J. A. Heckel.

32. Ibid., p. 153.

33. Ibid., p. 191.

smooth. The two wires are of a heavy gauge. The wrap is of coarse string painted red. The height of the first wire is 5.5 mm., and that of the second is 6.3 mm. The tip is opened 2.2 mm.

Reed 15. A shelf is formed at the collar of this reed. The scrape is gradual, even, and horizontal. The tip is quite rounded and opened 2 mm. A bevel ends at the second wire, with the sides of the blade planed. Three twists of the wire have been added at the front with two twists at the back, like those of reeds 21, 22, and 23. This feature, in combination with the red wrap, would indicate this as one of the missing Rust reeds.

Reed 16. I believe this to be the old reed associated with the Winnen bassoon because of a correspondence in shape and measurements. There is no shelf on the blade, but a spine has been formed along the center line. Most of the blade is of hard material. The bevel begins at the first wire, and the sides of the blades have been smoothed. The wrap is red.

Reed 17. The letters "I Z" are stamped into the bark between the wires of this reed. Most of the blade is of very hard material. The sides are smooth, and the wrap is red.

Reed 18. The letters "U K" appear between the wires of this reed. The scrape is straight and somewhat concentric. The heights at the two very thick-gauged wires are 4.6 mm. and 5.3 mm. The blade is spade-shaped. The wrap is brown. This might be one of the three Jehring reeds.

Reed 19. This reed has a number of letters stamped into the bark, only three of which are legible: they are a "D" (or a "b") and an "L," standing together above a "C." The tip opening is diamond-shaped and very open (2.7 mm.). The height at the first wire is 5.4 mm. and at the second is 6.3 mm. The wrap is brown. The blade has probably been shortened.

Reed 20. The tip on this reed has been shortened from its original length. The gouge is extremely thin (0.75–0.9 mm.) and uneven. The height at the wires is 5.5 mm. Like reed 16, this also looks like Mr. Waterhouse's drawing of the old Winnen reed.

Reeds 21, 22, and 23. These reeds all share the same characteristics and appear to have been made by the same maker. I am almost certain that these are the three remaining reeds belonging with the Rust bassoon (along with reed 15) because of their shapes, sizes, and other prominent details, including: front wires with three twists, back wires with two, shelves, planed sides, and a bevel that begins at the second wire. These three reeds also appear similar to several Boosey & Hawkes reeds in the collection of William Waterhouse.

Reeds 24 and 25. These are nineteenth-century contrabassoon reeds. They have been included here to demonstrate the fact that early bassoon

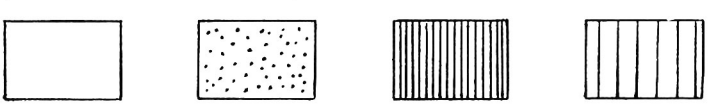
reeds, though large by modern standards, should not be dismissed as this larger form. They may be compared to reeds 12 and 13 from the deWit collection.

Three Reeds from the Collection of William Waterhouse, London

Reeds 26, 27, and 28. These reeds were formerly in the collection of J. Webb and are associated with an eight-key bassoon by William Milhouse, London (1761–ca. 1834).[34] Most of the important early bassoon reeds located in Great Britain have been identified and briefly described in publications.[35] There are at least thirty-one such reeds that I know of, and most likely more will be located in the future. On the whole they are well crafted, extreme in length and width, and are probably the products of professional reed suppliers, since British bassoonists have a long, unbroken tradition of not making their own reeds. English reed-building technology seems to have lagged behind that of the Continent, so these reeds may well represent an older type than is shown by the other reeds in this study. They are intriguing enough to deserve a detailed article of their own.

Key to Drawings of Reeds

Scale Drawings. These drawings are reproduced here at actual size to facilitate comparison with other reeds. (Because they are the traced outlines of reeds, they are slightly larger than the reeds in question.) The following patterns indicate the various layers of the cane:



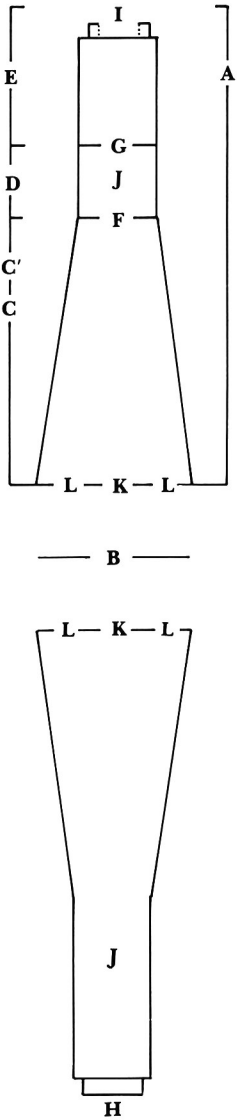
Bark | Dermis | Dense Parenchyme | Broad Parenchyme

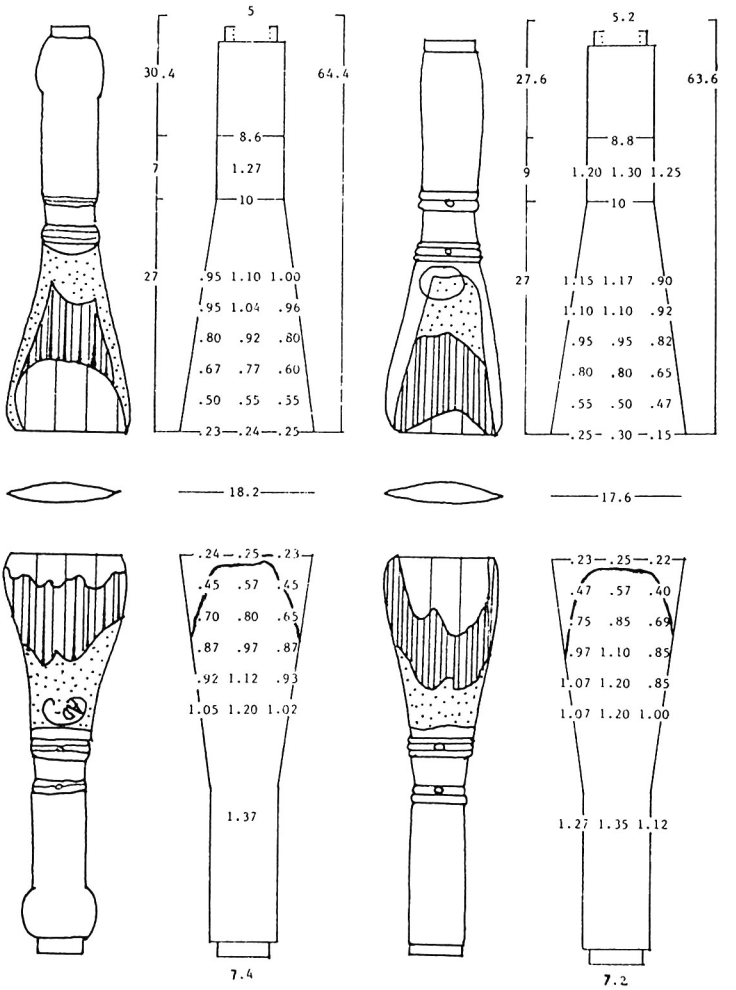
Schematic Drawings Showing Measurements. All measurements are in millimeters. Some figures were not recorded owing to technical difficulties. Silhouettes are shown here for reeds 1, 2, 3, 4, 5, 6, 7, 12, 13, 14, 15, 16, and 18; they are indicated as curved lines in the schematic drawings.

34. Ibid., p. 119. See also Phillip T. Young, *Twenty-five Hundred Historical Woodwind Instruments* (New York: Pendragon Press, 1982), p. v.

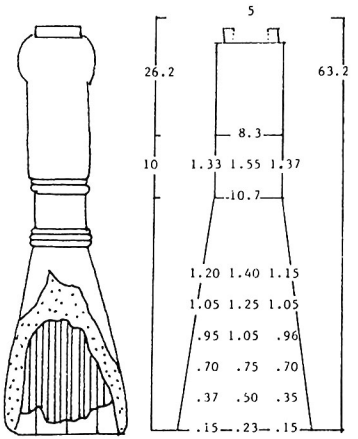
35. Lawrence Intravaia, "A History of Bassoon Reed-Making from the Late 17th Century to the Late 19th Century," *International Double Reed Society Journal* 4 (June, 1976) [note: this is different from the article with the same title by Intravaia and Corey cited above in n. 23]. See also Mary Kirkpatrick, "Register of Early Reeds: Bassoon Reeds in the Aylesbury Museum," *Galpin Society Journal* 34 (March, 1981): 148–49.

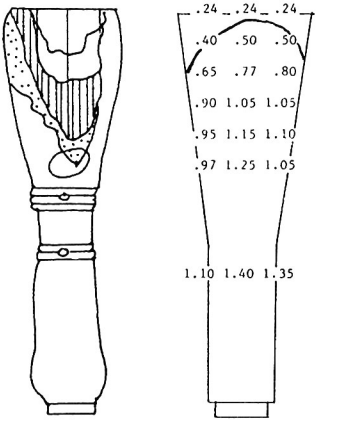
A Total length
B Tip width
C Distance from tip to collar (length of scraped area)
C′ Distance from collar to first wire (length of unscraped area; absence of this figure indicates that the reed is scraped from tip to first wire)
D Distance from first to second wire
E Distance from second wire to butt
F Width at side of first wire facing tip
G Width at side of second wire facing tip
H Exterior diameter of tube at butt
I Interior diameter of tube at butt
J Thickness of gouge between first and second wires
K Thickness of gouge at midpoint of reed, measured at 5 mm. intervals starting at tip
L Thickness of gouge at points half-way between midpoint and sides, measured at 5 mm. intervals starting at tip



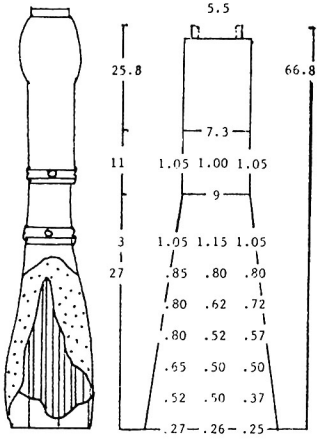

5
30.4
64.4
8.6
7
1.27
10
27
.95 1.10 1.00
.95 1.04 .96
.80 .92 .80
.67 .77 .60
.50 .55 .55
.23—.24—.25
18.2
.24—.25—.23
.45 .57 .45
.70 .80 .65
.87 .97 .87
.92 1.12 .93
1.05 1.20 1.02
1.37
7.4
5.2
27.6
63.6
8.8
9
1.20 1.30 1.25
10
27
1.15 1.17 .90
1.10 1.10 .92
.95 .95 .82
.80 .80 .65
.55 .50 .47
.25— .30 —.15
17.6
.23—.25—.22
.47 .57 .40
.75 .85 .69
.97 1.10 .85
1.07 1.20 .85
1.07 1.20 1.00
1.27 1.35 1.12
7.2

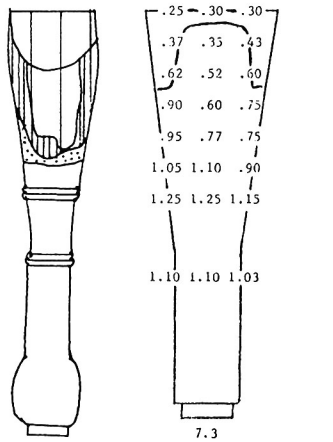
REED 1 REED 2


5
26.2
63.2
8.3
10
1.33 1.55 1.37
10.7
1.20 1.40 1.15
1.05 1.25 1.05
.95 1.05 .96
.70 .75 .70
.37 .50 .35
.15 .23 .15
18

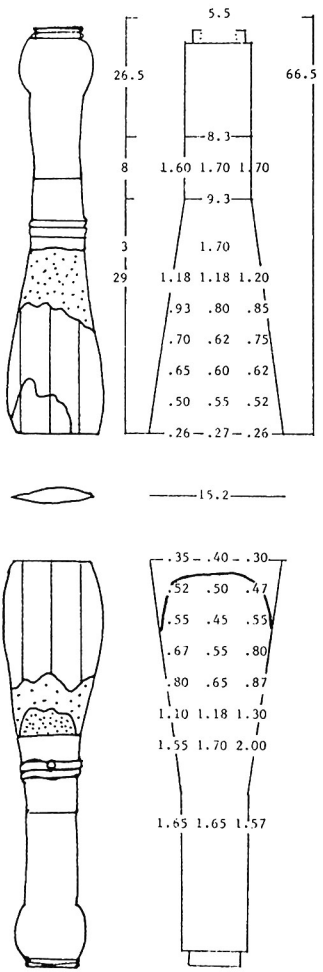

.24 .24 .24
.40 .50 .50
.65 .77 .80
.90 1.05 1.05
.95 1.15 1.10
.97 1.25 1.05
1.10 1.40 1.35

REED 3

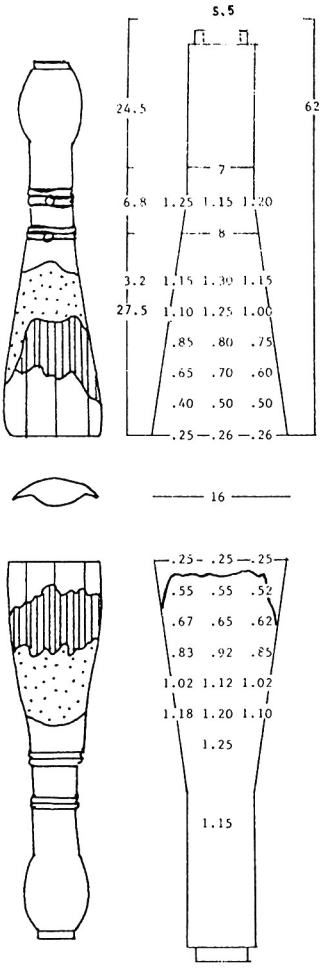

5.5
25.8
66.8
7.3
11
1.05 1.00 1.05
9
3
1.05 1.15 1.05
27
.85 .80 .80
.80 .62 .72
.80 .52 .57
.65 .50 .50
.52 .50 .37
.27 .26 .25
13.5


.25 .30 .30
.37 .35 .43
.62 .52 .60
.90 .60 .75
.95 .77 .75
1.05 1.10 .90
1.25 1.25 1.15
1.10 1.10 1.03
7.3

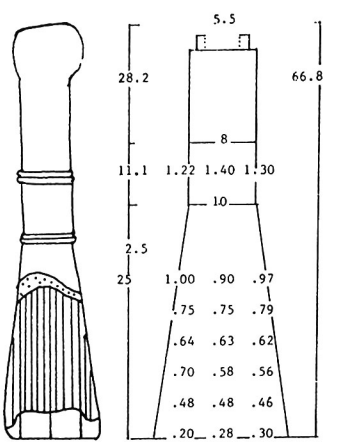
REED 4

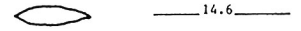

5.5
26.5
66.5
8
3
29
8.3
1.60 1.70 1.70
9.3
1.70
1.18 1.18 1.20
.93 .80 .85
.70 .62 .75
.65 .60 .62
.50 .55 .52
.26 .27 .26
15.2
.35 .40 .30
.52 .50 .47
.55 .45 .55
.67 .55 .80
.80 .65 .87
1.10 1.18 1.30
1.55 1.70 2.00
1.65 1.65 1.57

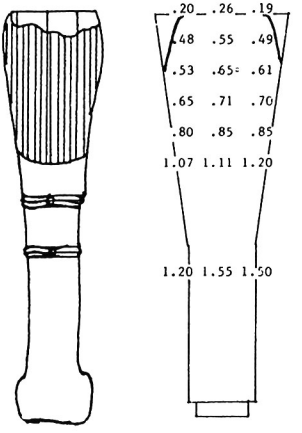
REED 5


5.5
24.5
62
6.8
3.2
27.5
7
1.25 1.15 1.20
8
1.15 1.30 1.15
1.10 1.25 1.00
.85 .80 .75
.65 .70 .60
.40 .50 .50
.25 .26 .26
16
.25 .25 .25
.55 .55 .52
.67 .65 .62
.83 .92 .85
1.02 1.12 1.02
1.18 1.20 1.10
1.25
1.15

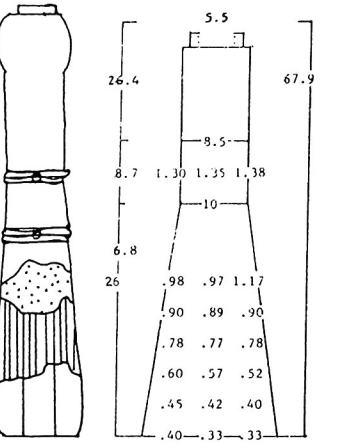
REED 6


5.5
28.2
66.8
8
11.1 1.22 1.40 1.30
10
2.5
25 1.00 .90 .97
.75 .75 .79
.64 .63 .62
.70 .58 .56
.48 .48 .46
.20 .28 .30

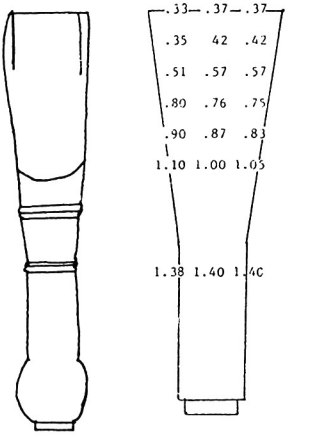

14.6


.20 .26 .19
.48 .55 .49
.53 .65 .61
.65 .71 .70
.80 .85 .85
1.07 1.11 1.20
1.20 1.55 1.50

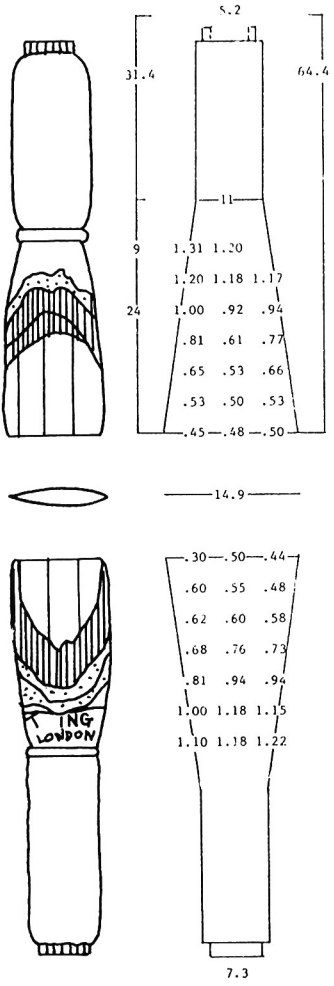
Reed 7


5.5
26.4
67.9
8.5
8.7 1.30 1.35 1.38
10
6.8
26 .98 .97 1.17
.90 .89 .90
.78 .77 .78
.60 .57 .52
.45 .42 .40
.40 .33 .33

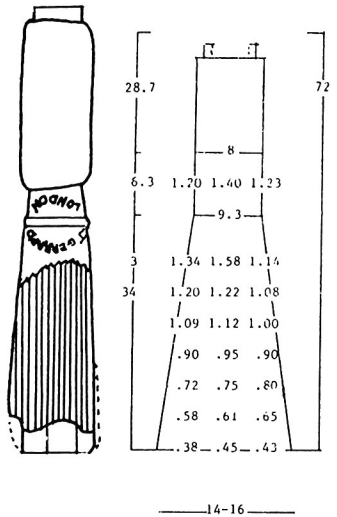

12.6

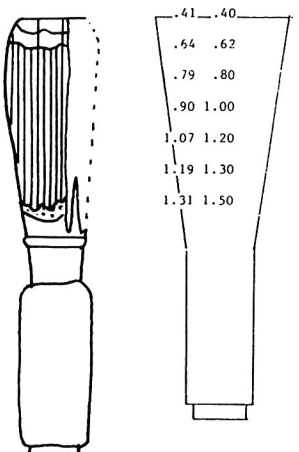

.33 .37 .37
.35 42 .42
.51 .57 .57
.80 .76 .75
.90 .87 .83
1.10 1.00 1.05
1.38 1.40 1.40

Reed 8

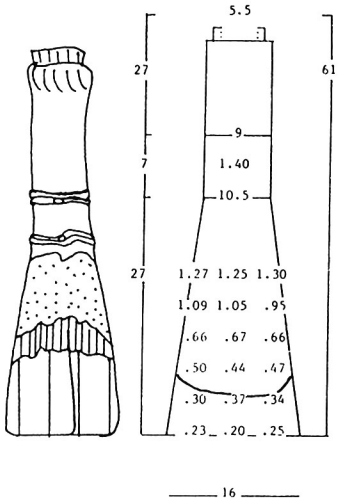


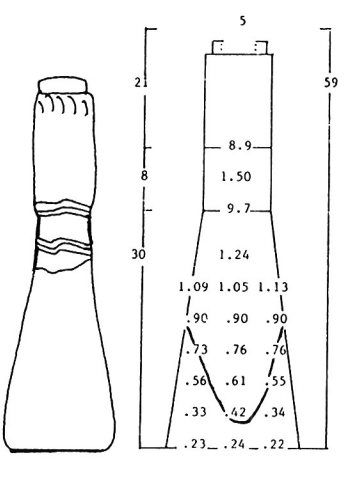
REED 9 REED 10



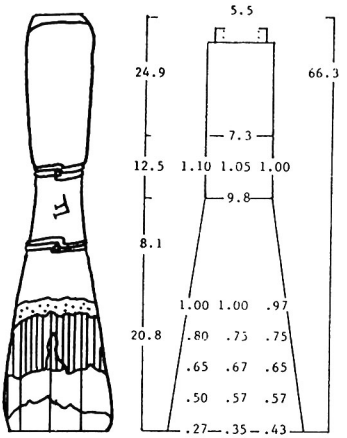


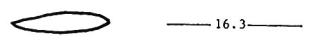
REED 11

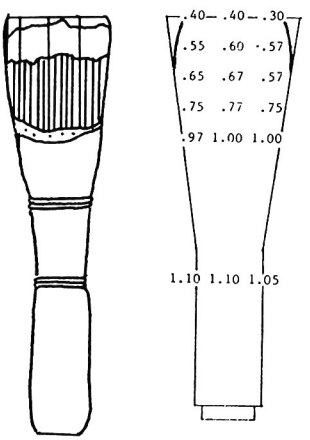




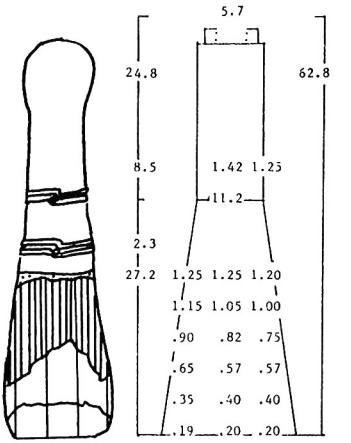
REEDS 12 (above) and 13 (below)

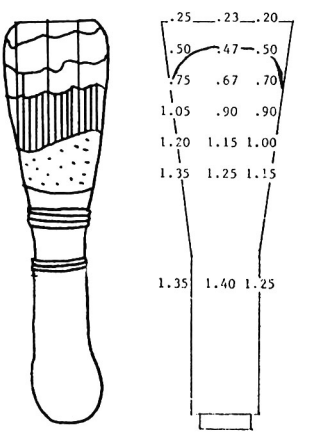




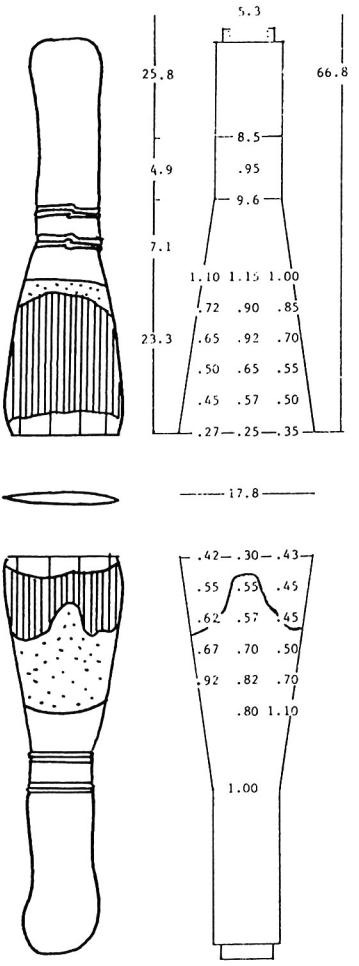


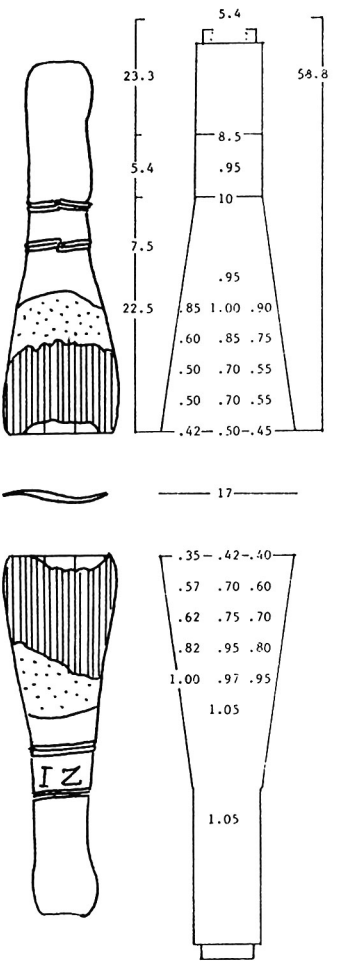
Reed 14





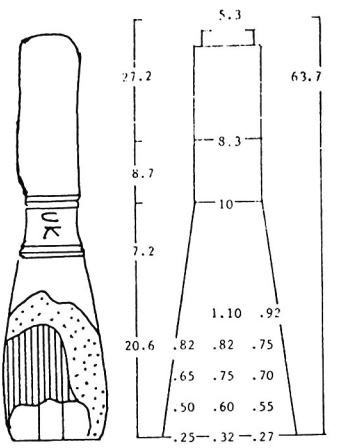
Reed 15

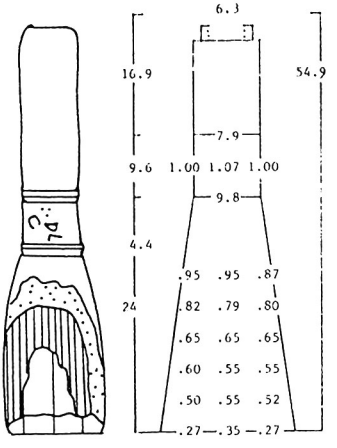




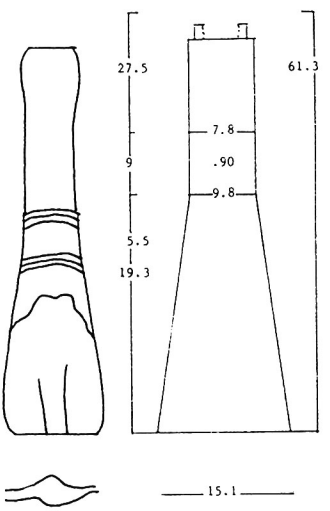
REED 16

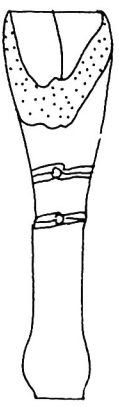
REED 17



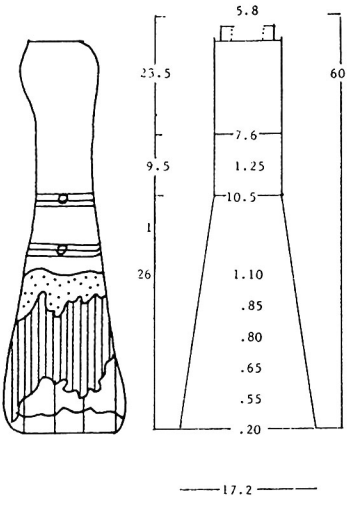


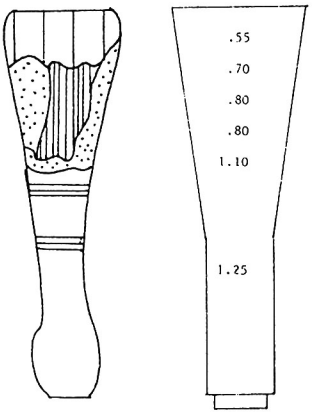
REED 18 REED 19



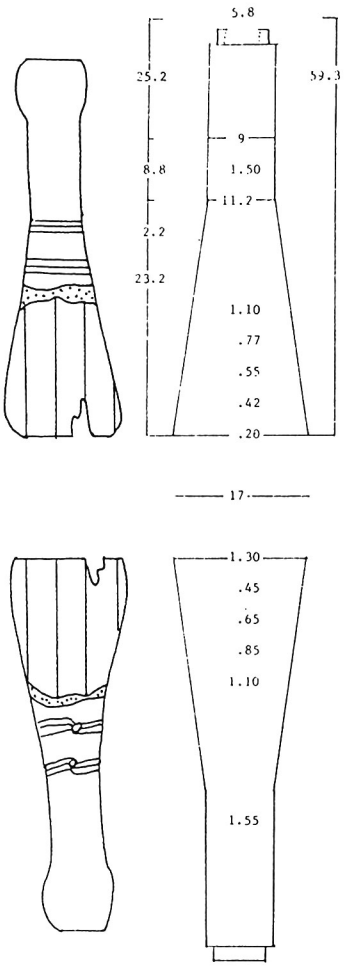


Reed 20

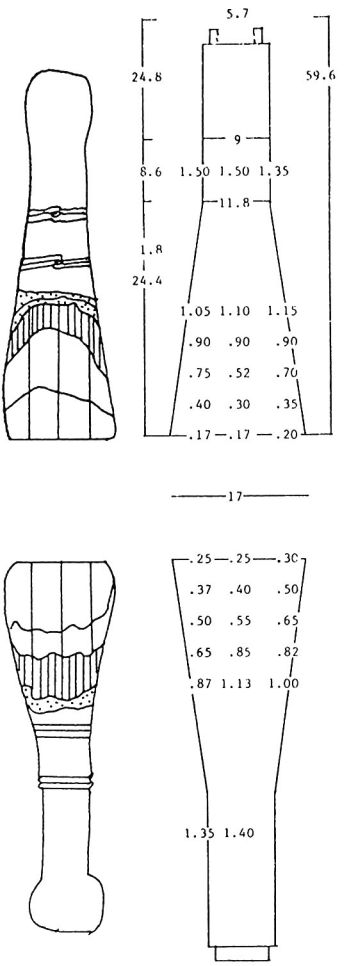




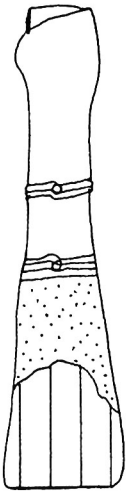
Reed 21

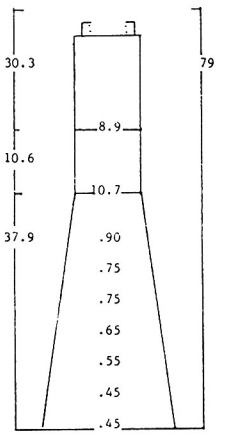


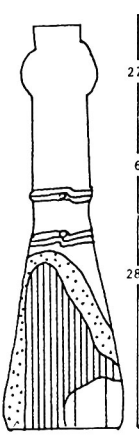
REED 22

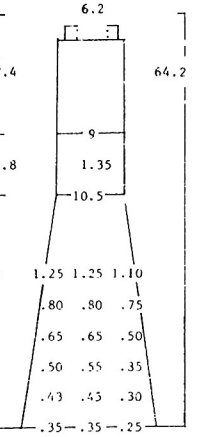


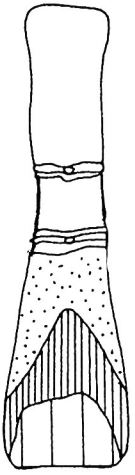
REED 23

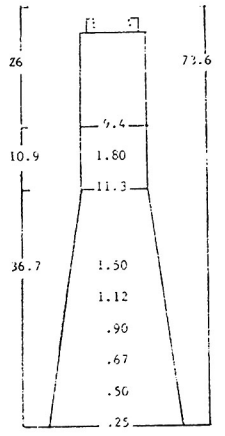


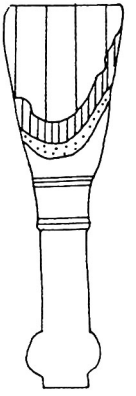


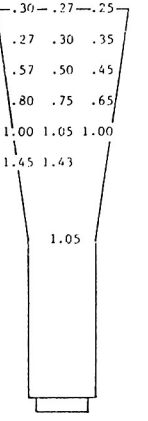


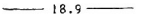






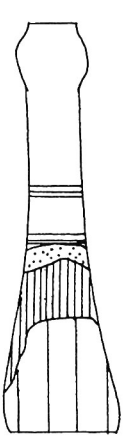


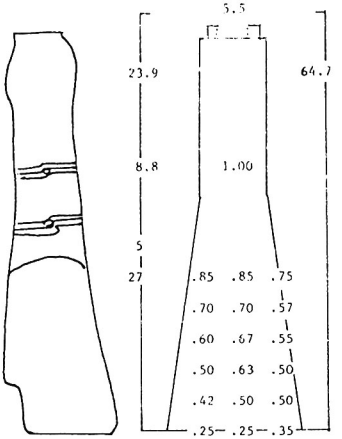




REEDS 24 (above) and 25 (below)

REED 26





REED 27

REED 28